

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Application of
Northern States Power Company d/b/a
Xcel Energy for Certificates of Need for
Four Large High Voltage Transmission
Line Projects in Southwestern Minnesota

**FINDINGS OF FACT,
CONCLUSIONS OF LAW
AND RECOMMENDATION**

A hearing was held before Beverly Jones Heydinger, Administrative Law Judge, commencing on May 6, 2002 at the Elks Club, 1105 Second Avenue, Worthington, MN, continuing at dates and places more specifically set forth below, and concluding on July 3, 2002 at the Public Utilities Commission, 121 Seventh Place East, St. Paul, MN.

Michael C. Krikava, and Lisa Agrimonti, Briggs and Morgan, P.A., 2400 IDS Center, 80 S. 8th St., Minneapolis, MN 55402, appeared on behalf of the Applicant, Northern States Power Company d/b/a Xcel Energy.

Julia E. Anderson, Assistant Attorney General, 525 Park St., Suite 200, St. Paul, MN 55103, appeared on behalf of the Department of Commerce.

Dwight S. Wagenius, Assistant Attorney General, 445 Minnesota Street, Suite 900, St. Paul, MN 55101-7345, and Michael Michaud, appeared on behalf of the Staff of the Minnesota Environmental Quality Board (EQB).

Laura and John Reinhardt, 3552 26th Avenue South, Minneapolis, MN 55406, appeared on their own behalf.

George Crocker, P. O. Box 174, Lake Elmo, MN 55042, appeared on behalf of the North American Water Office (NAWO).

Carol Overland, Attorney at Law, P.O. Box 559, Red Wing, MN 55066, appeared on behalf of the Public Intervenor's Network (PIN).

Paula Goodman Maccabee, Attorney at Law, 1916 Selby Ave., St. Paul, MN 55104, appeared on behalf of Sierra Club of MN Air Toxics Campaign (Sierra Club).

Peter T. Grills and Carl T. Williams, O'Neill, Grills & O'Neill, W1750 First National Bank Building, 352 Minnesota Street, St. Paul, MN 55101 and Beth Soholt, Senior Energy Associate, Izaak Walton League of America, Midwest Office, 1619 Dayton Ave.,

St. Paul, MN 55104, appeared on behalf of the Izaak Walton League of America (IWLA).

John R. Dunlop, Regional Manager, 448 Morgan Ave. South, Suite 300, Minneapolis, MN 55405, appeared on behalf of the American Wind Energy Association (AWEA).

Kevin Walli, Fryberger, Buchanan, Smith & Frederick, 386 North Wabash St., Suite 1190, St. Paul, MN 55102, David Benson, Task Force Chair, Nobles County Commissioner and Jack Keers, Pipestone County Commissioner, appeared on behalf of the Rural Minnesota Energy Task Force.

Two additional parties did not participate in the hearings. Michael Noble, Executive Director, Minnesota Building, Suite 600, 46 East Fourth Street, St. Paul, MN 55101, appeared on behalf of Minnesotans for an Energy-Efficient Economy (ME3). Deborah A. Amberg, Attorney at Law, 30 West Superior Street, Duluth, MN 55802, appeared on behalf of Minnesota Power.

Serving as public advisor, and present throughout the hearing was David Jacobson, staff member, Public Utilities Commission (PUC), Suite 350, 121 Seventh Place East, St. Paul, MN 55101-2147.^[1]

The last post-hearing memoranda were filed on October 9, 2002.

STATEMENT OF ISSUE

Should the Public Utilities Commission grant certificates of need to Xcel for four high voltage transmission lines?

RECOMMENDATIONS

1. That the Commission grant a certificate of need for a 161 kilovolt (kV) line connecting the Lakefield Junction Substation and Fox Lake Substation. This certificate of need should be contingent upon Xcel designating the contracts that increase generation from 300 megawatts (MW) to 468 MW as network resources and obtaining approval for network transmission service from the Midwest Independent System Operator (MISO).

2. That the Commission grant the three additional certificates of need required to implement Option 1H, subject to the following conditions:

a. A determination by the EQB that routing the three transmission lines included in Option 1H will not have a significantly greater negative effect on the environment than routing the three transmission lines included in Option 3, recognizing that the Buffalo Ridge to White line is part of both options.

b. Xcel demonstrate, prior to placing the additional three lines in service, that MISO has approved 825 MW of wind generation transmission requests that will connect through the Chanarambie or Yankee substations.

c. Xcel work with elected representatives and wind developers in southwestern Minnesota to establish the criteria for siting new substations in response to wind development and to clarify the costs borne by the generator and by Xcel.

d. Xcel file annual reports with the PUC that include the number of transmission requests pending with MISO from wind generators on Buffalo Ridge, and the number granted. Xcel shall also report annually on its efforts to facilitate small wind development (10 MW or less) on Buffalo Ridge.

FINDINGS OF FACT

Parties

1. Northern States Power Company d/b/a Xcel Energy (Xcel) owns and operates high voltage transmission lines in Minnesota, and delivers electricity to its customers in Minnesota and other states. On December 28, 2001, Xcel filed an Application with the Public Utilities Commission seeking approval of four Certificates of Need for new high voltage transmission lines to support further development of renewables-based electric power generation in southwestern Minnesota.^[2]

2. Laura and John Reinhardt are citizens of Minnesota with an interest in the taking of private lands by eminent domain for construction, operation and maintenance of high voltage transmission lines. In particular, they are concerned with the notice given to citizens, landowners and communities about the possibility that private lands will be affected if certificates of need are granted.^[3]

3. The Izaak Walton League of America (IWLA) is a conservation organization with over 40,000 members nationally, and about 2,000 who reside in Minnesota. Its members are interested in ensuring clean and sustainable energy through the development of renewable resources such as wind generation. The IWLA was a party to the Settlement Agreement in the merger of Northern States Power/New Century Energies, Inc. to form Xcel Energy, that required Xcel to undertake a transmission study of increased wind generation in Minnesota.^[4]

4. The Sierra Club is a national environmental organization with over 700,000 members nationally and approximately 19,000 members who reside in Minnesota. Since June, 2000, it has coordinated an Air Toxics Campaign to reduce air pollutants and protect the public health of adults and children in Minnesota. Its primary concern in this proceeding is to assure that the proposed transmission lines will be used for increased transmission of wind generation.^[5]

5. The Public Intervenors Network (PIN) is an organization of individuals who have studied facility siting. Its primary concern is to assure that the proper steps are taken to assure that the transmission lines are well-suited to Xcel's stated purpose of increasing outlet capacity for wind generation, and that capacity on any approved lines is reserved for wind generation.^[6]

6. The North American Water Office (NAWO) was chartered to educate the public and decision-makers about solutions to environmental problems. Since its inception in 1982 it has had a particular focus on electric utility wastes. Its primary interest in this proceeding is to assure that the transmission develops in a way that allows the expeditious installation of renewable distributed and dispersed generation capacity to serve the wholesale electric markets.^[7]

7. The American Wind Energy Association (AWEA) is the national trade association for the wind industry in the United States. Its members are involved in planning, contracting, permitting, siting, financing, scheduling, infrastructure development, equipment, construction, interconnection, operation and maintenance of wind energy development in Minnesota.^[8]

8. The Rural Minnesota Energy Task Force is an organization of 11 counties in southwestern Minnesota (Rock, Nobles, Jackson, Pipestone, Murray, Cottonwood, Lincoln, Lyon, Redwood, Renville and Mower Counties). It is interested in the development of wind generation in Southwestern Minnesota, assessing the impact of such development on the local infrastructure, and developing a transmission system that provides access for small-scale wind energy conversion systems.^[9]

9. Minnesotans for an Energy-Efficient Economy (ME3) is an organization that works on policy, outreach, education, and initiatives to transition Minnesota toward an energy system that is efficient, clean and fair. ME3 was a party to the settlement agreement that required Xcel to undertake the transmission study for increasing wind generation to 825 MW within Minnesota.^[10]

10. Minnesota Power, a division of ALLETE, Inc., provides retail electric service in northeastern Minnesota and northwestern Wisconsin. Minnesota Power may be directly affected by the determinations of need, and conditions placed on the certificates of need, if any. New transmission lines could affect its ability to move electricity and provide reliable service to its customers. The outcome may also affect possible future requests by Minnesota Power to build new transmission facilities.^[11]

11. The Environmental Quality Board (EQB) is the state agency responsible for the routing of transmission lines in the state under the Power Plant Siting Act.^[12] The EQB will prepare an Environmental Impact Statement on the project if any certificate of need is granted and the project proceeds to routing. The EQB has an interest in assuring that all environmental aspects of the size, type, and timing of the proposed transmission lines are fully developed in this proceeding since those issues may not be considered by the EQB during the routing process.^[13] The EQB may present its position regarding need and participate in the public hearing process prior to

the issuance or denial of a certificate of need.^[14] The primary purpose for intervention by the EQB staff was to assure full development of the record of the environmental impact of the proposed transmission lines.^[15]

12. The Department of Commerce is authorized by statute to participate in matters before the Public Utilities Commission involving utility rates and adequacy of utility services and intervene in certificate of need proceedings.^[16]

Procedural Summary^[17]

13. On December 28, 2001, Northern States Power Company d/b/a Xcel Energy (Xcel or the Applicant) filed an application with the Public Utilities Commission (PUC) under Minn. Stat. § 216B.243 and Minnesota Rules, Chapter 7849, for certificates of need to construct four high voltage transmission lines in southwestern Minnesota.

14. A certificate of need is required for construction of a “large energy facility,” which includes “any high voltage transmission line with a capacity of 200 kilovolts or more” and “any high voltage transmission line with a capacity of 100 kilovolts or more with more than ten miles of its length in Minnesota or that crosses a state line.”^[18]

15. On January 24, 2002, Xcel filed its first *Supplemental Filing*, providing new information and revising certain pages in the Application.

16. On February 11, 2002, the PUC issued an order finding that Xcel’s application was substantially complete as of January 24, 2002, and referring the matter to the Office of Administrative Hearings for a contested case hearing. The *Order Accepting Application as Substantially Complete* and *Notice and Order for Hearing* were published in the State Register on February 11, 2002.^[19]

17. On February 27, 2002, the Reinhardtts filed a *Motion for Consolidation of Transmission Line Proceedings to Grant Due Process to Affected Citizens*, requesting that the Administrative Law Judge (ALJ) combine the Certificate of Need process with the EQB’s siting process.

18. On March 1, 2002, the First Prehearing Conference was held in St. Paul, MN, at the Public Utilities Commission.

19. On March 7, 2002, the ALJ issued the *First Prehearing Order*, establishing a schedule, setting procedures, and denying the Reinhardtts’ February 27 Motion.

20. On March 25, 2002, Xcel submitted its second *Supplemental Filing* adding Appendices 4 through 7 to the Application.

21. On April 11, 2002, Xcel filed a *Motion and Memo to Limit Scope of Evidence at Hearing*. The Motion was opposed by the Reinhardtts, Sierra Club, NAWO, PIN, EQB and the Department of Commerce.

22. The ALJ issued the Fifth Prehearing Order on April 30, 2002 addressing previously filed motions and petitions, and denied Xcel's Motion of April 11.

23. Petitions to Intervene were granted to the Reinhardtts, NAWO, IWLA, ME3, AWEA, Sierra Club, PIN, Rural Minnesota Energy Task Force, and Minnesota Power and the EQB.

24. On May 1, 2002, a Second Prehearing Conference was held in St. Paul, MN at the Public Utilities Commission.

25. Notice of the Hearing was published in the Minneapolis Star Tribune, the St. Paul Pioneer Press and 33 additional newspapers in 14 counties throughout southwestern Minnesota.^[20] The notice included information on the hearing schedule, as well as information on the availability of Xcel's Draft Environmental Report.^[21]

26. As set forth in the published notices, public hearings were conducted:

- a. May 6 and 7, 2002 at the Elks Lodge, 1105 Second Avenue, Worthington, MN;
- b. May 8, 2002 at the Pipestone County Court House, 415 Hiawatha Avenue South, Pipestone, MN;
- c. May 9, 2002 at the Redwood Area Community Center, 901 Cook Street, Redwood Falls, MN;
- d. May 13 and 14, 2002, Holiday Inn East (I-94 and McKnight Road), 2201 Burns Avenue, St. Paul, MN.

27. Evidentiary hearings were also held at the dates and places set forth above, and continued on the following dates:

- a. May 15-17, 2002, Holiday Inn East (I-94 and McKnight Road), 2201 Burns Avenue, St. Paul, MN;
- b. May 20-24, and 29, June 25-28, 2002, Centennial Office Building, 658 Cedar Street, St. Paul, MN;
- c. July 3, 2002, Large Hearing Room, Public Utilities Commission, 121 Seventh Place East, St. Paul, MN.

28. On May 13, 2002, the ALJ issued a *Protective Order*, establishing procedures for handling nonpublic data.

29. On May 14, 2002, Xcel dropped its request in the application for a finding that all investment costs to increase outlet capacity from Buffalo Ridge are eligible for cost recovery under Minn. Stat. § 216B.1645.^[22]

30. Xcel filed a *Motion to Reconsider Ruling Precluding Admission of Evidence Relating to Option 1H* on May 20, 2002. The Motion was argued May 29, 2002, and granted orally on that day.^[23] A written *Order Ruling on Motions and Scheduling* was issued on June 4, 2002.

31. The evidentiary hearing adjourned on July 3, 2002.

32. On July 22 and 23, 2002, Comments to the Draft Environmental Report were filed by the Reinhardts, the Department of Commerce, NAWO, EQB, PIN, and Sierra Club. On July 23, 2002, PIN also filed a *Motion to Compel Discovery of Line Loss Modeling Based on Averages and Modeling Assumptions*.

33. On August 5, 2002, Xcel filed its *Memorandum in Opposition to Motion of Public Intervenors Network for Reconsideration*, opposing PIN's July 23rd Motion. PIN filed a Reply on August 7, 2002. The ALJ issued an order on August 8, 2002 denying PIN's July 23rd Motion.

34. On August 12, 2002, Xcel filed its Responses to Comments on the Draft Environmental Report. The Final Environmental Report (the Draft Report, Comments and Response) was distributed, and notice of completion was published in the EQB Bulletin on September 16, 2002.^[24]

35. Twelve written comments were filed by members of the public who were not parties.^[25]

36. The final posthearing submission was filed on October 9, 2002.

37. In its posthearing brief, IWLA requested that the Minnesota Energy Planning Report 2001, prepared by the Department of Commerce, be added to the record. Pages 35-39, 97-103, and 108 were previously received.^[26] There were no objections. The Report is a widely available public document. Xcel requested the addition of PUC Staff Briefing Paper re: MAPP II LLC, September 25, 2002. There were no objections.

Position of the Parties

38. Xcel seeks certification for four high voltage transmission lines collectively described as Option 1H. IWLA, ME3, AWEA and the Department of Commerce support Option 1H with certain conditions. The conditions are intended to increase the likelihood that the transmission lines will provide outlet capacity for wind generation. NAWO and the Rural Minnesota Energy Task Force support Option 1H if the commission also requires Xcel to develop a low-voltage collector system to facilitate development of locally-owned wind generation.

39. The Sierra Club and PIN support Option 3, with conditions.

40. The Reinhardts oppose any certificate of need.

41. The EQB and Minnesota Power took no position.

Notice of the Hearing

42. In addition to publishing notice in 35 newspapers, Xcel sent out a brochure to approximately 14,000 customers in the area of Buffalo Ridge explaining that new transmission lines were needed to support development of wind power. The brochure included the dates of the public hearings in Worthington, Pipestone and Redwood Falls, and additional "Informational Open Houses" in Lake Benton, Luverne and Worthington held prior to the public hearings.^[27] Route corridor maps were available to the public at the open houses and at the public hearings.^[28]

43. The notice did not inform landowners that construction of a transmission line could require new rights-of-way or the taking of private property through eminent domain.^[29]

The Application

44. Xcel is seeking certificates of need to construct new high voltage transmission lines. Xcel filed its initial application on December 31, 2001^[30] and supplemented it on January 24, 2002.^[31] Additional supplements were filed on March 25, 2002^[32] and on April 2, 2002.^[33] A consolidated application, with all supplements merged was provided at the hearing.^[34]

45. In its application, Xcel identified a need to increase its capacity to transmit electricity generated by wind power out of the area in southwestern Minnesota referred to as Buffalo Ridge. To increase its transmission capacity to 825 MW, Xcel proposed construction of four new high voltage transmission lines, each of which requires a certificate of need, and additional projects related to the upgrade that do not require a certificate of need.^[35]

46. Xcel offered four options for increasing the outlet capacity for energy generated by wind on Buffalo Ridge. Those options are set forth in detail in the application. During the hearing, Xcel offered a variation, Option 1H, that became its preferred option.

Development of Wind Power

47. The State of Minnesota has a vital interest in developing and using renewable energy resources wherever possible. It is in the public interest to encourage programs that will minimize the need for increased fossil fuel consumption.^[36]

48. The Legislature has set aggressive goals for developing sources of renewable energy. Commencing in 2005, each utility must make a good faith effort to have at least one percent of its electric energy provided by renewable resources, and to increase that amount by one percent per year through 2015. By 2015, the goal is that ten percent of the electric energy provided to retail customers in Minnesota shall be generated from renewable energy sources. One thousand seventy (1070) MW of wind,

operating at 30 percent capacity, would meet this goal.^[37] The Legislature has required regular progress reports.^[38]

49. Xcel must have 425 MW of wind generation under contract by December 31, 2002.^[39] In addition to the initial 425 MW, Xcel is required to construct and operate, purchase, or contract to purchase an additional 400 megawatts of wind generation by 2012. It is expected to do so through an all-source competitive bidding process. Xcel is not required to add all of the additional wind capacity on Buffalo Ridge.^[40]

50. Electric utilities are required to submit integrated resource plans explaining how they will meet 50 and 75 percent of all new and refurbished capacity needs through a combination of conservation and renewable energy resources. The PUC may not approve a certificate of need or allow rate recovery for a non-renewable energy facility unless the utility has demonstrated that a renewable energy facility is not in the public interest.^[41]

51. Electric utilities are required to offer their customers the opportunity to purchase electricity generated from renewable or high efficiency sources.^[42]

52. As an incentive, utilities are allowed automatic rate adjustments to recover expenses for transmission costs directly allocable to the need to transmit power from renewable sources of energy to a utility's retail customers.^[43]

53. Wind is generally the lowest cost renewable resource.^[44]

54. Buffalo Ridge is a terminal moraine that runs from northwest to southeast, roughly between Lake Benton and Worthington in southwestern Minnesota. It extends northwest into South Dakota. Buffalo Ridge divides the Mississippi River and Missouri River watersheds.^[45] The U.S. Department of Energy, National Renewable Energy Laboratory, has determined that Buffalo Ridge has good to outstanding potential for developing energy generated by wind.^[46] This was corroborated by several of the witnesses.^[47]

55. At the time that this proceeding commenced, 450 wind turbines capable of producing, in the aggregate, about 300 MW of electricity were installed on Buffalo Ridge.^[48] The current transmission system is adequate to meet this level of output.^[49] Xcel has firm commitments for the 425 MW of wind power it is required to have under contract by the end of 2002.^[50] New contracts allow Xcel to limit purchases when transmission capacity is not available.^[51]

56. Only one certificate of need, for the Lakefield Junction to Fox Lake 161 kV line, is needed to provide transmission for the 425 MW of wind power under contract.^[52]

57. There is a high level of interest in more wind development along Buffalo Ridge.^[53] Advancements in wind technology have increased its productivity and reliability while lowering the cost.^[54]

58. Xcel has received transmission interconnection requests from wind-powered generation facilities. Requests that have been formally filed with the Midwest Independent System Operator (MISO) would add 436 MW of new wind-powered generation.^[55]

59. Xcel is currently evaluating responses to its 2001 all-source request for bids. Bids were submitted for about 3700 MW of wind generation, with 700-1000 MW from the Buffalo Ridge area. The balance was sited in the Dakotas or in Minnesota east of Buffalo Ridge.^[56] At the time of the hearing, no bids had been selected. Xcel plans to present its final selections to the PUC by the end of 2002. Xcel cannot assure that any of the bids for wind generation on Buffalo Ridge will be selected in this bid process.^[57] The goal of the all-source bid process is to add 1000 MW between 2005 and 2009.^[58]

60. Xcel has also issued a Request for Proposals for contingency replacement of 1100 MW from the Prairie Island Nuclear Power Plant in the event the plant closes. It is seeking 550 MW of power deliveries in 2007 and the remaining 550 MW for deliveries beginning in 2008.^[59]

61. Small wind developers (up to 12 MW) can negotiate sale of wind generation directly with Xcel. They are not subject to the bid process and receive some financial incentives. Xcel has no estimate for the megawatts that may be purchased through this process.^[60]

62. Wind projects less than 2 megawatts receive a small production incentive from the State of Minnesota that helps lower the costs to the producer.^[61]

63. During the Xcel merger proceeding Xcel entered into an agreement with ME3, the Environmental Law and Policy Center of the Midwest, and the IWLA. Xcel agreed to conduct studies to determine what transmission upgrades would be needed to move a total of 825 MW of wind generation from within the State of Minnesota. Xcel agreed to review the most feasible transmission alternatives and seek the necessary regulatory approvals. Xcel also agreed to work with the parties to the agreement to remove any identified impediments so that wind energy could be competitive in an all-source bidding process.^[62]

64. Typically, wind generators do not operate at full capacity; generation is dependent on the wind blowing at an adequate speed. On an annual basis, wind generation is estimated to operate at about 30 to 35 percent of its full capacity.^[63]

65. Xcel has demonstrated that there is a very high probability that 825 MW of wind generation will develop on Buffalo Ridge if transmission outlet capacity is available.

FERC and MISO Authority

66. The proposed transmission lines will be subject to the Federal Energy Regulatory Commission's (FERC) jurisdiction and under the control of the Midwest

Independent System Operator (MISO).^[64] MISO was formed in response to FERC Order No. 2000 and has been approved by FERC as a Regional Transmission Organization (RTO).^[65] As an RTO, MISO's primary responsibilities are to ensure the reliability of the transmission system within its region, to coordinate regional transmission planning, respond to transmission service requests and constraints, and to administer a single system-wide open access tariff. Xcel became a member of MISO pursuant to a FERC Order approving the formation of Xcel Energy Inc.^[66]

67. Xcel is also a member of the Mid-Continent Area Power Pool (MAPP). MAPP is a voluntary organization intended to coordinate regional electric utility operations. It includes all of Minnesota and three other states, and portions of five other states and two Canadian provinces.^[67] MISO will take over several regional transmission functions from MAPP; that transition is in progress.^[68]

68. In Order No. 888, issued in 1996, FERC ordered all public utilities under its jurisdiction, including Xcel, to file an "open access transmission tariff" (OATT) setting forth transmission service terms and conditions available to all. Once a transmission line is built, the line must be operated according to the OATT.^[69] At the same time, the utilities were required to develop a same-time information system so that all potential and existing transmission users would have the same access to transmission information that the utility has. It is called the "Open Access Same-Time Information System" (OASIS).^[70]

69. As an RTO, MISO will take over operation of OASIS for its members, calculate Total Transmission Capability (TTC) and Available Transmission Capability (ATC), and administer the open tariff. It will also take over functional control of Xcel's transmission system.^[71]

70. In order to receive transmission services, wind generators must follow the interconnection procedures of MISO.^[72] There are expedited procedures for generators less than 20 megawatts.^[73]

71. Transmission capacity must be made available to any eligible customer on a non-discriminatory basis.^[74]

72. Xcel has no special right to access the transmission lines it builds.^[75] However, a utility can identify generation it owns or has under contract as a "network resource." A "network resource" is generation that the utility has designated to serve its own retail and wholesale power customers, referred to as "native load."^[76] A utility such as Xcel that is a "load serving entity" (LTE), may be able to reserve transmission capacity to serve its native load.^[77]

73. Xcel cannot guarantee that new transmission lines will serve only generation from renewable energy resources,^[78] and the lines were not designed to serve one form of generation.^[79]

74. Xcel did not study the effect that additional coal generation in North or South Dakota might have on its proposal and is not aware of any firm proposals to use the proposed transmission lines for that purpose.^[80]

75. Ordinarily a generator requests interconnection from MISO under the OATT. The application must include:

- a. location of the proposed generating facility;
- b. the planned maximum megawatt electrical output;
- c. the planned in-service date; and
- d. a deposit to cover the costs of interconnection and facilities studies.^[81]

76. Once the application is complete, the applicant is placed in the MISO queue and an Interconnection Evaluation Study is conducted. Phase 1 of the study includes a power flow analysis. Phase 2 involves short-circuit and stability analyses. Once the study is completed, an Interconnection Facilities Study is initiated. The product of this study is “a detailed estimate of construction costs and schedule to provide any necessary system upgrades required for interconnection.” Following completion of both studies, the Interconnection and Operating Agreement is negotiated between the generator and MISO.^[82]

77. Xcel has already received interconnection requests from the Buffalo Ridge area that would add 436 MW of new wind-powered generating capacity. If all of these projects are completed, the full 835 MW of transmission outlet capacity would be used.^[83] Total interconnection requests far exceed current outlet capacity.^[84]

78. Power customers, the purchasers of the generation, ordinarily apply for and own transmission rights.^[85]

79. At the time of the hearing, the process for a utility to identify generation as a network resource and reserve transmission service was in flux. MISO had submitted tariff provisions to FERC and approval was pending. Xcel anticipates that it will be able to reserve transmission capacity for new generation to the extent it can either designate new generation as a network resource or identify future load growth.^[86] If Xcel reserves capacity that is not currently needed, it must be made available to others until the capacity is actually needed and used.^[87]

80. It is not clear whether a letter of intent between Xcel and a wind generator would be sufficient documentation to designate the new generation as a network resource, or whether an approved power purchase agreement (PPA) will be required.^[88]

81. Xcel has received transmission requests from wind energy vendors sufficient to use all of the proposed increased transmission outlet capacity.^[89] Under the

federal tariff, Xcel must attempt to increase transmission capacity to accommodate new generation.^[90]

82. Xcel is required to file reports with the PUC concerning changes in FERC or MISO rules, policies, standards, tariffs or plans that may affect Xcel's delivery of transmission service.^[91]

83. Xcel and other energy companies are seeking approval from FERC to establish an independent transmission company, to be called TRANSLink, to operate the companies' transmission assets, through some combination of ownership, leases and/or operating agreements. At the time of the hearing Xcel anticipated that transmission lines governed by this application would be operated by Xcel and not TRANSLink.^[92]

Description of the Options

84. In its application, Xcel presents detailed information about four options. Other options were considered, and briefly discussed. In response to concerns raised during the hearings conducted in southwestern Minnesota about the lack of outlet capacity from the northern portion of Buffalo Ridge, Xcel proposed a variation of Option 1, referred to as Option 1H. All five options are designed to produce 825 MW of outlet capacity. All options meet the Power System Performance Standards established by the North American Electric Reliability Council (NERC).^[93] In addition to the new transmission lines, all options include many upgrades to existing transmission lines, rebuilds and new facilities on Buffalo Ridge and on other parts of the system that would be affected by an increase of generation outlet on Buffalo Ridge.^[94]

85. Option 1 includes:

161 kV Lakefield-Fox Lake (24 miles)

345 kV Split Rock-Lakefield (94 miles)

115 kV Chanarambie-Fenton-Nobles Co. (24 miles)

115 kV Fenton-Nobles Co. (14 miles)

86. Option 1 includes four new high voltage transmission lines requiring a certificate of need. Its distinguishing feature is a 345 kV transmission line approximately 94 miles long, connecting Split Rock Substation near Sioux Falls, SD and Lakefield Junction Substation near Lakefield, MN. Approximately 80 miles of the line will run through Rock, Nobles and Jackson Counties in Minnesota. The new line would require a new 150-foot wide right-of-way, and would be built on structures approximately 100 feet tall, and approximately 900 feet apart.^[95] Many other system upgrades are part of this option, including reconductoring several existing lines. Option 1 also requires the construction of a new Nobles County substation. A second substation at Fenton Township will be needed when generation on Buffalo Ridge exceeds 690 MW under this

option.^[96] Figure 3-1 in the combined application shows the general area where the new lines included in Option 1 would be located.^[97]

87. Option 1H includes:

161 kV Lakefield-Fox Lake (24 miles)

345 kV Split Rock-Lakefield (94 miles)

115 kV Chanarambie-Fenton-Nobles Co. (24 miles)

115 kV Buffalo Ridge-Yankee-White SD (26 miles)

88. Option 1H includes four new transmission lines requiring a certificate of need and numerous other system upgrades, including reconductoring a number of existing lines. Up to 690 MW, it is virtually identical to Option 1.^[98] Option 1H includes construction of the new Nobles County Substation, and potentially a second substation at the Yankee site.^[99] Although this option was introduced during the course of the proceeding, all four of the transmission facilities that make up this option were originally included in either Option 1 or Option 3. It includes the 94-mile 345 kV line from Split Rock Substation to Lakefield Junction from Option 1. It also includes one of the two proposed lines from Nobles to Fenton to Chanarambie that is included in Option 1. Option 1H differs from Option 1 in that it replaces the second Nobles-Fenton line with the Buffalo Ridge to White line that is included in Option 3. In Option 1H, the Buffalo Ridge to White is not needed until 690 MW capacity is reached.^[100]

89. Option 3 includes:

161 kV Lakefield-Fox Lake (24 miles)

161 kV Chanarambie-Heron Lake (52 miles)

115 kV Lyon Co-Franklin (44 miles)

115 kV Buffalo Ridge-Yankee-White SD (26 miles)

90. Option 3 includes four new transmission lines that require certificates of need, and numerous other system upgrades. Two of the four lines included in Option 3 are identical to Option 1H, the 161 kV Lakefield to Fox Lake line, and the 115 kV Buffalo Ridge to White line. This option does not require the 345 kV line that is part of Option 1 and Option 1H.^[101] Each of the new transmission lines would be placed on structures about 75 feet tall, with 400 foot long spans between structures. The two 115 kV lines would require a 75-foot-wide right-of-way; the 161 kV lines would require an 80-foot-wide right-of-way.^[102] Figure 3-2 shows the general area where the new lines included in Option 3 will be located.^[103]

91. Option 4 includes:

115 kV Lyon Co-Franklin-Fort Ridgely (72 miles)

161 kV Lakefield-Fox Lake (24 miles)

This option requires two new transmission lines and other system upgrades.^[104] Figure 3-3 shows the general area where the two new lines would be located.^[105]

92. Option 5 includes:

161 kV Lakefield-Fox Lake (24 miles)

93. Option 5 includes only one new transmission line but requires many upgrades to the existing system.^[106] It was referred to as the “Reconducting Only” option, although it does require one certificate of need for the 161 kV line that is common to all options.^[107] Option 5 minimizes the need for new right-of-way. Figure 3-4 shows the general area where the new line included in Option 5 will be located.^[108]

94. In addition to the five options that were fully developed, Xcel conducted a preliminary review of additional options, Options 1D, 1E and 6. Information about the options was included in the March 25, 2002 supplement to the Environmental Report.^[109] These options were rejected because they compared poorly on cost or performance. No party advocated for any of the screened options.

95. Option 1D is identical to Option 1 except that it includes a double circuit 345 kV line between Split Rock and Lakefield Junction rather than a single circuit 345 kV line.^[110]

96. Option 1E is nearly identical to Option 1, except it provides for a 500 kV rather than a 345 kV line between Split Rock and Lakefield Junction. It would require step up transformers at Split Rock and Lakefield Junction and an interconnection to the 500 kV line with transformation to 115 kV at the new Nobles County Substation. This additional capacity would allow the line to handle additional power in the future and would add reliability to the system. It is also more expensive than a 345 kV line.^[111]

97. An applicant for a certificate of need for a high voltage transmission must address the possibility of a direct current (DC) transmission line.^[112] Xcel proposed Option 6 as a DC option. It includes a 180-mile long high voltage DC line. It also includes a 25-mile 345 kV line from a tap point on the Split Rock to White 345 kV line in South Dakota to the Chanarambie substation and the same 161 kV line between Fox Lake and Lakefield Junction that is part of the other options.^[113] The EQB questioned whether the DC alternative was fully analyzed and presented.

98. Xcel’s explanation for discarding the DC Circuit option is spelled out in its application.^[114] Most of the electrical deficiencies associated with increased generation development on Buffalo Ridge would not be addressed by a DC circuit. It is not easy to integrate DC and AC circuits. A DC Circuit is a better alternative for transporting power long distances of several hundred miles without intermediate connections. Xcel has provided sufficient justification for eliminating the DC circuit as a viable alternative.

99. Only Options 1, 1H, 3 and 5 were developed at hearing. For these options, there was substantial evidence for each of the criteria set forth in Minn. R. 7849.0120.^[115] There was no support for Options 4, 1D, 1E or 6, and no evidence that they were preferable to Option 1H.

100. All options include many upgrades to existing transmission lines, rebuilds and new facilities, on Buffalo Ridge and on other parts of the system that would be affected by an increase of generation outlet on Buffalo Ridge.^[116]

101. All options require a certificate of need for a 161 kV transmission line connecting Lakefield Junction and Fox Lake Substations. The line would be approximately 24 miles long, placed on structures spaced about 600 feet apart, on a right-of-way 80 feet wide.^[117]

102. Each of the options also includes a new 115 kV line to connect the Chanarambie Substation, the Lake Yankton Substation, and a new substation near Marshall. This line runs through Murray and Lyon Counties. Approximately 40 miles of existing 69 kV lines would be upgraded, and about 20 miles would require new construction along a new 75-foot right-of-way. No certificate of need is required for this new line.^[118]

103. Gantt charts included in the application display the projected timing to complete the common projects and the necessary elements of Options 1, 1H, 3 and 5. Xcel projects that all elements of each option could be completed by the end of 2006 if Xcel receives the required regulatory approvals.^[119]

104. No option includes a “collector” system. A collector system is the infrastructure needed to move wind-generated electricity from the wind generator onto the transmission line.^[120]

105. A large wind project developer will ordinarily create a collector system to tie together the wind generators and connect to one or more distribution lines to a substation.^[121]

106. Smaller projects may be impeded by the lack of a collection system.^[122]

107. At this time, Xcel does not have a written policy that clarifies when and under what conditions it will construct substations or 35 kV lines to “collect” the electricity that is generated by wind turbines dispersed throughout Buffalo Ridge.

Criteria to Evaluate Need for the Proposed Transmission Lines

108. The two options best supported by the record are Option 1H and Option 3. Exhibits 732 and 733 show the location of the proposed common projects, the proposed elements of Options 1H and 3, and the proposed transmission line corridors.

109. The criteria for evaluating an application for a certificate of need are set forth at Minn. Stat. § 216B.243, and elaborated at Minn. R. 7849.0120. Each of the rule criteria is addressed below.

A (1). Accuracy of the Applicant's Forecast of Demand for the Type of Energy that Would Be Supplied by the Proposed Facility.

110. Xcel has repeatedly asserted throughout the course of these proceedings that it is seeking approval for transmission lines solely to support existing and new wind generation developing in the area of Buffalo Ridge. It has no other justification for constructing any of the facilities and does not claim any need for transmission capacity to serve any other form of generation.^[123] Its application did assume that a 55 MW biomass facility in Benson, MN would come on line and be supported by each option. That generation is not included in the 825 MW goal for wind generation.^[124]

111. Xcel's application was not driven by increased demand for electricity. However, the Department of Commerce did review the forecast information in Appendix 1 to the Application and concluded that the data were consistent with the Xcel's previous forecasts.^[125]

112. There is tremendous potential for wind energy development in the area of Buffalo Ridge.^[126] MISO has received many requests for transmission service for the Buffalo Ridge, and a substantial proportion is for wind generation.^[127] However, at this time, the precise location of the development beyond 425 MW, the number of megawatts that will be developed, and the timing of the development is uncertain.^[128]

113. In prior dockets, the PUC has accepted Xcel's overall forecasts of energy requirements for planning purposes, and approved its 2000 Integrated Resource Plan.^[129] There have been no significant changes since those forecasts were made.^[130]

114. Not all of the wind development will use Xcel's transmission facilities. Many of the requests for transmission service seek service from other transmission providers.^[131] Some of the generators requesting service will not be located in Southwestern Minnesota.^[132]

115. The requested certificates of need are not intended to serve a specific generator or to meet a specific load.^[133] The load served in the Buffalo Ridge area is small and well below the current level of generation. Local growth and demand will have little effect on the development of wind power, or on the use of the proposed transmission lines. The articulated need for the additional transmission is to further a policy goal of developing more wind power. More wind development will require more transmission outlet.^[134]

116. The timeline for developing wind generation, including contracting for the wind and constructing the generating facilities, is relatively short. Contracts can be negotiated and wind turbines installed in two years or less.^[135] In comparison, it takes several years to install transmission lines.

117. Once built, the transmission lines become part of an integrated regional transmission system that delivers power throughout the midwest region. The integrated transmission system serves native load, provides emergency ties to other regions, and also is regularly used for bulk power transfers between regions of the country. Because of the low cost of energy generated in the Midwest, the region increasingly exports electricity to other regions. In addition, the overall demand for electricity is projected to slowly rise.^[136]

118. It is very probable that additional wind generation will develop on Buffalo Ridge, but it is not certain. At this time, the proposed transmission lines are not needed to serve any other type of generation.

119. In evaluating the transmission outlet capacity, Xcel considered the effect of increased generation connecting to the transmission system through the Chanarambie substation about 15 miles east of Pipestone, MN. (100% Chanarambie). It also evaluated the effect if the new generation split between Chanarambie and a new "Yankee" substation on the northern part of Buffalo Ridge (50% Chanarambie, 50% Yankee). Both Option 1H and Option 3 can be modified to meet either the 100% Chanarambie or the 50/50 scenario as wind generation is sited. Both are flexible enough to accommodate increased development on both the northern and southern ends of the Ridge.^[137]

120. Virtually all of the modeling done to support the application assumed that new generation would be served by the Chanarambie or Yankee substations or the existing "Buffalo Ridge" substation located near Lake Benton, MN.^[138] None of the studies considered new generation originating elsewhere.

121. The proposed transmission lines do not generate electric power by means of a nonrenewable energy source, and the sole stated purpose is to transmit electric power generated by a renewable energy source.^[139]

122. Delay of approval of the certificates of need will not adversely affect Xcel's ability to serve its customers, neighboring systems or the overall availability of electric power.^[140]

123. Denial of the certificates of need will make it more difficult for the State to reduce its dependency on fossil fuels and increase development of renewable forms of energy.

A (2). Effects of the Applicant's Existing or Expected Conservation Programs and State and Federal Conservation Programs.

124. Xcel has consistently exceeded its energy saving goals.^[141] It has set future goals, participated in the Conservation Improvement Program administered by the Department of Commerce, and participated in other conservation planning efforts.^[142] No party presented evidence that conservation practices could diminish the need for increased transmission outlet capacity from Buffalo Ridge.

A (3). Effects of the Applicant's Promotional Practices.

125. There was no evidence that Xcel has engaged in promotional practices that have increased the demand for electricity. Xcel has publicized the need for additional transmission capacity from the Buffalo Ridge area and enlisted public support.^[143]

126. The Legislature, the PUC, and the Department of Commerce have encouraged increased generation from wind and other renewable resources.^[144]

127. In general, developing a regional transmission system and opening up access to it has increased power market activity because of the low cost of energy in the Midwest region. This has strained the existing transmission system and limits exports from the region.^[145]

A (4). Ability of Facilities that Do Not Require Certificates of Need to Meet the Future Demand

128. Unless one or more of the certificates of need is granted, Xcel will not be able to increase transmission outlet capacity from the Buffalo Ridge area to 825 MW. The transmission facilities currently in the region have outlet capacity of 260 MW. That capacity is fully subscribed and no additional generation can be added without improvements to the transmission system.^[146]

129. Some additions to transmission capacity can be made without an additional certificate of need, including construction of a new line from Chanarambie to Lake Yankton to Lyon County. However, in order to provide transmission service for the 468 MW of generation already under contract to Xcel, Xcel will require one certificate of need, for the Lakefield Junction to Fox Lake 161 kV line. This line is common to all options.

130. The Lakefield Junction to Fox Lake 161 kV line is necessary to prevent overloads on the existing line between those two points. Upgrading the existing line is not feasible. Building a new line is the most viable option.^[147]

131. Approval of this line would be sufficient for Xcel to provide transmission outlet for the 425 MW of wind generation it must have under contract.

132. Option 5 allows for expansion to 825 MW without any additional certificate of need except the Lakefield Junction to Fox Lake 161 kV line. Options 1, 1H and 3 all require three additional certificates of need to reach 825 MW of outlet capacity. Options 1 and 1H can attain 690 MW of outlet capacity with two additional certificates of need.

133. It is possible that small dispersed wind generation could develop in areas other than Buffalo Ridge and could connect to existing transmission lines.^[148] Development away from Buffalo Ridge will not decrease the anticipated demand for transmission service on Buffalo Ridge.^[149]

134. There is no evidence to compare the cost of generation and transmission of wind power, or any other form of power, away from Buffalo Ridge with the proposed transmission lines contained in this Application. Dr. Rakow, Rate Analyst for the Department of Commerce, looked at the costs of developing wind in other parts of the State and connecting to existing transmission lines, but was unable to develop any meaningful comparisons.^[150]

135. As part of its resource planning process, Xcel did investigate whether small distributed additions to the transmission network would suffice. It found that possible additions were very site specific, and any significant additions would require new transmission facilities.^[151]

136. Since Option 5 requires one certificate of need to reach 425 MW, it is not a “no build” option. Beyond that level, Option 5 includes upgrades to the transmission system that would provide 825 MW of transmission outlet capacity without any additional certificate of need.^[152] It cannot support any development beyond 825 MW.^[153]

137. PIN’s witness, Dr. B. Arthur Hughes, asserted that Xcel’s proposal was aimed in part at addressing current system deficiencies unrelated to new transmission outlet capacity.^[154] He contended that Xcel’s TLTG tables support his view because they show transmission capacity below current conditions. However, the TLTG tables represent the upgrades needed to avoid failures tied to new energy injected into the system. Xcel has shown that its current facilities are capable of transmitting up to 300 MW, but no more.^[155]

A (5). The Effect of the Proposed Facility, or a Suitable Modification, to Use Resources Efficiently.

138. Option 3 would require fewer miles of new transmission lines and narrower rights-of-way than either Option 1 or Option 1H. However, there is insufficient evidence to evaluate which option would require more acquisition of new land for new rights-of-way. The routing of the lines is under the jurisdiction of the EQB. Generally, an option that would require less land would be a better use of resources. However, the lack of information about the possible availability of current rights-of-way for each option, and their proximity to private property hampers the evaluation of this factor.

139. Other factors affecting efficient use of resources are included in the findings related to cost.^[156]

A More Reasonable and Prudent Alternative Has Not Been Demonstrated

140. The record must be analyzed to determine if there is a more reasonable and prudent alternative to the Applicant's preferred Option 1H. ^[157]

141. Xcel asserts that an option with a 345 KV line does the best job of meeting the policy objective of enhancing wind development. It maximizes available outlet capacity with the fewest new facilities in the shortest amount of time, and provides the best opportunity for additional development in the region, including wind power development. ^[158]

142. In evaluating the options, Xcel considered performance with single contingency planning and voltage stability; power and energy losses; the practicality of physically implementing the option within a reasonable time and with reasonable risks to customer loads; and price, the total cost of the option. ^[159]

143. Xcel prefers Option 1H because it is the lowest cost effective upgrade when line losses are included, it is electrically more robust than the options without a 345 kV line, and it can most effectively accommodate development on Buffalo Ridge beyond 825 MW. ^[160]

144. There is a need to increase generation outlet capacity from Buffalo Ridge if additional wind generation is to develop in that area. There is no feasible and prudent alternative to enhancing the transmission system if this policy goal is to be attained. The "no build" option would frustrate the competing policy of developing wind power in the part of the state with the richest wind potential.

145. All options for increasing transmission outlet capacity will cause some pollution, impairment or destruction of the environment. The options must be evaluated to determine which will have the least detrimental effect.

146. Option 1H is superior to Option 1 because of its lower cost and increased flexibility to serve the stated purpose of providing generation outlet capacity. Option 1H offers greater opportunity for development on both the northern and southern ends of Buffalo Ridge. It has slightly more miles of line than Option 1, but is less expensive when line losses are included and more adaptable to development on both the northern and southern portions of Buffalo Ridge.

147. Option 4 is not a feasible and prudent alternative to Option 1H because of its high cost and poor electrical efficiency, even though it would require only two new transmission lines. None of the parties supported Option 4, and it was not developed at hearing.

148. Option 5 is not a feasible and prudent alternative to Option 1H because of its high cost and poor electrical efficiency, even though it would require only one new transmission line. This option would have very high electrical losses requiring increased generation to obtain the same 825 MW of power, it would require many upgrades, and it would not improve the overall transmission system. The Reinhardts opposed granting any certificate of need. However, they preferred Option 5 to the other options because

it requires the least amount of new right-of-way, and it would be sufficient to provide transmission for Xcel's current contracts. No other party favored this option.

149. Options 1D, 1E and 6 were screened by Xcel early in its review, prior to filing the application. All of the options had higher costs than Option 1 and did not offer any benefit over Option 1. Option 6, the DC Circuit option, included a 180-mile transmission line. Thus, it was also rejected because of its detrimental land use and environmental impact.^[161] None of the parties supported these options.

150. Only Option 3 is a viable alternative to Option 1H. Its installed cost is slightly lower than Option 1H, and it may have less impact on the environment because it does not include a 345 kV line and requires fewer miles of transmission lines.

B (1). The Appropriateness of the Size, Type and Timing of the Proposed Facility, Relative to Reasonable Alternatives.

151. The size of both option 1H and Option 3 is adequate to provide 825 MW of generation outlet capacity. Two of the requested certificates of need, the Lakefield Junction to Fox Lake 161 kV line and the Buffalo Ridge to White 115 kV line, are included in both options. The significant distinction between the two options is that Option 1H includes a long 345 kV line. Option 3 requires fewer miles of transmission lines, smaller and lower towers, and narrower rights-of-way.

152. Assuming timely regulatory approvals, Option 1H would be completed in the fourth quarter of 2005; Option 3 would be completed in the fourth quarter of 2006.^[162] Since negotiating wind contracts and construction of wind turbines can be completed in approximately 18-24 months, a shorter horizon for construction will hasten transmission of wind power.^[163] Option 1H can be constructed more quickly than Option 3.

153. Option 1H could provide an intermediate level of 690 MW of generation outlet capacity if the certificate of need for the Buffalo Ridge to White 115 kV line is denied.^[164] Approval of only 690 MW of outlet capacity could hamper wind development on the northern part of Buffalo Ridge.^[165]

154. The Department of Commerce concurred in Xcel's definition of "type" of facility to mean "nominal voltages, rated capacity, [Surge Impedance Loading] and nature (AC or DC) of power transported." It concurred that none of the options, including Option 3, were more reasonable than 1H when evaluated against this definition.^[166]

B (2). The Cost of the Proposed Facility and the Energy Supplied By It, Relative to Reasonable Alternatives

155. The capital costs for installation of the alternatives to support 825 MW of wind generation are:

Option 1H	\$162.9 million
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Option 1	\$159.7 million
Option 3	\$159.0 million
Option 5	\$157.1 million. ^[167]

156. The installed cost of Option 1H is about \$4 million more expensive than Option 3 at 825 MW.^[168]

157. The capital costs for installation of the alternatives to support 468 MW of wind generation only are:

Option 1H	\$138.3 million
Option 1	\$138.4 million
Option 3	\$130.3 million
Option 5	\$88.8 million. ^[169]

158. Electrical line losses are one measure of efficiency. If there is significant line loss, additional electricity must be generated, and the higher the loss, the greater the cost of extra generation. Line losses are a significant factor in evaluating the overall cost of each option.

159. The correct methodology for calculating line losses was disputed throughout the proceeding. Xcel witness Richard Gonzalez explained Xcel's methodology in detail. Xcel's methodology was endorsed by IWLA witness Schedin.^[170] PIN's witnesses, Schoengold and Hughes, challenged Xcel's methodology but did not recalculate the figures. The EQB and Sierra Club also questioned the methodology.

160. There are two measures of line loss. There is demand loss and energy loss. Demand loss is a megawatt figure representing the amount of capacity that must be installed to meet the incremental difference in losses that occur at peak system demand. Energy loss is measured in megawatt hours representing the sum of the small instantaneous losses that occur on the transmission lines throughout the year. Its value is calculated by the cost to supply replacement energy for those losses. Xcel evaluated demand losses at the time of peak load on the system, and also looked at energy losses over the course of a year. The loss calculations were done by computer modeling.^[171] Of the total cost attributed to losses, about two thirds is attributable to demand losses and one third to energy losses. The adjustments disputed by the parties applied only to the calculation of energy losses.^[172]

161. In general, for a given amount of power, energy losses associated with a 345 kV line are less than losses over a lower voltage line.^[173]

162. The Applicant estimated the magnitude of system losses, and assigned an economic value to those losses. It designed the Southwest Minnesota Transmission Study^[174] with advice from and review by other MAPP participants.^[175] It concluded that Option 1H had the lowest losses.^[176]

163. The Study's model included the "North Dakota export" (NDEX) which is the amount of electricity moving out of North Dakota for which transmission capacity is already committed. In the model, the NDEX was set at the maximum value assigned by MAPP, 1950 MW.^[177]

164. The model also included wind generation at its maximum ("nameplate") capacity, and it looked at the expected load and generation on the existing system. The Study showed where deficiencies in the transmission system would occur as the outlet capacity from Buffalo Ridge increased to 825 MW. Xcel's application included the plan improvements necessary to handle the increased transmission without any negative effect on current transmission commitments.^[178]

165. To determine the loss figures for each option, Xcel ran models both "On Peak" and "Off Peak." Under the Off Peak model, Xcel assumed the NDEX was at its maximum, and the available wind generation was also at its maximum. Xcel recognized that these assumptions were not typical to the system's operation because wind generation rarely occurs at full nameplate capacity, and NDEX has rarely attained its maximum potential. Accordingly, it adjusted its Off Peak modeling by assuming a "loss factor" adjustment of 30 percent.^[179] Xcel's witness, Richard Gonzalez, acknowledged that this adjustment was an informed estimate, but that the actual loss factor was not known.^[180]

166. During the hearing, Sierra Club, PIN and the EQB brought motions to compel Xcel to redo the loss calculations using an "average" figure for NDEX. However, Xcel took the position that the "average" would not yield a meaningful loss calculation and that the MAPP maximum value was appropriate.^[181] The motions were denied.

167. Dr. B. Arthur Hughes challenged Xcel's loss calculations.^[182] He disagreed with the level of wind generation used in the calculation, and the formula's failure to consider whether high wind generation coincides most closely with peak or off-peak loads.^[183] Dr. Hughes did not believe that a 30 percent loss factor adequately accounted for the variations in load, export and wind.^[184] PIN witness David Schoengold conceded that Xcel's analysis may be consistent with North America Electric Reliability Council (NERC) and MAPP standards but may not accurately account for intermittent generation such as wind.^[185] Dr. Hughes did not redo the loss calculation, and there was no evidence that recalculating the losses using Dr. Hughes's assumptions would alter the cost ranking of the options.^[186]

168. Under Xcel's analysis, the relative cost of the options is significantly affected by the loss calculations. At 825 MW of generation of outlet capacity, Option 1H has the least expensive installed cost, including losses. Option 1 and Option 3 are

somewhat more expensive (although Option 1 is less expensive than Option 1H at certain higher outlet levels). Option 5 is significantly more expensive. Option 1H is approximately \$18 million less costly than Option 3 when losses are included.^[187]

169. When losses are factored into the costs, Option 1H is more expensive than Option 3 up to about 525 MW, but less expensive above that level.^[188]

170. The Department of Commerce used the losses calculated by Xcel and reviewed the costs associated with the losses. Although its cost calculation was different, the Department concurred with Xcel that Option 1H is the lowest cost option at 825 MW when losses are included. By the Department's calculation, including line losses, Option 1H is approximately \$11.6 million less expensive than Option 1,^[189] and \$36.3 million less expensive than Option 3.^[190]

171. The application contains some information regarding the total cost to construct the substation facilities associated with each alternative.^[191] Only a portion of the costs for the substations is included:

The estimates do not include the cost of the portion of substations that would be necessary to connect wind turbine collector lines (34.5 kV feeders) to the transmission system. Since the Yankee substation would be constructed for the sole purpose of connecting wind turbines to the transmission system and not for a transmission system purpose it was not included in the estimates of transmission alternatives.^[192]

172. Ordinarily, the costs associated with generation and distribution of electricity are not transmission costs. It is not clear from the record whether the failure to include substation costs would affect the cost rankings of Option 1H and Option 3.

173. Operating and maintenance costs were not included in the analysis of the options. Annual operating and maintenance costs are estimated to be a few percent of the installed cost (without losses) of each element and are not likely to affect the options' relative cost rankings.^[193] Because the installed cost of Option 3 is slightly lower, the operating and maintenance costs will be slightly lower for Option 3 than Option 1H.

B (3). The Effects of the Proposed Facility Upon the Natural and Socioeconomic Environments Compared to the Effects of Reasonable Alternatives.

174. The application contains a general discussion of the natural features that are located in the general area of each proposed transmission line.^[194] The record also includes an outline of potential environmental concerns.^[195] The environmental characteristics of the corridor the 345 kV line would follow from the Minnesota border to Lakefield Junction in Jackson County are summarized in Appendix 3, figures AP: 3-10 and AP: 3-11. The summary maps include natural features, areas of archeological importance and federal- and state-listed threatened and endangered species. The environmental characteristics of the South Dakota portion of the line are not identified.

Similar maps are included for each of the new transmission lines included in Options 1H and 3.^[196]

175. Xcel identified archaeological and Indian Mound sites within the corridors.^[197] There is also likely to be some impact on woodlands.^[198] Xcel anticipates that the effect on these resources can be minimized during the EQB siting process.^[199]

176. There is some noise created by transmission lines, particularly when the weather is rainy or damp.^[200] Noise standards promulgated by the Pollution Control Agency will apply.^[201] Noise may be addressed in the siting of the lines to minimize proximity to residences and other structures.

177. Ionization in foggy conditions may cause a corona, a luminous blue discharge of light, where the wires connect to insulators. It is more frequent with 345 kV lines than with lower voltage lines.^[202]

178. Transmission of electricity along electric conductors can create ozone and nitrogen oxides. Ozone production is proportional to line voltage. The state and federal governments have ozone standards that will apply. There is no evidence that the proposed lines would violate air quality standards.^[203]

179. The stated purpose of the proposed transmission lines is to transmit electricity generated by wind. The air emissions of alternative forms of generation are not directly at issue here. Xcel did not evaluate the differential impact of the alternatives.^[204] To the extent that the proposed transmission lines are used for the stated purpose, wind generation will be enhanced, with the resulting environmental benefits.^[205]

180. Xcel acknowledged that other potential generation developments are being studied and could affect transmission requirements in the region. Because the timing, size, and number of the possible projects could not be determined when the transmission study was done, the study did not attempt to address the characteristics of future transmission demands.^[206] In particular, Xcel has not done any studies to determine the effect on the transmission system of adding new coal generation in North or South Dakota.^[207]

181. Transmission upgrades will be necessary if additional coal generation is developed. For example, the ABB Project Summary Report prepared for the Lignite Energy Council states that a new Lignite 500 MW power plant in North Dakota would require "a 70-mile, 345 kV circuit between Split Rock and Lakefield Junction."^[208] Although there is evidence that future development of coal generation or other generation in North Dakota is possible, Xcel has not studied the ability of the transmission system to handle that additional outlet capacity,^[209] nor has Xcel completed Phase Two of the transmission study, which will include transfer capacity.^[210]

182. Some of the parties have grave concerns that the new transmission lines will stimulate coal generation in North Dakota. New generation would likely serve the

Twin Cities and east to Milwaukee and Chicago.^[211] Possible future development is beyond the scope of this proceeding. However, there could be serious adverse consequences to the environment if increased coal generation occurs west of Minnesota.^[212]

183. There is no evidence that stray voltage will have any effect on dairy farms that may be located near the proposed transmission lines. To be prudent, in the event that a transmission line runs near the electrical distribution system serving a farm, or the wiring on the farm, steps can be taken to mitigate any stray voltage.^[213]

184. New transmission lines will have a significant visual impact. A 345 kV line requires a 150-foot right-of-way; the 115 kV and 161 kV lines require 70 to 80-foot rights-of-way. The towers for the proposed 345 kV line will be 100 feet high, with approximately 900 feet between spans. The lower voltage lines will have lower towers, but the towers must be placed closer together. Southwestern Minnesota is generally flat, open land, and the structures and lines will be visible from long distances. The visual impact can be somewhat minimized during the siting, but for most people the overall aesthetic effect would be negative.^[214] Xcel rejected placement of the lines underground because it would add up to about \$500 million in additional costs. Underground lines are approximately 10 to 17 times more expensive to install.^[215]

185. More miles of right-of-way are required for Option 1H than are required for Option 3, with commensurately higher costs to acquire the land.^[216] In addition to the rights-of-way for the new lines, each of the options includes improvements that will use existing rights-of-way “to the extent possible.”^[217] There is no evidence of the additional rights-of-way that could be needed for these improvements.

186. Seventy percent of Option 1 could be routed along existing right-of-way and 30 percent along road right-of-way. Fifty five percent of Option 3 could be routed along existing right-of-way and 45 percent along road right-of-way. Similar percentages were not provided for Option 1H but its components are included within Option 1 or Option 3.^[218] There is no evidence showing whether the proposed transmission corridors drawn on the figures in Appendix 3 to the Application follow the rights-of-way or to what degree the existing rights-of-way coincide with the denoted environmental concerns.

187. Xcel estimated the costs to acquire rights-of-way.^[219] It is unclear how these estimates tie to projected use of existing rights-of-way.

188. There is no evidence of what, if any, structures are currently running along the rights-of-way, or the current use of adjoining land. It is also not clear whether the current road rights-of-way are sufficiently wide to permit installation of transmission lines without taking additional property. Although siting will be decided by the EQB, it is difficult to compare the effect on the natural environment of Options 1H and 3 without evaluating the possible routes each option will follow.

189. Construction of new transmission lines to increase the generation outlet capacity will have an economic effect on Southwestern Minnesota. At a minimum, the construction itself brings money into the local economy, and there is some continued revenue from the maintenance of the facilities. If the transmission lines meet the stated goal of facilitating increased development of wind power, that development will have a decided effect on the region. New construction will also increase property tax revenues in the counties where the new construction is located. In the past, property taxes have averaged about 2.4 percent of installed cost, across all jurisdictions. Option 1H has the highest installed cost.^[220]

190. Landowners receive a property tax credit in proportion to the length of the line crossing their property. Ten percent of the assessed value of the line is distributed to landowners.^[221]

191. Xcel makes easement payments to landowners in a lump sum at the time of acquisition based on present worth of property diminution. Other than this one-time payment, there is no economic benefit to the landowner.^[222]

192. If the new wind generators are locally owned by individuals or companies in Southwestern Minnesota, the development will have a much greater benefit for local landowners and for the region.^[223]

193. Residents of Southwestern Minnesota, through their elected county commissioners and the Rural Minnesota Energy Task Force, are vigorously pursuing development of local ownership of wind generation. Local support for new transmission lines is tied to increased local ownership of the new generators. Financing for a collector system is necessary to spur local ownership.^[224]

194. The Application does not quantify the impact of construction or maintenance employment or compare the relative impact of the various options. There was some limited evidence that approximately 20-25 workers are assigned to transmission projects and the Gantt charts show the approximate length of time to complete a project. This information was very general and did not include salaries for the workers.^[225] Option 1H can be completed more quickly, but one cannot conclude from this record that Option 3 would employ more workers or require higher total wages. There was no breakdown of the labor costs.

195. Xcel did not analyze the effect that new transmission facilities would have on future economic development. However, the Application presumes that if the transmission facilities are built, new wind generation will develop along Buffalo Ridge. Exhibit 611 sets forth the potential economic development from increased generation.^[226]

196. Local residents are less likely to oppose construction of transmission lines if nearby landowners can participate in the business opportunity the lines offer.^[227]

197. To the extent that the transmission lines support wind development that replaces other forms of generation with air emissions, the transmission lines will have the socially beneficial effect of reducing air pollution.^[228]

198. Both Option 1H and Option 3 have the potential to increase outlet capacity for renewable wind generation that will decrease reliance on fossil fuel generation. Pollutants from use of fossil fuels disrupt ecosystems and impose health risks on plants and animals.^[229]

B (4). The Expected Reliability of the Proposed Facility, Relative to Reasonable Alternatives.

199. The MAPP Modeling Building Working Group (the “MBWG”) developed the models used to determine the reliability of the electrical system in Minnesota. The MBWG maintains a library of power system models that simulate the behavior of the bulk electric system. The models are designed to accurately represent all major generation, load, and transmission facilities in MAPP. The 1999 MAPP base models were used in the Southwestern Minnesota Study. The 1999 model simulates projected generation, load and system equipment conditions in 2004, and was updated to simulate 2001 conditions. The Study examined system performance under both summer peak and off peak conditions with different levels of power transfers.^[230] Xcel fully participated in the development of the models.

200. The reliability of the electric system has two components: adequacy and security. “Adequacy” is the ability of the electric system to supply customers at all times, taking into account scheduled and reasonably expected unscheduled outages. “Security” is the ability of the system to withstand sudden disturbances such as short circuits or unanticipated loss of a system component.^[231]

201. Xcel evaluated the reliability of each of the proposed alternatives. It simulated the desired increase of energy to 825 MW, predicted where system deficiencies would occur, and included the upgrades required to assure that national standards for safety and reliability were met.^[232]

202. Xcel’s design standards took into account the effect of losing any one component of the system (“single contingency planning”). Each option provided acceptable performance.^[233]

203. Ordinarily, an analysis of reliability would include contingency analysis, transfer capability, reactive power, voltage security, transient and dynamic stability, and robustness.

204. The modeling assumed delivery of power to Xcel’s northern control area (the Twin Cities). The ability to deliver power to other locations was not examined.

205. Xcel also evaluated the impact of Option 1 and Option 3 on voltage and reactive power requirements. Similar information for Option 1H was not provided so no comparison can be made.^[234]

206. Xcel did not fully study transient and dynamic stability. It acknowledged that stability should be examined if an option was selected that did not include a 345 kV line.^[235]

207. In its evaluation, Xcel took into account the potential impact 825 MW of power from Buffalo Ridge would have throughout the interconnected transmission system. MAPP requires that additions to the interconnected system cannot aggravate existing system limitations (“constrained interfaces”). Xcel included cost estimates in its evaluation of each alternative to address the existing limitations that would be exceeded with the additional outlet capacity.^[236]

208. The system constraint in Omaha, Nebraska presents such a limitation. If Option 1 were implemented, Xcel estimates that a 345kV transmission line costing approximately \$5.9 million would have to be built in the Omaha area. This would apply to Option 1H as well. If Option 3 were implemented, new equipment, estimated to cost \$4.0 million, would be used to address the Omaha system constraint.^[237]

209. Both Option 1H and Option 3 would enhance the overall reliability of the transmission system and accommodate expansion of wind power on Buffalo Ridge to 825 MW.

210. The Transmission Study addressed the likely increase in generation projects off of Buffalo Ridge in Southwest Minnesota and the Dakotas. It is assumed that other new generation will need west to east transmission through Minnesota, and that there will be “significant incremental demand for transmission service.”^[238] Although larger capacity lines, such as a 345 kV line, may better support future development, Xcel did not compare the options to determine which ones may have greater transfer potential.

211. Option 1H is a more “robust” option because it requires relatively few incremental improvements to achieve 825 MW and beyond. Option 1H’s lower line losses are also consistent with a “robust” system. Although Xcel did not complete stability studies, in general 345 kV lines have greater stability than lower voltage lines.^[239] Stability assures that changes in generation, voltage fluctuations and protective equipment do not lead to uncontrolled interruptions in transmission. Typically the low-impedance lines on a 345kV circuit enhance stability.^[240]

C. Benefits to Society Compatible with Protecting the Natural and Socioeconomic Environments, including Human Health

212. The Minnesota Department of Health has conducted a review of peer-reviewed literature and the conclusions of scientific committees convened by federal agencies and the United States Congress and addressed the health risks from exposure to electric and magnetic fields (EMF).

“[T]he current body of evidence does not show that exposure to these fields is a health hazard. Specifically, no conclusive and consistent evidence

shows that exposures to residential electric and magnetic fields produce cancer or any other adverse human health effect.”^[241]

213. Nonetheless, the Department of Health recommends continued monitoring of EMF research and “support for prudent avoidance measures, such as providing information to the public regarding EMF sources and exposure.”^[242]

214. Ordinarily there is higher EMF associated with a 345 kV line than with lower voltage lines. However, the greater the distance from the line, the lower the risk to people and animals. There is insufficient evidence on this record to compare the proximity of the lines in Option 1H and Option 3 to residences and to weigh the relative risks.^[243]

C (1). The Relationship of the Proposed Facility, or a Suitable Modification, to the State Energy Needs.

215. The Legislature and Commission have expressed support for the development of renewable energy resources. If the transmission lines serve the stated purpose, they will advance the state’s shift to renewable energy, decrease reliance on fossil fuels, and decrease toxic waste products.

C (2). The Effects of the Proposed Facility Relative to Not Building the Facility.

216. No significant additional development of wind generation can occur on Buffalo Ridge unless additional transmission lines are built.^[244]

217. No studies have been done to determine whether not building the transmission lines would affect development of new renewable or non-renewable generation off of Buffalo Ridge.^[245]

218. Because of the size and location of the proposed Sioux Falls to Lakefield Junction 345 kV line, Option 1H may be easier to upgrade to levels above 825 MW than the lines included in Option 3. However, no studies have been done that support or refute this hypothesis.

C (3). The Effects of the Facility, or a Suitable Modification Thereof, in Inducing Future Development.

219. The Rural Minnesota Energy Task Force favors Option 1H because it believes that the 345kV line included in that option will sustain the greatest potential development and will be more likely to induce future development on both the north and south ends of Buffalo Ridge.^[246] However, Task Force support for the option is dependent upon Xcel providing financial support for a collector system for new wind generation on Buffalo Ridge. Without a collector system, the Task Force support for Option 1H or any other option is weak.^[247]

220. There is strong evidence that local ownership of new wind generation will provide substantially greater benefit to southwestern Minnesota than outside

ownership. Neither Option 1H nor Option 3 will offer significantly better opportunities for local ownership.

221. The location of the collectors and substations is not known and will be determined as new generation contracts are developed. Both Option 1H and Option 3 will provide the capacity to connect new wind generation on both the northern and southern ends of Buffalo Ridge.

222. The Task Force is concerned that the developers who first obtain financing will dictate the size and location of new wind development. The Task Force wants to work with Xcel to develop protocols for interconnection and infrastructure that will facilitate small scale development.^[248]

223. The proposed transmission lines will do little to induce future development in Southwestern Minnesota unless wind generation or other small renewable energy projects are able to access the lines.

C (4). The Socially Beneficial Uses of the Output of the Proposed Facility, or a Suitable Modification, Including Its Uses To Protect or Enhance Environmental Quality.

224. With the exception of the Reinhardts, the parties agree that it is socially beneficial to develop more wind generation. To the extent that the proposed transmission lines will in fact spur additional wind development to 825 MW, and potentially beyond that level, the result will enhance environmental quality. Both Option 1H and Option 3 are likely to spur development of wind generation.

225. There was no evidence in this proceeding of the general social benefit or detriment of increased transmission capacity *per se*.

D. The Design, Construction , or Operation of the Proposed Facility, or a Suitable Modification, Will Comply with Relevant Policies, Rules, and Regulations of Other State and Federal Agencies and Local Governments.

226. Xcel plans to comply with all relevant policies, rules, and regulations of state and federal agencies and local governments applicable to construction and operation of the proposed transmission lines.^[249] There was no evidence that Xcel could not or would not comply.

Public Comment

227. Several members of the public offered comments. The persons testifying in southwestern Minnesota were concerned that wind generation develop in a way that would allow individual landowners to own the turbines and share in the economic benefits of ownership. More local ownership would assure that more of the profits of wind generation would remain in the local area.^[250]

228. One member of the public was concerned that generation from other forms of renewable energy, such as biomass, would have access to the transmission lines.^[251]

229. David Norgaard, Lincoln County Commissioner, requested that Xcel consider increasing the outlet for wind-generated power on the northern portion of Buffalo Ridge by adding a link from Buffalo Ridge to the White substation in South Dakota, where it could link to an existing 345 kV line.^[252] Option 1H was developed partly in response to this comment.^[253]

230. Jim Nichols, Lincoln County Commissioner, stressed that wind power is creating new employment in southwestern Minnesota. In particular, the wind turbines require maintenance, and maintenance workers can be trained and employed locally.^[254] Mr. Nichols also expressed an interest in increasing transmission from Buffalo Ridge into the White substation.^[255]

231. In general, public participants in southwestern Minnesota support wind generation, want to see the opportunity for local participation in its development and ownership, and believe that it will provide economic development opportunities in southwestern Minnesota.

232. Public participants who testified in St. Paul wanted assurance that new transmission lines would be used for wind power or power from other renewables, and not used to transmit energy from new coal-fired plants in the Dakotas.^[256]

233. One participant in southwestern Minnesota was concerned that the proposed siting of the 345 kV line from Split Rock to Lakefield Junction along I-90 could interfere with the small airport he operates.^[257]

234. Several written comments were received from landowners in southwestern Minnesota and one in South Dakota who support increased wind generation and want assurance that a collection system will be developed that will allow local, small-scale developers to connect to the transmission system.^[258]

Conditions

235. Several parties supported approval of the certificates of need only if the PUC imposed conditions on the certificates. The IWLA, through its witness Larry Schedin, proposed the following conditions:

- a. That Xcel reserve an additional 400 MW (for a total of 825 MW) of transmission capacity for new wind generation on Buffalo Ridge;
- b. That Xcel follow the MISO procedures to ensure that new wind generators are designated as network resources and that new transmission capacity is reserved;

- c. That Xcel be required to install the additional 400 MW of wind generation by the date that the proposed transmission facilities are placed in service.^[259]

236. The Department of Commerce supports similar conditions, with some variation. The Department's proposed conditions are:

- a. That Xcel sign PPA's for a minimum of 675 MW with wind developers by December 31, 2003 and submit them to the Commission for action no later than June 30, 2004;
- b. That Xcel install 825 MW of wind generation on Buffalo Ridge by 2006;
- c. That Xcel apply to MISO for transmission service for at least 825 MW of wind-generated power, and cooperate with the generators' requests for interconnection;
- d. That Xcel commit to designate new wind-powered generators as network resources under the MISO Open Access Transmission Tariff (OATT);
- e. That Xcel report regulatory developments at the federal or regional level that could affect the conditions imposed.^[260]

237. Sierra Club, NAWO and the Rural Minnesota Energy Task Force endorse the conditions proposed by IWLA and the Department, but their support for the certificates of need is also predicated on increased support for locally-owned wind generators. Sierra Club proposed:

- a. That Xcel purchase a minimum of 30 MW of locally-owned wind generation on Buffalo Ridge by December 31, 2003;
- b. That Xcel build needed substation facilities whenever 20 MW or more of small, locally-owned wind generation is aggregated on Buffalo Ridge;
- c. That the PUC establish a task force to develop additional guidelines for development of a low-voltage collection system and report back to the Commission within 90 days.^[261]

238. NAWO endorses the conditions proposed by IWLA and the Department of Commerce, but contends that those conditions are not sufficient to justify the certificates of need. It wants Xcel to commit to providing an interconnection point whenever 20 megawatts of wind generation are aggregated.

In every Power Contract executed by [Xcel], there shall be a clause stating that upon a showing of the aggregation of 20 megawatts or more, that is

demonstrated to be viable through documentation of adequate financing, the utility shall provide an interconnection point, i.e., a substation.^[262]

239. The Rural Minnesota Energy Task Force supports Option 1H, subject to the Commission requiring Xcel to work with the Task Force and other interested parties to develop a mechanism for sharing the cost of a collector system to serve small-scale wind projects (up to 2 MW).^[263]

Environmental Report

240. Xcel designated its entire application as the Draft Environmental Report. The application described the size and type of the proposed facilities, and provided general information about location. The beginning and end points for each line were included, along with a corridor map.

241. The application included detailed information about four options and a fifth option was developed during the hearing. Each option involved upgrading some existing transmission lines. Each option assumed that an additional 525 MW of wind generation will develop close to Buffalo Ridge.

242. The application included a general evaluation of the availability, estimated reliability, and economic, employment, and environmental impact of the proposal and alternatives.

243. The application included a general analysis of the alternatives of no facility and delayed construction of the facility, and addressed conservation and load management measures.

244. The Draft Environmental Report, comments to the Report, and Xcel's response to the comments constitute the Final Environmental Report and are included in the record of this proceeding.

245. As discussed more fully at Findings 174-198, the Environmental Report does not disclose any significant environmental bar to the construction of Options 1, 1H, 3 or 5.

CONCLUSIONS OF LAW

1. The Public Utilities Commission and the Administrative Law Judge have jurisdiction to consider Xcel's application for four certificates of need.^[264]

2. The PUC determined that Xcel's Application was substantially complete as of January 24, 2001.^[265]

3. The criteria for evaluating the application for certificates of need are set forth in statute and rule.^[266] Application of the criteria includes a determination that there is no reasonable and prudent alternative.^[267]

4. Four public hearings were held at places and times convenient to the public, and public testimony was taken at the public hearings.^[268] The public hearings were completed on May 14, 2002; the evidentiary hearing was completed on July 3, 2002.^[269]

5. David Jacobson, a member of the staff of the PUC, was available throughout the proceeding to facilitate citizen participation.^[270]

6. Xcel provided notice of the hearings as provided by statute and rule, and provided additional notice as well.^[271]

7. The Environmental Quality Board is authorized to issue permits for the routing of large energy facilities and members of its staff participated in the hearing.^[272]

8. No “large energy facility” can be sited or constructed in Minnesota without a certificate of need from the Commission.^[273] Any high-voltage transmission line with a capacity of 200 kilovolts or more with more than ten miles of its length in Minnesota, or that crosses a state line is a “large energy facility.” Each of the proposed transmission lines for which Xcel is seeking a certificate of need is a large energy facility.^[274]

9. Because Xcel operates a nuclear-powered electric generating plant in Minnesota it was required to install 225 megawatts of electric energy installed capacity generated by wind energy conversion systems by December 31, 1998; and an additional 200 megawatts of installed capacity by December 31, 2002.^[275]

10. Xcel is also required to “construct and operate, purchase, or contract to purchase an additional 400 megawatts of electric energy installed capacity generated by wind energy conversion by December 31, 2002, subject to resource planning and least cost planning requirements”^[276] Xcel is to give preference to wind energy conversion systems within the State of Minnesota, to the extent allowed by law.^[277]

11. Before it can grant a certificate of need for a transmission line that will carry electric power generated by a nonrenewable energy source, the PUC must fully examine the option of generating power by means of renewable energy sources, including hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.^[278]

12. The proposed transmission lines are not “renewable energy facilities.” Xcel has demonstrated that the transmission lines cannot be replaced by a renewable energy facility.^[279] Xcel has demonstrated that granting the certificates of need has a high probability of promoting increased renewable energy generation.^[280]

13. Any approved certificate of need may be contingent upon modifications required by the PUC.^[281]

14. There is substantial evidence on the record of each criteria listed in rule part 7849.0120 to support consideration of Options 1, 1H, 3, and 5.^[282]

15. Xcel has demonstrated the need for a new 161 kV line connecting Lakefield Junction Substation and Fox Lake Substation. This transmission line is justified by the 468 MW of wind generation currently under contract to Xcel. Approval should be contingent upon Xcel designating the generators covered by these contracts as network resources and immediately seeking approval for transmission service from MISO. The contingency is necessary to comply with Minn. Stat. § 216B.243, subd. 3a.

16. Xcel has demonstrated the need for both Option 1H and Option 3. Both Option 1H and Option 3 will allow increased outlet capacity for wind generation on the northern and southern ends of Buffalo Ridge. Based on the evidence presented, Option 1H is the more reasonable and prudent alternative, but Option 3 closely approximates the same benefits. To assure that Option 1H is the more reasonable and prudent alternative, the environmental impact of the two options should be closely compared during the routing process.

17. The additional certificates of need should be approved, subject to Xcel demonstrating, prior to placing the approved transmission lines in service, that MISO has approved an additional 400 MW of wind generation on Buffalo Ridge for transmission service.

18. Delay of approval of the certificates of need will not have a negative impact on Xcel's ability to serve its customers, neighboring systems or overall availability of electric power.^[283] It will delay development of wind generation on Buffalo Ridge.

19. Denying the certificates of need will adversely affect the adequacy of future development of renewable energy supplies.

20. The Environmental Report was filed as required, and its contents met the criteria set forth in rule.^[284]

21. During this proceeding, Xcel withdrew its request for findings and conclusions that the expenses or costs attributable to construction of the high voltage transmission lines can be recovered from the ratepayers.^[285] It may pursue that request in a separate proceeding.

22. The 2001 State Energy Planning Report prepared by the Department of Commerce, dated February 15, 2002, and the PUC Staff Briefing Paper re: MAPP WIND II LLC, September 25, 2002, have been added to the record after the close of the evidentiary hearing.

23. The citations to transcripts or exhibits in these Findings of Fact are not intended to indicate that all evidentiary support in the record has been cited.

24. These conclusions are reached for the reasons set out in the Memorandum that follows which is incorporated by reference.

Based on the Findings of Fact, Conclusions of Law and the record in this proceeding the ALJ makes the following:

RECOMMENDATIONS

1. That the Commission grant a certificate of need for a 161 kV line connecting the Lakefield Junction Substation and Fox Lake Substation. This certificate of need should be contingent upon Xcel designating the contracts that increase generation from 300 MW to 468 MW as network resources and obtaining approval for network transmission service from MISO.

2. That the Commission grant the three additional certificates of need required to implement Option 1H, subject to the following conditions:

a. A determination by the EQB that routing the three transmission lines included in Option 1H will not have a significantly greater negative effect on the environment than routing the three transmission lines included in Option 3, recognizing that the Buffalo Ridge to White line is part of both options.

b. Xcel demonstrate, prior to placing the additional three lines in service, that MISO has approved 825 MW of wind generation transmission requests that will connect through the Chanarambie or Yankee substations.

c. Xcel work with elected representatives and wind developers in southwestern Minnesota to establish the criteria for siting new substations in response to wind development and to clarify the costs borne by the generator and by Xcel.

d. Xcel file annual reports with the PUC that include the number of transmission requests pending with MISO from wind generators on Buffalo Ridge, and the number granted. Xcel shall also report annually on its efforts to facilitate small wind development (10 MW or less) on Buffalo Ridge.

Dated this 8th day of November, 2002.

S/ Beverly Jones Heydinger

BEVERLY JONES HEYDINGER

Administrative Law Judge

MEMORANDUM

Xcel's application for four certificates of need for high voltage transmission lines stems from the State's commitment to develop electrical power from renewable resources and to reduce dependence on fossil fuels. In recent years, the state legislature has enacted legislation and the Commission has issued orders that encourage this shift. There is strong support for this policy from many environmental groups, the Department of Commerce and the Environmental Quality Board. Xcel as a major utility in the state is obligated to develop renewable generation, and, as a condition of the merger of NSP, it was obligated to study and develop a plan for increasing the outlet capacity of wind generation from Buffalo Ridge in Southwestern Minnesota. This application for certificates of need for four high voltage transmission lines is a result of that study.

The Legislature and PUC have set aggressive goals for developing renewable energy. As a result of public controversy over storing nuclear waste at the Prairie Island Nuclear Power Plant, Xcel was directed to begin developing wind power. Xcel has contracts to meet the original legislative mandate of 425 MW. The PUC has directed Xcel to contract for an additional 400 MW of wind generation by 2012 if it is cost effective. Also, each utility must make a good faith effort to attain the goal of providing 10 percent of its electric energy through renewable resources by 2015. Wind energy is the least expensive form of renewable energy, its cost is coming down, and there is very strong interest in developing it further.

These goals are separate from Xcel's agreement to study and seek approval for increased outlet capacity on Buffalo Ridge. Xcel did not commit to purchase the wind generation as part of the merger agreement; it only agreed to seek authority to increase the outlet capacity. Its requirement to purchase 825 MW of wind power by 2012 is an entirely separate commitment, and Xcel firmly asserts that the two requirements should not be tied together.^[286]

Buffalo Ridge, the watershed between the Missouri and Minnesota Rivers in Southwestern Minnesota, is a premier location for additional wind development. Interest in wind generation in the area is high, as is evidenced by the presence in this proceeding of the Rural Minnesota Energy Task Force, a joint effort of 10 southwestern counties to increase their understanding of wind development and act collectively to encourage its development. Not only does wind development aid the shift from dependence on fossil fuels, but it offers an alternative form of economic development and income to landowners in a part of the state that has suffered from a poor agricultural economy.

Xcel seeks the certificates of need to increase outlet capacity for wind generation on Buffalo Ridge. Xcel has plainly stated that these lines were proposed solely for that purpose, and for no other purpose. Xcel does not need the lines to meet projected growth in demand for electricity, and it is not seeking the lines to serve increased generation in any other location. Xcel has also clearly demonstrated that no additional development of wind generation can occur on Buffalo Ridge without additional

transmission capacity. The demand for electricity in the area of the Ridge is quite low, so all electricity that is generated must be exported to another area. Xcel is seeking to build new lines, at an estimated cost of about \$160 million dollars, to facilitate the development of wind power.

Xcel has demonstrated the need for the four transmission lines to increase the outlet capacity from Buffalo Ridge. There is no other demonstrated need. Thus the PUC has a clear decision to make: should it approve new transmission lines in order to facilitate increased wind generation on Buffalo Ridge?

Analysis of the decision is complicated by the changing federal oversight of transmission lines. Over the past several years, the Federal Energy Regulatory Commission (FERC) has compelled transmission operators to open up transmission capacity to any user. Regional transmission organizations (RTO's) have been given the authority to control access to the lines. As a result, a transmission operator such as Xcel cannot guarantee that wind generators alone will have access to the lines.

FERC Order No. 888 mandates owners of transmission lines to file nondiscriminatory open access tariffs and requires that the owners acquire transmission service for their own wholesale purchases and sales on the same terms it offers transmission service to others.^[287] Order 888 does not control facilities used for local distribution or used only for intrastate transmission, but neither of those exceptions would apply to the lines governed by this application. FERC's position is that transmission on the interstate grid is placed in interstate commerce and subject to its jurisdiction.

FERC Order No. 2000 mandates transmission companies to participate in an RTO that will administer access to the transmission system. Thus, Xcel does not control its transmission lines. Rather, applicants for transmission service in this region file with the Midwest Independent Transmission Organization (MISO), MISO oversees the necessary studies, and MISO gives the necessary approvals for access. Xcel cannot guarantee access to the transmission lines for wind generation, or give precedence to wind generation over other forms of generation.

Under the federal framework, Xcel must keep its transmission line business separate from its purchase of generation and sale of power to its customers. Xcel can contract for generation to serve its own "native load," that is, the customers who buy power from Xcel. It can designate the generation as a "network resource" and seek MISO approval to move the energy that is generated by the network resource over the transmission lines. It cannot add new generators to its own transmission system without MISO approval.

As a transmission company, Xcel is obliged to maintain an adequate supply of capacity to serve generators requesting transmission service. It takes several years to obtain a certificate of need, site transmission lines, acquire property and necessary permits, and physically construct the transmission lines. The process must begin well ahead of the date that a generator is ready to connect if the transmission lines are going

to be ready in time. When new generation requires its own certificate of need and takes years to construct, the planning can be coordinated and the generator's location taken into account in the design and location of the transmission line upgrades. But that is not the case here.

In this instance, there is convincing evidence of the strong interest in wind development. But at this time Xcel cannot identify precisely when or where the wind generators will be constructed nor can it guarantee that only wind generation will be able to access the transmission lines. Yet, wind development will not occur on Buffalo Ridge unless transmission is assured.

The need for the transmission lines must be determined before the actual number and location of wind generators are known. The precise location and timing will be determined in future contract negotiations between Xcel and wind developers and designation of the new generation as a network resource, and also by interconnection and transmission requests approved by MISO that may not involve Xcel as the power purchaser.

Although the application is in direct response to developing wind generation, Xcel did not attempt to design the proposed transmission lines specifically for wind generators. PIN's witness, Dr. Hughes, criticized Xcel's failure to address the needs of the wind industry, include a collector system and assure adequate back-up power for wind.^[288] Xcel conceded that the size and type of its proposed lines are unaffected by how the power is generated and can serve other forms of generation. Xcel correctly asserts that FERC requires that transmission capacity be available to any eligible customer. Although the need for the new transmission lines is linked to developing wind generation, once built, access to the lines cannot be limited.

The uncertainty about the use of the proposed transmission lines and the precise timing and location of new wind generation complicates the need determination. This is reflected in the position of several parties to this proceeding. IWLA, ME3, AWEA, Sierra Club, PIN, NAWO, the Rural Minnesota Energy Task Force and the Department of Commerce all strongly support the public policy of shifting to renewable forms of energy, and, specifically, they support further development of wind power. Their support for the certificates of need is conditioned upon the PUC taking steps to increase the likelihood that wind generators will in fact connect to the new lines and fossil fuel developers will not benefit from the new lines. In particular, they are concerned that generation from non-renewable resources may use up the capacity of the new lines before MISO grants approval to connect and transmit wind generation.

New transmission lines stretching for miles across the open land in southwestern Minnesota will have a negative impact on the environment.^[289] Thus, it is essential to determine if there is a reasonable, prudent alternative to their construction. A number of alternatives are discussed below.

No-build. The Reinhardtts argue that the only alternative supported by the record is to deny the requested certificates of need. They correctly point out that there is no

documented forecast of future demand for electricity that justifies the request. They also contend that taking additional private land and expending millions of dollars to develop new lines is not justified by the interest in developing more wind power. Xcel does not contend, nor do any of the parties argue, that there is a need for an additional 825 MW of electricity to serve Xcel's customers. Yet, it is also uncontroverted that no significant new wind development can go forward on Buffalo Ridge unless new transmission lines are built. Since Buffalo Ridge is the best location for development of wind power in Minnesota, denying the certificates of need would, at a minimum, delay the development of this renewable resource and hobble efforts to achieve the State's energy policy goals. For this reason, only the Reinhardts supported the "No-Build" option.

Some of the parties contended that Xcel should have provided costs for adding wind generation at other places on the transmission system to compare with the costs of new transmission lines to serve Buffalo Ridge. Xcel and the Department of Commerce offered limited testimony that such an option had been considered but rejected without significant analysis. In part, generation elsewhere is not a reasonable alternative because it leaves development of the best wind resource stranded. Also, no significant amount of generation could be added to other parts of the transmission system without substantial upgrades. Widely dispersed upgrades would quickly exceed the costs of this proposal.^[290]

Option 5. Although Option 5 was sometimes characterized as a "No-Build" option, it does require one certificate of need. Granting one certificate of need for the 161 kV line from Lakefield Junction to Fox Lake would allow Xcel to meet its current statutory obligation to provide 425 MW of wind power from Buffalo Ridge, and it could be enhanced to 468 MW to meet Xcel's current contractual obligations. The virtues of this option are that it requires little new construction with less new right-of-way and impact on the landscape, and it has the lowest installed cost. However, this is a very poor option to achieve the stated purpose of the lines: to develop outlet capacity for 825 MW of wind generation on Buffalo Ridge. With this option, development will require a very large number of construction projects, have the poorest line efficiency because of line losses, and do little to enhance the overall reliability of the electrical system. It is a default option if the Commission determines that promoting wind generation does not warrant construction of four new transmission lines and that upgrades, although inefficient, can be made as needed. None of the parties supported Option 5, although the Reinhardts would prefer it to either Option 1H or Option 3 because it requires the least new line construction.

Delay Approval. Wind development and transmission line regulation are in flux. There are a few variables that may become clearer within the next several months. First, Xcel anticipates that it will complete its review of the bids received in response to the 2001 all-source bidding process and submit its selections to the Commission for approval by the end of 2002. If no significant number of megawatts of wind generation have been included, it may undercut Xcel's claim that wind development is imminent. If there are many megawatts of wind generation, it will bolster Xcel's claims. Also, FERC

may clarify the process for utilities to designate network resources and reserve transmission capacity.

Although either development could clarify whether Xcel will be able to use the transmission line capacity for its own wind contracts, there is no other reason to delay approval. It is quite clear that there are many wind generation projects that have already requested interconnection and transmission and are listed on the MISO queues. Thus, even if Xcel does not enter into any additional contracts through the bidding process, and is not able to reserve transmission rights, there is still a high likelihood that wind development will occur if the transmission lines are approved.

Delay will not have a negative impact on the ability of Xcel to serve its customers, neighboring systems or overall availability of electric power. It will stall wind development.

Approval of the Certificate of Need for Lakefield Junction to Fox Lake 161 kV line.

The evidence clearly supports the need for the Lakefield Junction to Fox Lake 161 kV line. It was included in every option. Xcel already has signed contracts in place to fully utilize the transmission capacity that this line will add. If it is denied, it is unlikely that Xcel can provide transmission service for the wind generation it is statutorily mandated to acquire.^[291]

The EQB contends that Xcel did not fully consider upgrading the existing infrastructure between Lakefield Junction and Fox Lake.^[292] However, Xcel did explain why upgrading without a new transmission line was not feasible.^[293] Based upon the preponderance of the evidence, this certificate of need should be granted. It is the underpinning to all of the options for increasing outlet capacity to 825 MW.

Also, since Xcel already has contracts for 468 MW of generation and a statutory mandate for 425 MW of wind generation, it is appropriate to require the steps necessary to secure transmission service. It can do so by designating the contracts as network resources to serve its native load and immediately seeking MISO approval for transmission service.

Comparison of Option 1H and Option 3

If the Commission decides that the goal of increasing reliance on renewable resources and shifting away from fossil fuels justifies the expense and environmental impact of new construction, the two best options are Option 1H and Option 3. Based on the record presented, Option 1H, the option preferred by Xcel, is the more reasonable option. However, Option 3 is very close in virtually every respect. For that reason, it should remain a viable alternative during the routing process to assure that the environmental impact of the two options is more closely compared. If it is clear that siting Option 3 will have significantly less environmental impact than Option 1H, those concerns may offset the advantage that Option 1H has on other criteria.

In selecting Option 1H, Xcel evaluated performance, power and energy losses, practicality and price.^[294] It concluded that both Option 1H and Option 3 would perform adequately. It concluded that Option 1H would provide necessary stability, but that Option 3 should be more closely evaluated. Its study of energy losses will be discussed in detail below. It concluded that both Option 1H and Option 3 were practical, in that they could be physically implemented in a reasonable period of time with reasonable risk to customer loads. It also concluded that the installed cost of Option 1H was greater, but that total cost, including line losses, favored Option 1H.

It is undisputed that both Option 1H and Option 3 provide acceptable electrical performance. Both will provide 825 MW of outlet capacity from Buffalo Ridge. Xcel did not consider precisely where the wind generators would be located or in what megawatt increments. Thus, there is no evidence of the location of collector lines, transformers and substations of the connection costs for any of the options. Both Option 1H and Option 3 are sufficiently flexible to allow development on the northern and southern ends of Buffalo Ridge. However, Option 1H is the more “robust” option. The 345 kV line will provide greater reliability and stability to the transmission system, and better support future demand for transmission service.

Xcel has demonstrated that Option 1H meets the criteria for certificates of need and that no other option offers a better alternative.

Cost. The installed costs of Options 1H and 3 are close. The capital costs to install Option 1H are about \$4 million more expensive than Option 3, slightly more than a 2 percent difference. When the line losses are taken into account, Option 1H is the less expensive option. Xcel calculated that Option 1H was \$17.9 million less costly than Option 3.^[295] The Department of Commerce calculated that Option 1H was approximately \$36.3 million less expensive than Option 3.^[296]

PIN’s witnesses challenged Xcel’s analysis of the line losses. The Sierra Club and EQB also questioned whether Xcel had calculated the expected losses under projected average loading, or “average” levels of North Dakota Export (NDEX).^[297] During the course of the hearing, some parties requested additional discovery that would have required Xcel to redo the loss calculations. The requests were denied because it was unclear that the new calculations would yield any meaningful information, and, to a lesser degree, because of the timing of the request. Xcel’s witness, Mr. Gonzalez, offered a persuasive explanation for the methodology he used, including the 30 percent loss factor and NDEX value. That methodology was reviewed by, and agreed upon, by the MAPP working group that assisted with the transmission study. IWLA witness Schedin also accepted the soundness of Xcel’s methodology. PIN’s witnesses did not run any calculations to refute those produced by Xcel. Also, the relative ranking of the options was consistent with the general principle that an option that includes a 345 kV line could be expected to show decreased losses.^[298] PIN’s witness, Dr. Hughes, accepted this general principle.^[299] The principle was also supported by the decreased losses for Option 1H compared with Option 1 since the Buffalo Ridge to White line in Option 1H connects to a second 345 kV line.

No party performed alternative calculations.^[300] The Department concluded that it was preferable to use Xcel's loss figures rather than ignore the existence of losses altogether, and it completed its cost comparison accordingly. Its cost comparison resulted in a different dollar differential but the same relative ranking of Option 1H and Option 3 when line losses were considered.^[301]

Based on the evidence, it seems more likely than not that the relative ranking of the costs, taking into account the line losses, is correct, and that Option 1H is the less expensive option. It is one of the factors that favors Option 1H. However, this factor was not determinative in the selection of Option 1H. Although Xcel applied its methodology consistently across all options, the resulting dollar figures are only approximations. Xcel admitted that it is difficult to project actual daily conditions, taking into account the intermittency of wind and the fluctuating NDEX, and compute average line losses over a year. Instead, it made reasonable estimates, based on available information. Although Xcel may have done the best it could, such false precision should not be overly weighted in the determination of the best option. The difficulty in accurately calculating the line losses contributes to the conclusion that Option 1H and Option 3 are both reasonable options.

Operating and maintenance costs were not included in the analysis of the options, although Xcel's witness, Mr. LaCasse, testified that those costs are estimated to be a few percent of the installed cost of each element. Thus, because the installed cost of Option 3 is slightly lower than Option 1H, the annual operating and maintenance costs should also be slightly less.

Option 1H could be constructed in less time than Option 3. However, Option 3 requires fewer miles of new transmission lines, lower towers, and narrower rights-of-way.

The Environmental Impact. The certificate of need criteria require consideration of the effect of the proposed facility upon the natural and socioeconomic environment. Xcel did produce evidence that there is no significant barrier to the proposed construction of the lines. None of the parties identified specific environmental resources that would be irreparably damaged by any option. However, one cannot compare the relative environmental impact of Option 1H and Option 3 on this record because the precise routing of the lines is not known. The routing of the lines is within the province of the Environmental Quality Board. It will take a very close look at the proposed route for the four lines. Because Option 1H and Option 3 are comparable in many ways, if the EQB should determine that the environmental impact of Option 3 is significantly less than the impact of Option 1H, it may be reasonable to conclude that Option 3 is a reasonable and prudent alternative to Option 1H.

One area that is especially unclear is the need for additional rights-of-way. On the one hand, Xcel has represented that existing rights-of-way could be used to a great degree. On the other hand, it has estimated that the cost to acquire easement and land rights for Option 1H may be twice as expensive as Option 3.^[302] Option 1H requires 20 more miles of transmission lines than Option 3. Depending on the availability of existing

rights-of-way, one option could have significantly greater impact and higher cost than the other.^[303] This should be analyzed carefully.

It is important to consider the availability of existing rights-of-way so that private landowners are not forced to give up their land unnecessarily. Once the need for the transmission lines is determined, landowners may be powerless to resist the taking of their land through eminent domain. Money may not fully compensate them for the loss. One cannot fully value the loss of a home.^[304] Their interest in protecting their land must be considered.

There are several other significant factors that may affect the selection of routes, and could not be evaluated on this record. These include:

- Length, location and size of the proposed lines;
- Damage to the natural environment, including forest fragmentation, habitat, threatened and endangered species, Indian mound and archaeological resources;
- Visual impact, EMF, noise, corona, and stray voltage from the lines when proximity to residences or population is considered;
- Impact of construction; and
- Interference with existing land use, including agricultural land.

Some of these factors will affect the cost of the proposed lines. For example, the installed costs assume certain miles of line length. The length of the lines could increase if the route must be altered to avoid environmental damage. Longer lines have increased line losses which may effect the relative cost of the options. One option or the other may affect far fewer landowners. Given these uncertainties, it is appropriate to develop the environmental record more fully before determining that there is no prudent or feasible alternative to Option 1H.

The EQB may not consider the size, type and timing of the proposed transmission lines.^[305] That is, it should not reconsider whether either option is needed or capable of providing 825 MW of transmission capacity. But given that either Option 1H or Option 3 has been demonstrated to be viable, it is appropriate for the relative size and type of the physical structures used in the two options to be considered. The review should be limited to determining whether the other virtues of Option 1H are offset by significantly greater environmental harm as compared to Option 3.

Conditions to the Certificates of Need

Several of the parties propose conditions on the certificates of need. Those proposals address two key concerns. The first is to assure that the transmission lines serve their intended purpose, to enhance outlet capacity for wind generation on Buffalo Ridge. The record is clear that Xcel has no other purpose for these lines, and that it has

done no other studies that would support the need for these lines. Thus, some parties contend, Xcel should be required to put the lines to the intended use.

The second type of conditions favored by some of the parties would compel Xcel to participate in the development of a low voltage collector system so that small wind generators can successfully connect to the transmission system.

Xcel opposes any conditions because it contends that it has no control over which generators will be granted access to the transmission lines. It argues that Xcel's transmission lines are under the jurisdiction of MISO, and that MISO will determine which generators gain access to them. To a degree, Xcel's position is supported by the law, which does in fact operate to assure open access to the transmission lines and limit a utility from tying up its own transmission lines. However, the proposed transmission lines are designed for and needed for only one purpose: to provide outlet capacity for wind generation on Buffalo Ridge. If the new transmission lines are not used for that purpose, there is no need to incur the cost for them, and no need to take private land or damage the environment to build them.

Approval for Transmission Service. Although the changing federal regulations clearly favor open access to transmission service, the authority to determine need for the transmission lines remains with the Commission. In this case, the need for the proposed transmission lines rests solely on development of wind generation on Buffalo Ridge. Although the Commission cannot control the MISO approval process, it can condition operation of new transmission lines on demonstrated need. If MISO does not approve transmission service for wind generators on Buffalo Ridge, the four transmission lines included in Option 1H and Option 3 are not needed.

Accordingly, it is appropriate to allow the new transmission lines to come into service only when the requisite megawatts of wind generation have received approval for transmission service. With the strong interest in wind development, this should not be a difficult condition to meet.

Contract Requirements. The Department and IWLA propose that Xcel sign contracts for a certain number of megawatts of wind power as a condition of the certificates of need. Since Xcel has represented that it has 468 MW of wind generation under contract, such a condition would not seem to be necessary for granting the certificate of need for the first transmission line, the 161 kV line from Lakefield Junction to Fox Lake. Instead, to assure that the wind generation comes on line, Xcel must follow through with designating those contracts as network resources, and ask MISO to approve transmission access. Such approval is essential if Xcel is going to meet the goal previously set by the PUC to have 425 MW of wind generation under contract by the end of 2002. Thus, approval of the 161 kV line from Lakefield Junction to Fox Lake should be conditioned upon Xcel's agreement to designate of 468 MW of wind generation as a network resource and immediately request that MISO approve transmission service.

For the balance of the 825 megawatts, it would seem inconsistent with the record and with the federal law to require Xcel to contract for the full number of megawatts. It is clear that there are many requests for transmission service from wind generators already pending with MISO, and that not all of those involve contracts with Xcel.^[306] There is no apparent reason to limit access to the transmission lines to just the wind power under contract to Xcel, and such a limitation may conflict with federal laws promoting open access. Instead, it is sufficient to require that Xcel present evidence to the Commission prior to placing the additional three transmission lines into service that MISO has in fact granted transmission access for a total of 825 MW of wind generation.

Xcel can quickly negotiate wind contracts and apply for transmission service to reduce the risk this condition may present, but so long as the wind generation comes on line, it does not matter whether Xcel is the purchaser of the generation. There is no justification for the lines without the wind generation.

There could also be an intermediate step to this condition. If Option 1H is ultimately approved, the certificates of need for the 345 kV Split Rock to Lakefield Junction transmission line, and the Nobles-Fenton-Chanarambie 115 kV line could be conditioned upon MISO's approval of transmission access for 690 MW of wind generation from Buffalo Ridge. The final certificate of need, for the Buffalo Ridge to White 115 kV line, could be conditioned upon MISO's approval of the balance of the 825 MW of wind generation from Buffalo Ridge. The disadvantage of delaying approval of the fourth transmission line is that it could hamper development of wind generation on the northern part of Buffalo Ridge. This intermediate step is not available for Option 3.

IWLA suggests that the Commission could require Xcel to contract for 400 MW of wind generation by 2006. IWLA acknowledges that Xcel's approved resource plan requires 400 MW of wind generation by 2012, if it is cost effective. In its *Order Modifying Resource Plan, Requiring Additional Wind Generation, Requiring Further Filings, and Setting Standards for Next Resource Plan Filing*,^[307] the Commission reviewed arguments favoring a wind-only bid process and rejected that option. It concluded that competition with other forms of generation would likely yield the lowest wind price, and improve wind's competitive position in the long run. Accordingly, it rejected a wind-only bid process.^[308] Because there is already a resource plan with bidding requirements, it is inappropriate to add an additional contracting requirement to the certificate of need proceeding. The Commission may want to reopen the resource plan in light of the voluminous evidence that wind generation could conceivably supply well in excess of 825 MW of electricity before 2012. A resource planning docket would be the more appropriate vehicle to consider higher goals or shorter timelines.

IWLA has also suggested that Xcel immediately request up to 825 MW of transmission capacity for its network resources within fifteen days of the certificates of need being granted. The Department of Commerce agreed. However, it is not clear that Xcel can reserve transmission service until it has power purchase agreements, or at least a clear intent to enter into them with named vendors in specific locations.

Ownership of Wind Generation

NAWO and the Rural Minnesota Energy Task Force's support for the certificates of need and Option 1H is dependent upon Xcel developing a collector system to facilitate locally-owned, dispersed wind development. The Sierra Club's support for Option 3 is subject to the same condition. The Task Force states that its first priority is to increase the opportunity for local ownership of small-scale wind energy development.^[309]

There is no doubt that the economic benefit for southwestern Minnesota will be greater if locally-owned, dispersed wind development takes place. Local ownership is more likely to involve local financing, and profits are more likely to be invested or spent locally. The agricultural economy in southwestern Minnesota is unstable, and residents of the area would like to protect their rural life-style and develop new forms of income. Wind power could provide that opportunity. The 1996 study, *Economic Impact Analysis of Windpower Development in Southwest Minnesota*, concluded that the economic development from wind may be ten times greater if the new generation is locally owned and financed.^[310]

Both Mr. Benson and Mr. Nichols testified that the region has not benefited from current wind operations to the degree anticipated because only 21 of the 457 turbines operating on Buffalo Ridge are locally owned. Large out-of-state corporations own the rest.^[311] As David Benson, Chair of the Task Force, testified, opposition to the siting of the power lines will be offset in part if the local residents anticipate that the local economy will see a significant benefit from the related development of wind generation. "We would recognize that Option 1-H without the collector system would have generalized benefits to the society in terms of the development of renewables, but the localized benefits for the host community would be minimal and we would find it difficult to support."^[312] The Task Force is actively seeking financing and assisting local landowners to participate in wind development, and seeking support from Xcel to bolster local ownership.

NAWO's witness, Dan Juhl, who is developing small wind projects, echoed Mr. Benson's opinion that local residents would be less likely to oppose transmission lines if there were greater opportunity for local economic development.^[313]

One impediment to locally-owned wind development is uncertainty over the costs of interconnection to the transmission system and whether Xcel or other transmission service providers will participate in those costs. One of the Task Force's objectives is to negotiate a cost-sharing method with Xcel that will reduce the capital investment necessary for local residents to own, operate and receive revenue from small-scale wind generators. It may be that a collector system is crucial to that development.

The development of Option 1H originated with public testimony urging Xcel to consider increasing the opportunity for outlet from the northern part of Buffalo Ridge as well as the southern part.^[314] In response to the testimony, Xcel analyzed the addition of the Buffalo Ridge to White line to Option 1, replacing the second Lake Huron to

Fenton line. That variation led to the presentation of Option 1H, which became Xcel's preferred option because it provided greater flexibility and proved to be less expensive than Option 1. Because of this development, the Task Force argues that it saved the ratepayers the difference in cost between Option 1 and Option 1H, approximately \$12 million, that could be allocated to the development of a collector system. This was referred to as "Pareto Optimal," reflecting that the parties offering an option that saved money could benefit from the savings without any commensurate disadvantage to other parties.^[315]

Another suggestion was that the Commission direct Xcel to work with the other parties to the proceeding to develop a collector system that would facilitate local development. Yet another suggestion was that Xcel be required to commit to the criteria it would apply in determining when and where substations would be added, thus assuring that local interests could plan accordingly.

Although good social policy might encourage local development, there is insufficient evidence in the record to recommend specific conditions to the certificates of need that could accomplish that goal. There is no clear statement by the parties of what precisely the Commission should order to promote local generation. Although there was some suggestion that Xcel allocate the \$12 million "saved" by its shift from Option 1 to Option 1H to construction of a collector system, no party recommended that expenditure as a condition to approval of the certificates of need.

Sierra Club proposed that Xcel be required to contract with local landowners for a minimum of 30 megawatts of wind generation by December 31, 2002. Sierra Club and NAWO advocated that Xcel be required to build needed substation facilities whenever 20 or more megawatts of small, locally-owned wind generators were aggregated on Buffalo Ridge in areas with at least Class 3 winds. However, such conditions do not seem appropriate to a certificate of need for transmission lines.

The State's preference for renewable energy and development of wind power is not based on the local economic benefit from the ownership and operation of the wind turbines but by a desire to move away from dependence on fossil fuels. Who owns the wind turbines does not affect this goal. Ownership of the generation does not affect the design, construction, capacity or operation of the transmission lines. There are already many wind-generation projects listed on the MISO queues. Preference for one type of ownership over another may also be inconsistent with the tariffs that govern access to transmission service.

In addition, the Commission has required Xcel and other utilities to do resource planning and has given them goals for developing renewable generation. It may be good public policy to require Xcel to give preference to locally-owned generators in its bid process, or to develop a financing mechanism so that small locally-owned generators can better compete for Xcel's business. The burden of hosting transmission lines may justify such preferences. However, there are many possible ways to accomplish those goals, and a number of competing interests. If there is a strong argument favoring local ownership, and evidence that a collector system will facilitate

local ownership, it should be addressed in a proceeding where all types of generators and all types of owners have notice that those issues are under consideration. It would not be obvious from the Commission's Order referring this matter to OAH, or from the Notice of Hearing, that preferences or incentives for local ownership of wind generation were going to be determined in this docket.

The concerns of the Task Force are important ones. The history of power line siting in Minnesota has sometimes been marked by strong local opposition. Even though the public as a whole may benefit from new transmission lines, there is no doubt that the burden of the transmission lines falls most heavily on the local landowners whose lands are taken or crossed. For those landowners, the burden may far outweigh any benefit, and they are understandably upset by the intrusion on their property. Several creative ideas for making the transmission lines less of a burden and more of a benefit were offered during this proceeding. The Commission may want to explore those. Nonetheless, one cannot conclude from this record that the certificates of need in this case should be tied to a particular type of ownership, or a particular type of financial incentive. The social benefits of increasing wind generation are clearly reflected in state statute and Commission Orders. Who owns that wind generation is not.

It is appropriate, however, for Xcel to state its criteria for constructing new substations, and what interconnection costs it will require contractors to bear. The lack of criteria and information hampers the efforts of local wind developers to construct a proposal and obtain financing. If, for example, Xcel agreed that it would build substation facilities whenever 20 or more megawatts of small, locally-owned wind generation were constructed, it would provide a level of certainty that is currently lacking. In order to assure that the region does benefit from the new transmission lines, it is appropriate to require Xcel to work with locally elected representatives and other interested parties to develop criteria that it will follow.

Limiting the Use of the Transmission Lines to Wind-Generated Electricity

There was a great deal of speculation throughout the hearing about whether approval of Option 1H would inevitably spur development of coal generation in North and South Dakota. Sierra Club and PIN, especially, questioned Xcel's witnesses extensively about the capacity of the 345 kV line, its potential to carry power above the 825 MW of wind generation, and its suitability to transfers of bulk power from the Dakotas. Their concerns are appropriate. The environmental effects of coal power have been well documented. North Dakota is very interested in developing a 500-megawatt lignite coal generator.^[316] However, one must conclude on this record that the relationship between either Option 1H or Option 3 and future coal generation is entirely speculative. No additional generation from points in North or South Dakota was added into the modeling. Any significant amount of additional generation would require new studies to determine its effect on the transmission system. On this record, there is no basis to conclude that either Option 1H or Option 3 is a subterfuge for increased coal generation, or that one option or the other would better facilitate increased North Dakota export.

Xcel maintains that the form of generation is not relevant to the need determination for a transmission line. While that might be true in most cases, the form of generation is clearly

relevant here because Xcel has steadfastly maintained that the only reason it has applied for the certificates of need is to serve wind generation. The record shows that Xcel's proposal assumes that power injected into the system would come through either the Chanarambie or Yankee substations, and that only renewable forms of generation are developing in that area. One can reasonably conclude that the new transmission lines are indeed intended to serve renewable forms of generation. Placing conditions on the certificates of need that tie construction to MISO's approval of wind generation transmission requests will assure that the intended purpose is served.

Notice

Xcel complied with the statutory notice provisions. Notice of these proceedings was published widely. The Reinhardts claim that the notice was not adequate to inform landowners that private lands might be taken if the certificates of need were granted. The Reinhardts are correct that the notice did not specifically state that private lands might be needed if the certificates of need were granted. However, the proceedings were well-publicized and many local elected representatives attended the hearings in Worthington, Pipestone and Redwood Falls. The Task Force, made up of representatives of 10 counties in the affected area, fully participated in the proceeding, and certainly understand that private lands might be needed. The Commission is currently conducting rulemaking on the certificate of need process and may wish to consider the Reinhardts' concerns in that context. In this case, however, one cannot conclude that due process was denied by the lack of individual notice to landowners in the possible corridors.

Eminent Domain

The Reinhardts also questioned the statutory structure which compensates landowners who have wind turbines sited on their property differently from those whose property is taken for construction of transmission lines. Although this is an interesting question, it is outside the scope of this proceeding. As transmission lines become more interconnected, and Minnesota and the surrounding area increase their export of electricity to other parts of the country, the Legislature may want to reexamine how landowners are compensated for their property.

The Environmental Report

As part of the certificate of need proceeding, the applicant must file an environmental report. **Rules promulgated by the EQB set forth the report requirements.**

Contents. The environmental report on the certificate of need application shall include:

- A. a brief description of the proposed facility;
- B. an identification of reasonable alternatives of a different sized facility, a transmission line with different endpoints, upgrading existing transmission lines, and additional generating facilities;

C. a general evaluation, including the availability, estimated reliability, and economic, employment, and environmental impacts, of the proposal and alternatives; and

D. a general analysis of the alternatives of no facility and delayed construction of the facility, which analysis shall include consideration of conservation and load management measures that could be used to reduce the need for the proposed facility.

The environmental report shall not be as exhaustive or detailed as an EIS and shall consider only those route differentiating factors identifiable pursuant to the information requirements of part 7849.0260; and the report shall be reviewed in the manner provided in part 4410.7100, subparts 5 to 12.^[317]

The EQB requires the PUC to “be responsible for preparation of an environmental report on [a large high voltage transmission line] at the certificate of need stage.”^[318] The PUC, in turn, assigns that responsibility to the applicant.^[319] In this case, Xcel designated its application, supplemented prior to hearing, as its draft environmental report (DER).^[320] As required, the DER was available for review, and the public had notice of the opportunity to comment.^[321] In addition, the parties had the opportunity to submit comments. Xcel responded to the comments submitted. The draft report, comments and responses constitute the “final” environmental report.^[322] They were added to the record, and were considered in preparing these recommendations.^[323] As part of the record in this proceeding, they will be available to the Commission when making its decision.^[324]

Several of the comments to the draft report go to the merits of the certificate of need determination and have been duly considered. Some of the comments admonish Xcel for failing to provide sufficient information. The environmental report can be brief and general. It need not be as exhaustive or detailed as an environmental impact statement.^[325] Although some parties challenge the completeness of Xcel’s evaluation of alternatives, the DER’s scope exceeds what the rule requires.

At the certificate of need stage, the environmental review is intended to be general. Although there are content requirements, neither the ALJ nor the PUC is directed to make findings and conclusions about the report itself. Instead, general information is gathered and considered when deciding on the certificate of need. Therefore, Sierra Club’s assertions that the PUC must act as a responsible governmental unit, apply independent judgment and impartial analysis, and prepare a detailed environmental report are not supported by statute or rule.^[326]

The statute and rules governing the certificate of need require the PUC to consider environmental information in its decision. For example, the applicant must include certain environmental data.^[327] In addition, the applicant must analyze the alternative of not building the facility.^[328] This information must be weighed with the other statutory criteria in reaching a final determination concerning the certificate of

need.^[329] In so doing, the environmental consequences of the alternatives, including the size, type and timing of those alternatives have been considered.

The EQB will conduct additional environmental review as part of its proceedings to route any power lines granted a certificate of need.^[330]

B.J.H.

^[1] Minn. Stat. § 216B.243, subd. 4 (2002) requires that a Commission employee be designated to facilitate public participation in the proceeding. Unless otherwise noted, statutes are cited to the 2002 edition.

^[2] Exhibit 1 is the initial application, revised January 24, 2002. It was further supplemented and amended on March 25, 2002 (Ex. 2) and April 2, 2002 (Ex. 3); Exhibit 35 is the compiled, complete application.

^[3] The Petition to Intervene was made orally at the Prehearing Conference on May 1, 2002 and there was no opposition to the Reinhardt's request. Their interest is stated in the Notice of Appearance which includes "Grounds for Intervention," dated February 27, 2002.

^[4] Petition to Intervene of the Izaak Walton League of America.

^[5] Petition to Intervene of Sierra Club.

^[6] Public Intervenors Network Petition to Intervene.

^[7] Petition to Intervene of the North American Water Office.

^[8] Petition to Intervene of the American Wind Energy Association.

^[9] Petition to Intervene of the Rural Minnesota Energy Task Force.

^[10] Petition to Intervene of Minnesotans for an Energy-Efficient Economy.

^[11] Petition to Intervene of Minnesota Power, April 22, 2002, and response to objections to its Petition, April 30, 2002.

^[12] Minn. Stat. §§ 116C.51-116C.69.

^[13] Minn. Stat. §§ 116C.53, subd. 2.

^[14] Minn. Stat. § 216B.243, subd. 7.

^[15] Petition to Intervene of the Minnesota Environmental Quality Board Staff.

^[16] Minn. Stat. §§ 216C.09, 216C.10(a)(9); 216B.243, subd. 7.

^[17] Additional motions concerning discovery, intervention and other matters were filed and additional orders were issued; all of the documents are included in the record.

^[18] Minn. Stat. § 216B.2421, subds. 2 and 3 (as amended, 2001 Minn. Laws Ch. 212, Art. 7, §29.)

^[19] See Minn. R. 7829.2500, subp. 4.

^[20] Exs. 12, 13, 32; Ex. 9, p. 16, ll. 13-16 (Alders).

^[21] See Minn. R. 4410.7100, subp. 6; Ex. 12.

^[22] Tr. V. 10, p. 11, l. 22 - p. 12, l. 19; Tr. V. 13, p. 7, l. 24 - p. 8, l. 2.

^[23] Tr. V. 21, pp. 43-50.

^[24] See Minn. R. 7849.0230, subps. 3 and 4.

^[25] See Minn. R. 7829.0900.

^[26] Exs. 713 and 716.

^[27] Ex. 510.

^[28] Tr. V. 8, pp. 105, 111, ll. 15-17. (Alders).

^[29] Tr. V. 8, pp. 89, 95-96 (Alders).

^[30] Ex. 1.

^[31] Ex. 34.

^[32] Ex. 2.

^[33] Ex. 3.

^[34] Ex. 35.

^[35] Ex. 35, p.1.

[36] Minn. Stat. § 216C.05.

[37] Tr. V. 12, p. 133, l. 21-p. 134, l. 1 (S. Jones).

[38] Minn. Stat. § 216B.1691, subd. 2.

[39] Minn. Stat. § 216B.2423, subd. 1.

[40] Ex. 15, MPUC Resource Plan Order E002/RP-98-32; Minn. Stat. § 216B.2423, subd. 2.

[41] Minn. Stat. § 216B. 2422, subds. 2,4.

[42] Minn. Stat. § 216B.169, subd. 2.

[43] Minn. Stat. § 216B.1645, subd. 2.

[44] Tr. V. 12, p.111, ll. 13-14 (S. Jones).

[45] Ex. 35, p. 4. Exhibits 733 and 734 show the location of current wind development, the proposed common projects (in pink) and proposed projects included in Option 1H (Ex. 733) and Option 3 (Ex. 734).

[46] Ex. 200; See also Ex. 37, Minnesota's Wind Resource By Wind Speed Class, Prepared by the Minnesota Department of Commerce, February 2000.

[47] See, e.g., Ex. 17, p. 10, ll. 5-9 (S. Jones); Ex. 306, p. 3, l. 3 to p. 5, l. 14 (J. Caldwell). Throughout this proceeding, the term "Buffalo Ridge" sometimes referred to the larger geographical region surrounding the physical ridge, consisting of approximately 10 counties in the southwestern corner of Minnesota. Tr. V. 10, p. 149, ll. 16-25 (Alders).

[48] Ex. 35, p. 41, Table 4-1; Ex. 17, p. 10, l. 15 - p. 11, l. 2 (S. Jones).

[49] Tr. V. 7, pp. 96-97 (Gonzalez).

[50] Ex. 35, p. 4, p. 38; Minn. Stat. § 216B.2423; Ex. 17, p. 12, ll. 9-11; Ex. 7, p. 3, ll. 10-12; Tr. V. 7, p. 64, ll. 13-22; Exs. 735 and 736 reflect the location of the new development. See also Ex. 3002, attached ex. SO-1.

[51] Tr. V. 10, p. 166, ll. 20-25 (Alders).

[52] Ex. 7, p. 4, ll. 2-12 (Gonzalez).

[53] Ex. 306, p. 5 (Caldwell).

[54] *Id.*, pp. 5-6.

[55] Ex. 35, p. 39; Ex. 3002, attached ex. SO-2.

[56] Tr. V. 10, pp. 117-118 (Alders).

[57] Tr. V. 10, pp. 145-146 (Alders).

[58] Ex. 35, Appendix 1, p. 43.

[59] *Id.*

[60] Tr. V. 10, p. 74, ll. 1-7 (Alders); Tr. V. 12, p. 107, l. 21 - p. 108, l. 14 (S. Jones).

[61] Tr. V. 12, p. 108, l. 24 - p. 109, l. 14 (S. Jones).

[62] Ex. 49.

[63] Tr. V. 9, p. 55, ll. 21-25 (Alders).

[64] Ex. 35, Appendix 5, p. 39. Appendix 5 explains FERC and MISO jurisdiction in detail.

[65] Ex. 35, Appendix 5, p. 27, citing *Midwest Indep. Sys. Operator, Inc.*, 97 FERC para 61, 326 (2001); Tr. V. 7, p. 141 (Gonzalez).

[66] Ex. 35, Appendix 5, pp. 23-25.

[67] Ex. 35, Appendix 5, pp. 21-22.

[68] Ex. 35, Appendix 5, p. 26.

[69] Tr. V. 7, p. 141 (Alders).

[70] Ex. 35, Appendix 5, pp. 8-9; citing *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Serv. by Pub. Util.; Recovery of Stranded Costs by Pub. Util. and Transmitting Util.*, Order No. 888, FERC Stats. & Regs. [Reg. Preambles 1996-2000] 31,036 (1996), *order on reh'g*, Order No. 888-A, FERC Stats. & Regs. [Reg. Preambles 1996-2000] para. 31,048 (1997), *order on reh'g*, Order No. 888-B, 81 FERC para 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC para 61,046 (1998), *aff'd in substantial part sub nom. Transmission Access Policy Study Group v. FERC*, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom. New York v. FERC*, 122 S. Ct. 1012 (2002).

[71] Ex. 24, pp. 2-3 (J. Johnson).

[72] Ex. 35, Appendix 5, p. 42.

[73] Tr. V. 13, p. 111, ll. 4-18 (J. Johnson).

[74] Ex. 35, Appendix 5, p. 41; Tr. V. 10, p. 90, ll. 8-17 (Alders).

[75] Ex. 24, p. 4 (J. Johnson); Tr. V. 13, pp. 116-118, pp. 172-173 (J. Johnson); Ex. 303, p. 4, ll. 9-12 (Hempling).

[76] Definition of "Native Load", Ex. 35, Appendix 5, p. 14, n. 15, quoting Pro Forma OATT, § 1.19.

- [77] See Ex. 35, Appendix 5, pp. 16-17.
- [78] Tr. V. 10, p. 159, ll. 10-23 (Alders).
- [79] Tr. V. 23, p. 27, l. 19-p. 28, l. 5 (Gonzalez).
- [80] Tr. V. 10, p. 161, ll. 6-22 (Alders).
- [81] Ex. 307, p. 3 (D. Olsen).
- [82] *Id.*
- [83] Ex. 35, p. 39.
- [84] Ex. 31, p. 19, ll.10-14 (D. Jones).
- [85] Ex. 307, p. 4 (D. Olsen).
- [86] *Accord*, Tr. V. 17, p. 76, ll. 2-16 (Hempling).
- [87] Ex. 35, Appendix 5, pp. 40-41; see also pp. 16-17, defining “Network Service”; Ex. 308, p. 9, ll. 10-23 (Schedin); Ex. 24, pp. 5-9 (J. Johnson); Tr. V. 13, pp. 177-181 (J. Johnson).
- [88] Tr. V. 14, p. 49, l. 3 – p. 50, l. 16 (J. Johnson). See also, Tr. V. 17, p. 76, ll. 7-10 (Hempling).
- [89] Ex. 35, Appendix 5, p. 47; Ex. 522, p. 3; Ex. 24, p. 7, l. 15 - p. 8, l. 10 (J. Johnson); Ex. 25.
- [90] Ex. 31, p. 19, ll. 12-14 (D. Jones); Ex. 24, p. 13, l. 4 - p. 14, l. 2 (J. Johnson).
- [91] Ex. 26; Ex. 24, p. 15, ll. 1-14 (J. Johnson).
- [92] Ex. 35, Appendix 5, pp. 46-47; Tr. V. 10, p. 150, l. 24 - p. 151, l. 11 (Alders).
- [93] Ex. 4, p. 6 (Gonzalez).
- [94] Ex. 35, pp. 15-17, elements 1-15; p. 21, Table 2-1.
- [95] Ex. 35, pp. 18-19.
- [96] Ex. 35, pp. 14-20, Appendix 2B, Option 1 Transfer Limit Table Generator (“TLTG”) table.
- [97] Ex. 35, Appendix 3, Figure AP: 3-1.
- [98] Ex. 50, p. 3, ll. 2-9 (Gonzalez); Tr. V. 25, p. 132, ll. 11-15 (Gonzalez); Ex. 53.
- [99] Ex. 53, TLTG table.
- [100] Ex. 50, pp. 2-3 (Gonzalez); Ex. 53 “A”.
- [101] Ex. 35, pp. 23-27, Appendix 2B, Option 3 TLTG table.
- [102] Ex. 35, pp. 23-24; p. 36, Table 3-1.
- [103] Ex. 35, Appendix 3, Figure AP: 3-2.
- [104] Ex. 35, pp. 27-31, Appendix 2B, Option 4 TLTG table.
- [105] Ex. 35, Appendix 3, Figure AP: 3-3.
- [106] Ex. 35, pp. 31-35, Appendix 2B, Option 5 TLTG table.
- [107] Ex. 35, pp. 31-37, p. 37-A Table 3-3.
- [108] Ex. 35, Appendix 3, Figure AP: 3-4.
- [109] Ex. 2, Appendix 6.
- [110] Ex. 35, Appendix 6-B, Option 1D TLTG table.
- [111] Ex. 35, Appendix 6-B, Option 1E TLTG table.
- [112] Minn. R. 7849.0260 B (6).
- [113] Ex. 35, Appendix 6-B, Option 6 TLTG table.
- [114] Ex. 35, pp. 59-60; Ex. 35, Appendix 6, p. 3.
- [115] Minn. R. 7849.0110.
- [116] Ex. 35, pp. 15-17, elements 1-15; p. 21, Table 2-1.
- [117] Ex. 35, p. 15.
- [118] *Id.*
- [119] Ex. 35, Appendix 3, Figures AP: 3-5, 3-6, 3-7, 3-8; Ex. 59.
- [120] Tr. V. 12, p. 38, ll. 18-23 (LaCasse).
- [121] Tr. V. 12, p. 98, ll. 3-7 (S. Jones).
- [122] Tr. V. 12, p. 99, ll. 5-8 (S. Jones); Tr. V. 20, p. 96, l. 21 - p. 97, l. 6 (Schoengold).
- [123] See e.g., Ex. 31, p. 7, l. 15 - p. 8, l. 2 (D. Jones); Ex. 50, p. 13, ll. 7-16 (Gonzalez); Tr. V. 8, p. 23, ll. 9-12, p. 32 (Gonzalez).
- [124] Tr. V. 10, p. 157, l. 17 - p. 158, l. 2 (Alders); Tr. V. 23, p. 122, ll. 14-17 (Gonzalez).
- [125] See Minn. R. 7849.0270.
- [126] Tr. V. 15, p. 129, ll. 10-16 (D. Olsen); Ex. 306, p. 2, ll. 6-9 (J. Caldwell).
- [127] Ex. 25; Ex. 24, p. 8, ll. 7-10 (J. Johnson).
- [128] Ex. 3005, p. 18, line 8; p. 20, l. 19 – p. 21, l. 3; p. 21, ll. 9-22 (Rakow); Ex. 3012, p. 1 (Rakow).
- [129] Docket No. E002/RP-00-787; Ex. 3012, pp. 11-14 (Rakow).
- [130] Ex. 3005, p. 12, ll. 1-16 (Rakow); Ex. 3012, p. 13 (Rakow).

[131] Ex. 25.
[132] Ex. 307, p. 8, ll. 1-3, 9-18 (D.Olsen).
[133] Ex. 35, pp. 50-51; Ex. 31, p. 15, ll. 12-16 (D. Jones).
[134] Ex. 4, pp. 25-30 (R. Gonzalez); Ex. 3005, p. 15, l. 20 – p. 16, l. 18 (Rakow); Ex. 31, p. 20, ll. 6-13 (D. Jones).
[135] Ex. 307, pp. 6-7 (D. Olsen); Tr. V. 8, p. 62, l. 22-p. 65, l. 9 (Alders).
[136] Ex. 15; Ex. 35, p. 48; Ex. 35, Appendix 1, p. 47.
[137] Ex. 53, Tr. V. 23, p. 116, ll. 18-21; p. 131, ll. 1-7 (Gonzalez).
[138] Tr. V. 23, p. 121, l. 25 – p. 122, l. 13 (Gonzalez).
[139] See Minn. Stat. § 216B.2422, subd. 4.
[140] Minn. R. 4100.7100, subp. 3(1).
[141] Ex. 3005, attached ex. SRR-3.
[142] Ex. 3005, pp. 24-25 (Rakow).
[143] Ex. 510.
[144] See e.g., Minn. Stat. § 216B. 2423, subsd. 1 and 2; PUC Order No. E002/RP-98-32; Minn. Stat. § 216B.1691; Ex. 716, pp. 55-57.
[145] Ex. 3001, attached ex. DT-2, p. 4.
[146] Ex. 35, pp. 62-64.
[147] Ex. 2020; Tr. V. 7, pp. 29-30 (Gonzalez).
[148] See, e.g., Ex. 18 (Dodge County).
[149] For example, IWLA witness David Olsen has plans to develop approximately 200 MW of wind generation near Sioux Falls, South Dakota, and his firm is considering development of up to 3000 additional megawatts. Ex. 307, p. 7; Tr. V. 15, p. 99.
[150] Tr. V. 28, pp. 62, 327 (Rakow).
[151] Tr. V. 9, p. 51, l. 19 - p. 52, l. 8 (Alders).
[152] Ex. 35, Appendix 2-B, Option 5 TLTG table.
[153] Ex. 35, p. 58; Exs. 51, 54.
[154] Tr. V. 19, p. 52, ll. 7-18; p. 55, ll. 5-9; p. 58, ll. 2-6 (Hughes).
[155] Ex. 641; Ex. 35, Appendix 2-B; Ex. 53.
[156] See Part B(2), *infra*.
[157] Minn. Stat. § 116D.04, subd. 6.
[158] Ex. 31, pp. 11-12 (D. Jones).
[159] Tr. V. 23, p. 16, l. 24 – p. 17, l. 18 (Gonzalez).
[160] Ex. 4, p. 21; Ex. 50.
[161] Ex. 9, pp. 8-9 (Alders).
[162] Ex. 35, Appendix 3, Figure AP: 3-8; Ex. 59.
[163] Ex. 307, p. 7, ll. 1-4 (D. Olsen).
[164] Ex. 53; Tr. V. 8, p. 30, l. 15 - p. 31, l. 7 (Gonzalez).
[165] Tr. V. 23, p. 72, ll. 7-12 (R. Gonzalez).
[166] Ex. 3009, p. 13, l. 20 to p. 14, l. 2, and attached ex. SO-12 (Ouanes).
[167] Ex. 35, Appendix 2 (TLTG tables); Ex. 53.
[168] Tr. V. 23, p. 52, ll. 4-24 (Gonzalez).
[169] Ex. 35, Appendix 2 (TLTG tables); Ex. 53.
[170] Vol. 20, p. 29, ll. 5-16 (Schedin).
[171] Tr. V. 25, p. 36, ll. 8-19; p. 87, l.18 – p. 88, l. 4; p. 95, ll.19-25; p. 110, l.16 – p. 111, l. 2 (Gonzalez).
[172] Tr. V. 25, p. 111, ll. 12-15 (Gonzalez).
[173] Ex. 308, p. 5, ll. 18-21 (Schedin); Tr. V. 19, p. 82, ll. 20-22 (Hughes); Tr. V. 25, p. 101, ll. 23-25 (Gonzalez).
[174] Ex. 35, Appendix 2.
[175] Tr. V. 23, p. 16, ll. 11-22; p. 18, l. 3 - p. 19, l. 24 (Gonzalez); Ex. 35, Appendix 2, p. 4.
[176] Ex. 642.
[177] Ex. 35, Appendix 2, p. 5; Tr. V. 24, p. 95, l. 17 – p. 97, l. 11(Gonzalez).
[178] Tr. V. 24, p. 98, ll. 1-5, ll. 11-14 (Gonzalez).
[179] Tr. V. 16, p. 107, l. 18 - p. 108, l. 10 (Gonzalez).
[180] Tr. V. 25, p. 96 (Gonzalez). For overall explanation of the loss calculation, see Tr. V. 25, pp. 85-98 (Gonzalez).

[181] Tr. V. 24, p. 103, l. 11 – p. 105, l. 24; Tr. V. 25, p. 74, ll. 13-22 (Gonzalez).

[182] Ex. 601, pp. 9-10; Ex. 635, pp. 18-20 (Hughes).

[183] Tr. V. 19, pp. 30-35.

[184] Tr. V. 19, pp. 39-40.

[185] Tr. V. 20, p. 125, ll. 3-17.

[186] Tr. V. 26, p. 39, l. 3 – p. 42, l. 6; p. 68, l. 17 – p. 71, l. 3 (Hughes). The EQB also had questions about the engineering aspects of the loss calculations.

[187] Exs. 54, 56.

[188] Ex. 54. If H-frame construction is used for the 345 kV line, Option 1H is less expensive than Option 3 at about 425 MW. Ex. 7, pp. 11-12 (Gonzalez). With the 50% Chanoramble/50% Yankee development, Option 1H is less expensive above 650 MW. Ex. 56.

[189] Tr. V. 26, p. 97, ll. 6-11 (Ouanes).

[190] Ex. 3014, p. 2, ll. B28-D4 (Ouanes).

[191] Ex. 35, p. 19 (Nobles County and Fenton substations) and Appendix 4B, pp. 1-2 (Yankee substation).

[192] Xcel Response to comments to Draft Environmental Report, p. 10 (August 12, 2002).

[193] Ex. 20, pp. 8-9 (LaCasse); Tr. V. 12, p. 70, ll. 20-23; p. 80 (LaCasse).

[194] Ex. 35, pp. 80-99.

[195] Ex. 3001, attached ex. DT-3.

[196] Ex. 35, Appendix 3, Figures AP: 3-13, 3-14, 3-15 and 3-16.

[197] Exs. 2032, 2035.

[198] Ex. 2036.

[199] Tr. V. 10, p. 33; p. 134, ll. 16-20; p. 135, l. 22 - p. 136, l. 6 (Alders).

[200] Ex. 35, pp. 72-74, tables 6-1, 6-2; Ex. 3001, p. 9, ll. 11-18 (Teske).

[201] Minn. R. 7030.0010 *et seq.*

[202] Ex. 3009, p. 9, ll. 18-21 (Teske).

[203] Ex. 35, pp. 71-72.

[204] Tr. V. 10, p. 53, l. 3 - p. 55, l. 2 (Alders).

[205] *Accord* Tr. V. 10, p. 68, l. 20 - p. 69, l. 2 (Alders).

[206] Ex. 35, Appendix 2, p. 2.

[207] Tr. V. 10, p. 161, ll. 6-22 (Alders).

[208] Ex. 604, p. 2.

[209] Tr. V. 20, p. 67, ll. 1-14 (D. Jones).

[210] Tr. V. 3, p. 18, l. 8 - p. 19, l. 11 (Gonzalez).

[211] Ex. 35, Appendix 2, pp. 29-30.

[212] Ex. 713.

[213] Ex. 35, p. 79, *citing Final Report of the Science Advisors to the Minnesota Public Utility Commission: Research Findings and Recommendations Regarding Claims of Possible Effect of Currents in the Earth on Dairy Cow Health and Milk Production*, July 1998.

[214] Ex. 3001, attached ex. DT-3, pp. 1-2.

[215] Tr. V. 12, pp. 86-87 (LaCasse). Ex. 3002, attached ex. SO-14.

[216] Ex. 2044.

[217] *See, e.g.*, Ex. 35, pp. 19-20, items 18, 19 and 20.

[218] Ex. 2045.

[219] Ex. 3002, attached ex. SO-17.

[220] Ex. 3009, p. 21, ll. 1-5; Ex. 3002, attached ex. SO-17; Ex. 523.

[221] Ex. 523, *citing* Minn. Stat. § 273.425.

[222] Ex. 523.

[223] Ex. 611, p. 6 (*Economic Impact Analysis of Windpower Development in Southwestern Minnesota*, Sept. 1996); Tr. V. 5, pp. 89-91, pp. 109-110 (Juhl); Tr. V. 10, p. 95 (Alders).

[224] Tr. V. 24, pp. 15-21, 24, 25 (Benson).

[225] Tr. V. 13, p. 74, l. 16 – p. 76, l. 16 (Kotz). *But see*, Tr. V. 12, p. 83, ll. 11-16 (LaCasse) (transmission construction jobs average \$35/hr.)

[226] *See also*, Tr. V. 5, pp. 109-110 (Juhl); Ex. 405.

[227] Ex. 400, p. 5 (Juhl); Ex. 802 (Benson).

[228] Ex. 35, p. 63.

[229] Minnesota Department of Commerce, 2001 State Energy Planning Report (Jan. 2000) at 36.

[230] Ex. 35, pp. 46-47 and Appendix 2.

[231] Ex. 3001, attached ex. DT-2, North American Electric Reliability Council Reliability Assessment, p. 7.

[232] Ex. 35, pp. 52-53 and Appendix 2; Ex. 53; Ex. 4, p. 6 (Gonzalez).

[233] Ex. 35, pp. 52-53; Ex. 3002, attached ex. SO-18; Ex. 3009, p. 21, ll. 12-20 (Ouanes).

[234] Ex. 35, pp. 53-54 and Appendix 2, § 5.3, p. 13, table 4.

[235] Ex. 35, Appendix 2, p. 2.

[236] Ex. 35, pp. 54-55.

[237] *Id.*; Ex. 53 A. *But see* Ex. 35, Appendix 2-B, Option 3, Ft. Calhoun-Omaha Interface upgrade, estimated at \$5.9 million.

[238] Ex. 35, Appendix 2, § 7.2, p. 30.

[239] Tr. V. 15, p. 178, ll. 7-10 (Schedin).

[240] Ex. 3002, attached ex. SO-18; Tr. V. 15, p. 194, ll. 5-8 (Schedin).

[241] Ex. 36, p. 4.

[242] *Id.*

[243] Ex. 3009, p. 20, ll. 1-4, 12-16 (Ouanes).

[244] Ex. 4, p. 25 (Gonzalez).

[245] Tr. V. 20, p. 67, ll. 1-22 (D. Jones).

[246] Ex. 802, pp. 1-2 (Benson).

[247] Ex. 802, pp. 2-3 (Benson).

[248] Ex. 802 (Benson).

[249] Ex. 9, pp. 12-13 (Alders); Ex. 31, p. 18, ll. 1-5 (D. Jones); *see also* Ex. 519.

[250] Tr. V. 1 at 58-59 (Benson); V. 3 at 64-65 (J.D. Jones); V. 6 at 89 (Toftland).

[251] Tr. V. 5 at 15 (Forrest).

[252] Tr. V. 6 at 20 (Norgaard).

[253] Ex. 528.

[254] Tr. V. 6 at 62 (Nichols).

[255] Tr. V. 6 at 73 (Nichols).

[256] Tr. V. 10 (Femling, Dickinson, Childs, Eibenholz); v. 11 (Fleming, Jacobi, Comeau).

[257] Tr. V. 2 at 15-17 (Nauerth); *see also* written submission from Mr. Nauerth, Feb. 25, 2002.

[258] Roger Kas, Steve Tiedeman, Doug Fey, Gary Boeve, Pete Bisson.

[259] Ex. 308, p. 4, ll. 1-20. In their Initial Brief at page 4, the IWLA, ME3 and AWEA add some interim deadlines for complying with these conditions. These include: having signed power purchase agreements (PPA's) with wind developers for a total of 825 MW of wind-generated power by December 31, 2003, and immediately seeking PUC approval for those PPA's; designating the new wind generation as network resources; requiring the additional 400 MW of wind-generated power to be installed by the end of 2006; requiring Xcel to submit requests for transmission service to MISO for at least 825 MW of wind generated power within 15 days of Commission approval of the certificates of need; and requiring Xcel to report any proposed regulatory changes that could affect the conditions the PUC places on the certificates of need.

[260] *Initial Brief of the Energy Division of the Minnesota Department of Commerce*, pp. 70-71.

[261] *Sierra Club Memorandum Supporting Issuance of Certificates of Need for Transmission Line Option 3 Alternative with Conditions*, p. 88.

[262] *Initial Brief of the North American Water Office*, p. 26.

[263] *Initial Post-Hearing Brief of The Rural Minnesota Energy Task Force*, p. 9 (*see also* p. 6, possible criteria).

[264] Minn. Stat. §§ 216.243 and 14.50.

[265] *Order Accepting Application as Substantially Complete and Notice and Order for Hearing*, Feb. 11, 2002.

[266] Minn. Stat. § 216B.243, subd 3; Minn. R. 7849.0120.

[267] *See, e.g.* Minn. Stat. § 116.04, subd. 6.

[268] Minn. Stat. § 216B.243, subd. 4.

[269] Minn. R. 7829.1100; Minn. R. 7829.2500, subd. 9.

[270] Minn. Stat. § 216B.243, subd. 4.

[271] *Order Accepting Application as Substantially Complete and Notice and Order for Hearing*, p. 4;

[272] Minn. Stat. § 116C.53, subd. 2; Minn. Stat. § 216B.243, subd. 7.

[273] Minn. Stat. § 216B.243, subd. 2.

[274] Minn. Stat. § 216B.2421, subd. 2, as amended, 2001 Minn. Laws Ch. 212, Art. 7, § 29.

[275] Minn. Stat. § 216B.2423, subd. 1.

[276] Minn. Stat. § 216B.2423, subd.2.

[277] *Id.*, subd. 2a.

[278] Minn. Stat. § 216B.243, subd. 3a.

[279] See Minn. Stat. § 216B.2422.subd. 4.

[280] *Id.*

[281] Minn. Stat. § 216B.243, subd. 5; Minn. R. 7849.0400, subp. 1.

[282] Minn. R. 7849.0110.

[283] Minn. R. 4100.7100, subp. 3(1).

[284] Minn. R. 4410.7500, subp. 3.

[285] Minn. Stat. § 216.1645, subd. 2, as amended, Laws 2001, Ch. 212, art. 8, § 1; Tr. V. 10, p. 12, ll. 14-16; p. 14, ll. 3-7 (Krikava).

[286] Tr. V. 14, p. 96 (J. Johnson); Tr. V. 15, p. 237 (D. Jones).

[287] 18 C.F.R. § 35.28 (c) (1) and (c) (2) (2001).

[288] Ex. 635, pp. 6, 9-11 (Hughes).

[289] *Accord, People for Environmental Enlightenment and Responsibility (PEER) v. Environmental Quality Council*, 266 N.W.2d 858, 867, n.n. 12-13 (Minn. 1978).

[290] Tr. V. 9, p. 51, l. 19 – p. 52, l. 8 (Alders); Tr. V. 28, pp. 62, 327 (Rakow).

[291] Minn. Stat. § 216B.2423, subd. 1.

[292] *Brief of the Minnesota Environmental Quality Board*, pp. 23-25.

[293] Ex. 2020; Tr. V. 7, pp. 29-30 (Gonzalez).

[294] Tr. V. 23, ll. 1-10 (Gonzalez).

[295] Ex. 53.

[296] Ex. 3014, p. 2, ll. B28-D4.

[297] See Minn. R. 7849.0260, subps. A(3) and C(6).

[298] Ex. 308, p. 5, ll. 18-21 (Schedin); Tr. V. 25, p. 101, l. 20 – p. 102, l. 6 (Gonzalez).

[299] Tr. V. 19, p. 82, ll. 20-22 (Hughes).

[300] The Legislature has directed the Department of Commerce to sponsor a “Reliability Administrator” to present “independent, factual, expert and technical information on infrastructure proposals.” Minn. Stat. § 216.052, subd. 1(a)(3). That independent analysis was not provided in this proceeding.

[301] Ex. 50, p. 11, ll. 1-7 (Gonzalez), Ex. 54 (Gonzalez); Ex. 3014, p. 2, l. D4 (Ouanes).

[302] *Compare*, Exs. 2044 and 2045.

[303] See also, Minn. Stat. § 116C.63, subd. 4 which allows the landowner to sell all contiguous, commercially viable land to the utility.

[304] *Cooperative Power Ass’n v. Eaton*, 284 N.W. 2d 395, 397 (Minn. 1979).

[305] Minn. Stat. § 116C.53, subd. 2.

[306] The Department of Commerce would require 675 MW of contracts. Ex. 3012, p. 3 (Rakow).

[307] Ex. 15, Docket No. E-002/RP-98-32, February 17, 1999.

[308] *Id.*, pp. 10, 23.

[309] *Initial Post-Hearing Brief of the Rural Minnesota Energy Task Force*.

[310] Ex. 611; Tr. V. 5, pp. 109-110 (Juhl).

[311] Tr. V. 6, p. 68 (Nichols).

[312] Tr. V. 24, p. 44, ll. 12-23 (Benson).

[313] Tr. V. 5, pp. 89, 109 (Juhl).

[314] Tr. V. 6, p. 20, ll. 6-22 (Norgaard).

[315] Tr. V. 28, p. 30, l. 17 – p. 31, l. 4 (Rakow).

[316] Ex. 604 (Lignite Vision 21 Transmission Report); Ex. 610, p. 7 (Gascoyne entry); Ex. 505.

[317] Minn. R. 4410.7500, subp. 3.

[318] Minn. R. 4410.7500, subp. 1.

[319] Minn. R. 7849.0230.

[320] Ex. 35.

[321] Minn. R. 4410.7100, subp. 6.

[322] Minn. R. 4410.7100, subp. 8; Minn. R. 7849.0230, subp. 3.

[323] Minn. R. 4410.7500, subp. 2; Minn. R. 7849.0230.

[324] Minn. R. 4410.7100, subp. 11.

- [\[325\]](#) Minn. R. 4410.7100, subp. 4.
- [\[326\]](#) Minn. R. 4410.7100, subp. 4.
- [\[327\]](#) Minn. R. 7849.0310.
- [\[328\]](#) Minn. R. 7849.0340.
- [\[329\]](#) See Minn. Stat. § 216B.243.
- [\[330\]](#) Minn. Stat. § 116C.57; Minn. R. 4400.1210.