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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 1
Date Received: October 31, 2007

Question:

On an on-going basis, please provide the Department a copy of the Applicants' responses to other parties' information requests in this proceeding.

Response:

We have noted your request and will provide copies to the Department.

Response By: Jim Alders
Title: Manager Regulatory Projects
Department: Government and Regulatory Affairs
Company: Xcel Energy
Telephone: 612-330-6732
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow Information Request No. 2
MN Department of Commerce
Date Received: October 31 , 2007

Question:

Please explain why the following conductors were chosen, as mentioned on pages 2.10 to 2.11 of the Petition:

a. a bundled conductor of two 954 ACSS cables for all proposed 345 kV transmission lines;
b. a single conductor, 795 ACSS cable for the proposed 230 kV transmission line; and
c. a single conductor, 795 ACSS cable for both proposed 161 kV transmission lines.

Response:

The size of conductor for the voltage classes of the lines proposed have become fairly standardized. In the early 1990s, Northern States Power Company ("NSP") sought to standardize the conductors it used on various transmission lines. The three projects under consideration in this proceeding have incorporated NSP's standardization work in their planning. The result of this standardization was to reduce life-cycle costs. This was done through 1) more closely matching line conductor capacity to the capacity of associated substation equipment, such as switches and breakers, 2) reducing impedance and, therefore system losses, and 3) controlling warehousing carrying costs by reducing the quantities of materials in emergency stock.

NSP also considered whether to use ACSR or ACSS conductors. Typically, an ACSS conductor can carry nominally 60 percent more power than identically-sized ACSR, but adds significantly less to the total project cost. As a result of this effort,

the ACSS conductor was selected as the standard for 345 kV, 230 kV, and 161 kV transmission lines.

Specific sized conductors were also chosen for each voltage. For 345 kV lines, the standard is a 954 ACSS bundled conductor. The most recent 345 kV project in the State, the Lakefield Junction to Split Rock 345 kV line, was constructed using the standard 954 ACSS bundled conductor. A bundled conductor is the standard because it reduces corona and audible noise. The 954 ACSS conductor is the standard because of its capacity (approximately 2,050 MVA), lower loss profile and minimal increased costs over the 795 ACSS conductor (approximately 1,860 MVA capacity) – in general, the step up from 795 ACSS to 954 ACSS results in approximately three percent increased project cost.

Twin Cities – Brookings County 345 kV Project:

The primary need studied in the Southwestern Minnesota Study was the need to increase generation outlet capability in Southwestern Minnesota. It was concluded that the 954 ACSS bundle conductor was the appropriate size because it would increase the power carrying capability, provide a lower impedance path, and have a lower losses profile than 795 ACSS.

The Twin Cities – Brookings County 345 kV Project also includes a 230 kV line from Hazel Creek Substation to Minnesota Valley Substation. The 795 conductor size is the most common size 230 kV conductor in service in the State. In essence, the proposal extends the existing 230 kV system that terminates in the Granite Falls area to the proposed Hazel Creek Substation. Since the existing 230 kV system uses the 795 conductor there would be no advantage to building the short connection to Hazel Creek to higher capacity standards.

Since filing the application, planning efforts have progressed. As noted in the Biennial Transmission Report, engineers are examining whether it makes sense to convert the existing 230 kV line from Granite Falls to the Twin Cities to 345 kV as the next step, after the CapX2020 Twin Cities – Brookings County 345 kV Project to increase transmission support to the Buffalo Ridge area. Consequently, the Applicants are re-evaluating the design of the Hazel Creek to Minnesota Valley segment of the CapX2020 proposal. The Department will be notified as soon as that examination is complete.

Twin Cities – Fargo 345 kV Project

The initial need driving the Twin Cities – Fargo 345 kV Project is to improve system reliability in the communities in the southern zone of the Red River Valley, the Alexandria area and the St. Cloud area. Study work indicated the 795 ACSS conductor could adequately serve the immediate needs to be addressed.

In the TIPS Update, the Forbes – Chisago 500 kV line was identified as the critical outage in the area as it pertains to loading on the Twin Cities – Fargo 345 kV line. The proposed project must be appropriately sized to make up for the capacity lost if the Forbes line were out of service. It is estimated that, immediately upon installation, the new Twin Cities – Fargo 345 kV line will carry 600 MVA of power during the loss of the Forbes line because it would be a strong path linking generation in Manitoba to the Twin Cities. Given demand growth patterns and significant wind resource potential in northwestern Minnesota and North Dakota, it is anticipated that the loading of this line will increase over time, justifying use of the higher capacity conductor.

Based on these near and longer-term needs, cost and the lower loss profile of a larger conductor, the 954 ACSS bundled conductor was chosen for construction of the Twin Cities – Fargo 345 kV line.

Twin Cities – La Crosse 345 kV Project

The initial need driving the Twin Cities – La Crosse 345 kV Project is also community service reliability. The electrical systems in the Rochester area and La Crosse require improvement to reliably meet the growing demand for power. In this case, study work also concluded that the 795 ACSS conductor could adequately address the immediate load-serving needs. However, the growth trend in these communities is expected to continue. Moreover, there is increasing interest in wind development in south-central and southeast Minnesota. Consistent with the long range comprehensive planning approach of the Vision Plan, there is also opportunity to connect the La Crosse line to power systems to the east or south in the future. It was concluded that the standard 954 ACSS bundled conductor, with its higher capacity and lower losses profile, would offer the best long-term system support.

For the 161 kV lines, the standard 795 ACSS conductor was chosen. A 795 ACSS conductor has a rating of 434 MVA. This conductor size (795) is the typical size used for 161 kV lines in the State. Additionally, planning engineers concluded

that this capacity rating was needed to provide system support in the event of a 345 kV line outage.

Response By:	Amanda King
Title:	Sr. Transmission Planning Engineer
Department:	Transmission Planning
Company:	Xcel Energy
Telephone:	612-330-5931
Date:	February 13, 2008

Response By:	Daniel Kline
Title:	Transmission Planning Engineer
Department:	Transmission Reliability & Assessment
Company:	Xcel Energy
Telephone:	612-330-7547
Date:	February 13, 2008

Response By:	Jared Alholinna
Title:	Senior Transmission Planning Engineer
Department:	Transmission Planning, Contracts & Strategy
Company:	Great River Energy
Telephone:	763-241-5797
Date:	February 13, 2008

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Xcel Energy
Docket No. E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 3
Date Received: October 31, 2007

Question:

Regarding the list of underlying facilities in Figure 2-14 of the Petition, to the best of the Applicants knowledge, would the anticipated best solution for any of the overloaded facilities require a new (i.e., not reconductored or rebuilt to the same voltage) transmission line with either:

a. a capacity of 200 kV or more and greater than 1,500 feet in length in Minnesota; or
b. a capacity of 100 kV or more with more than ten miles of its length in Minnesota or that crosses a state line?

If so, please list the overloaded facility and associated the anticipated solution

Response:

At this time, none of the anticipated solutions for the overloaded facilities in the underlying electrical system includes any new transmission lines that meet the definitions set forth in "a" or "b" above.

Response By: Jim Alders
Title: Manager Regulatory Products
Department: Government and Regulatory Affairs
Company: Xcel Energy
Telephone: 612-330-6732
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 4
Date Received: October 31, 2007

Question:

The June 6, 2007 response of Northern States Power Company, a Minnesota Corporation and wholly-owned subsidiary of Xcel Energy (Xcel) to Department Information Request No. 18 b-f in Docket No. E002/CN-06-1518 indicates that the French Island generation units are scheduled to be retired in 2010 (units 1 and 2) and 2015 (units 3 and 4). How would those retirements effect:

a. the need analysis for the Twin Cities—La Crosse line in general; and
b. the critical load levels and MW at Risk provided in Figure 4-8 of the Petition?

Response:

a. It is expected that if French Island units 1 and 2 are retired, the critical load level would decrease by 26 MW for Figures 4-5 through 4-7.

In general, the analysis in the Application of the reliability risks in the La Crosse/Winona Area assumed that units 1 and 2, which are fueled with refuse derived fuel, were on-line at 13 MW each (26 MW total) and units 3 and 4, which use fuel oil, at 70 MW each (140 MW total) were off-line. Figures 4-5 through 4-7 illustrate the above French Island generation assumption of 26 MW on-line. This assumption is based on current use of the generators. Generally, units 1 and 2 are run during the weekdays and units 3 and 4 are only run when needed for system security. If units 3 and 4 are on-line, the load levels in Figures 4-5 through 4 7 increase by 140 MW. This is also stated in the text accompanying Figures 4-5 through 4-7.

b. There are two critical load levels shown in Figure 4-8, 450 MW and 470 MW. The 470 MW critical load level assumes the following conditions:

- JPM on-line
- G3 on-line
- French Island 1 and 2 on-line – 26 MW
- French Island 3 and 4 off-line – 0 MW
- Outage of Genoa-Coulee 161 kV line

If French Island units 1-4 are retired, the 470 MW critical load level is reduced by 26 MW to 444 MW.

The 450 MW critical load level assumes the following conditions:

- JPM off-line
- G3 on-line
- French Island 1 and 2 on-line – 26 MW
- French Island 3 and 4 on-line – 140 MW
- Outage of Genoa-Coulee 161 kV line

If French Island 1-4 are retired, the 450 MW critical load level is reduced by 166 MW to 284 MW.

Response By: Amanda King
Title: Sr. Transmission Planning Engineer
Department: Transmission Planning
Company: Xcel Energy
Telephone: 612-330-5931
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 5
Date Received: October 31, 2007

Question:

Do the Applicants believe that the retirement dates for the French Island generators need to be coordinated with the completion of the Twin Cities – La Crosse line in some manner, or is such coordination unnecessary?

If yes, please explain how they should be coordinated.

Response:

Xcel Energy anticipates that the retirement date(s) for the French Island generators will be extended beyond the expected 2011/2015 completion timeframe of the Twin Cities – La Crosse 345 kV Project. The rationale surrounding the contemplated extension of the French Island generator operation will be addressed in Xcel Energy's upcoming Resource Plan.

Response By: Richard D. Peterson
Title: Resource Analyst
Department: Resource Planning & Bidding
Company Xcel Energy
Telephone: 612-330-5831
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 6
Date Received: October 31, 2007

Question:

Otter Tail Power Company's most recent resource plan (Docket No. E017/RP-05-968) at page 6-11 to 6-12 indicates that Hoot Lake units 2 and 3 are scheduled to be retired in 2017. How would those retirements effect:

a. the need analysis for the Twin Cities – Fargo line in general; and
b. the critical load levels and MW at Risk provided in Figure 4-13 of the Petition?

Response:

The Twin Cities – Fargo 345 kV project is expected to be in service in 2015, prior to the estimated 2017 retirement date. Additionally, the Hoot Lake site is expected to be under consideration for life extension, re-powering, or use for other resources that would continue to provide voltage support in the region. For discussion purposes only, the below outlines the hypothetical case of the Hoot Lake units 2 and 3 not being available/retired.

If the assumption is made that the Hoot Lake units 2 and 3 are retired in the study timeframe, then this further supports the need for the Twin Cities – Fargo 345 kV Project. However, if the Hoot Lake units 2 and 3 remain in-service, the planned addition of Fargo to St. Cloud 345 kV line is still needed for voltage support in the Red River Valley study area. Operation of the Hoot Lake generators has a marginal positive affect on voltage levels in the Enderlin, North Dakota area during the critical contingency, loss of the 345 kV Center – Jamestown – Maple River line. Power flow analysis indicates that if the Hoot Lake generators are not operating, voltages levels in the Enderlin, North Dakota decrease by 0.5%. As a result, retirement of the Hoot Lake generators would not appreciably alter the critical load level of 1,360 MW shown in Figure 4-13.

However, retirement of the Hoot Lake generators would have a significant impact on the critical load level in the Alexandria area. Under contingent conditions, removing the Hoot Lake generators results in a 2.5 % drop in voltage at Elbow Lake, which is only two buses away from Hoot Lake (Hoot Lake – Grant County – Elbow Lake) and, thus, derives a lot of its voltage support from the Hoot Lake generators (under system intact conditions). The critical load in the Alexandria area with Poleyard generation off-line is 171 MW. If Hoot Lake generators 2 and 3 were retired, the critical load level would drop to 150 MW, resulting in an estimated deficiency of approximately 28 MW in the year 2019.

Response By: Daniel Kline
Title: Transmission Planning Engineer
Department: Transmission Reliability & Assessment
Company: Xcel Energy
Telephone: 612-330-7547
Date: December 4, 2007

Response By: Jason Weiers
Title: Supervisor, Transmission Planning
Department: Delivery Planning
Company: Otter Tail Power
Telephone: 218-739-8311
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 7
Date Received: October 31, 2007

Question:

Do the Applicants believe that the retirement dates for the Hoot Lake generators need to be coordinated with the completion of the Twin Cities – Fargo line in some manner, or is such coordination unnecessary? If yes, please explain how they should be coordinated.

Response:

Because the estimated 2017 retirement date for the Hoot Lake generators is after the proposed 2015 in-service date of the Twin Cities – Fargo line, and the Hoot Lake site is expected to be under consideration for life extension, re-powering, or use for other resources that would continue to provide voltage support in the region, no coordination should be necessary. However, should the in-service date for the Twin Cities – Fargo 345 kV project (specifically the Alexandria terminal) be delayed beyond 2017, it may be prudent to delay retirement of the Hoot Lake generators.

Response By: Daniel Kline
Title: Transmission Planning Engineer
Department: Transmission Reliability & Assessment
Company: Xcel Energy
Telephone: 612-330-7547
Date: December 4, 2007

Response By: Jason Weiers
Title: Supervisor, Transmission Planning
Department: Delivery Planning

Company: Otter Tail Power
Telephone: 218-739-8311
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 8
Date Received: October 31, 2007

Question:

The June 6, 2007 response of Xcel to Department Information Request No. 18 b-f in Docket No. E002/CN-06-1518 indicates that 61.3 MW of Granite City generation is scheduled to be retired in 2009. How would those retirements effect:

a. the need analysis for the Twin Cities – Fargo line in general; and
b. the critical load levels and MW at Risk provided in Figure 4-19 of the Petition?

Response:

a. The Company anticipates that the operation of the Granite City generators will be extended beyond the expected 2011 completion timeframe of the Monticello – St. Cloud portion of the Twin Cities-Fargo 345 kV line. If the units were retired, the load level at which customer service is at risk would be lowered, which would increase the exposure to that risk. Under contingency conditions, the demand for power in the St. Cloud area already exceeds the capability of the electrical system serving the area. The Granite City generators provide an internal power source within the city of St. Cloud. When Granite City generation is unavailable (due to retirement, maintenance or any other reason) the critical load level in the St. Cloud area drops substantially. The diminishing critical load levels are listed in Appendix C-3 under the scenario with Granite City generation offline.

   Granite City generation does not have a measurable impact on the need analysis in either the Red River Valley or the Alexandria area.

b. The critical load level in the St. Cloud area without Granite City generation is 228 MW (Appendix C-3). For example, in 2011, if Granite City generation is not available, there would be an estimated 180 MW at risk in 2011 under

critical contingency conditions. The megawatts at risk would increase to approximately 207 MW in 2016.

Response By: Daniel Kline
Title: Transmission Planning Engineer
Department: Transmission Reliability & Assessment
Company: Xcel Energy
Telephone: 612-330-7547
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 9
Date Received: October 31, 2007

Question:

Do the Applicants believe that the retirement dates for the Granite City generation needs to be coordinated with the completion of the Twin Cities – Fargo line in some manner, or is such coordination unnecessary? If yes, please explain how they should be coordinated.

Response:

The Company anticipates that the operation of the Granite City generators will be extended beyond the expected 2011 completion timeframe of the Monticello – St. Cloud portion of the Twin Cities – Fargo line. The rationale surrounding the contemplated extension of the operation of the Granite City generator will be addressed in the Company's upcoming Resource Plan.

Response By: Richard D. Peterson
Title: Resource Analyst
Department: Resource Planning & Bidding
Company Xcel Energy
Telephone: 612-330-5831
Date: December 4, 2007

Response By: Daniel P. Kline
Title: Transmission Planning Engineer
Department: Transmission Reliability & Assessment
Company Xcel Energy
Telephone: 612-330-7547
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow Information Request No. 10
MN Department of Commerce
Date Received: October 31, 2007

Question:

On page 7.25 of the Petition the Applicants state:

> Compared with the cost of constructing 230 kV or 115 kV lines in addition to the Twin Cities – Fargo 345 kV line and given the length of time a 345 kV solution would effectively address the Alexandria-area voltage problems, the incremental cost of adding the termination at Alexandria is a reasonable solution to the existing issues.

Regarding this statement, please provide estimates of:

a. the cost of constructing the 230 kV or 115 kV lines;
b. the incremental cost of adding a termination at Alexandria; and
c. the length of time the 345 kV solution would effectively address the Alexandria-area voltage problems.

Response:

a. The 230 kV alternative would consist of a 230 kV transmission line from the Henning Substation to the Alexandria Substation that would be approximately 45 miles long and cost approximately $32.6 million. There would also be approximately $7.8 million in additional transformer and other substation costs at Alexandria Switching Station.

b. The incremental cost of adding a 345 kV line termination in the Alexandria area has been estimated to be approximately $12.5 million.

c. Based on currently forecasted load growth, the 345 kV solution for the Alexandria area has been forecasted to last until approximately 2050. The 230 kV

solution would effectively address the Alexandria-area voltage problems until approximately 2025.

Response By:	Daniel Kline
Title:	Transmission Planning Engineer
Department:	Transmission Reliability & Assessment
Company:	Xcel Energy
Telephone:	612-330-7547
Date:	November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 11
Date Received: October 31, 2007

Question:

On page 9.22 of the Petition the Applicants discuss television interference. Would the future switch to digital television broadcasts cause any changes to television interference?

Response:

Both analog and digital TV signals are susceptible to interference from transmission lines, however analog and digital television reception exhibit different failure modes when impacted by electric interference (noise) or multipath (reflected) signals from structures.

For analog reception, the picture gradually deteriorates and becomes "noisy" (speckles throughout the picture) possibly accompanied by "ghosting" (multiple images) or "tearing" (loss of picture lock).

Digital reception is, in most cases, considerably more tolerant of electric interference and somewhat less resistant to multipath reflections. In the digital realm, the picture does not gradually degrade; rather, at what is called the "avalanche point", the picture suddenly pixelates (turns into squares) and usually "freezes". This pixelating and freezing occurs at approximately the same interference environment as the point at which the analog picture becomes unusable.

If the interference is due to the power line, the electric utility will remedy problems so that reception is restored to its original quality. Generally, the problem is resolved by moving or raising or adjusting the customer's antenna. In some instances, a more effective antenna or a signal amplifier is required.

Response By: Stephen LaCasse
Title: Senior Transmission Engineer
Company: Ulteig Engineers
Telephone: 763-277-6211
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow Information Request No. 12
MN Department of Commerce
Date Received: October 31, 2007

Question:

Page 16 of Appendix A-1 of the Petition states:

> When a certificate of need (CON) is filed for Big Stone II, a vision study sensitivity will be completed to determine how the Big Stone II project proposed facilities fit into the timeline for the CapX 2020 vision study facility additions.

Regarding this statement, has the vision study sensitivity been determined? If so, please explain the results of the analysis.

Response:

Yes. This analysis was undertaken in the Southwestern Minnesota Study (Appendix A-4). In that study, planning engineers assumed the Big Stone II proposed generation and transmission improvements were in place.

Response By: Amanda King
Title: Sr. Transmission Planning Engineer
Department: Transmission Planning
Company: Xcel Energy
Telephone: 612-330-5931
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 13
Date Received: October 31, 2007

Question:

Page 17 of Appendix A-1 of the Petition states:

> The team temporarily put aside base case results but eventually will compare them with the post-new facility results for each bias to find the most effective set of 345 kV and higher transmission infrastructure additions…

Regarding this statement, has this analysis been completed? If so, please explain the results of the analysis.

Response:

Yes. This statement was intended to describe the next step in the Vision Plan process, which has been completed. This was the step where the results of the eastern and Minnesota biases were compared to the base case scenario. This step is described in Section 4.2 of the Vision Plan and the analysis of these results is contained in Sections 4.3, 4.4, 4.5 and 6.

Response By: Amanda King
Title: Sr. Transmission Planning Engineer
Department: Transmission Planning
Company: Xcel Energy
Telephone: 612-330-5931
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 14
Date Received: October 31, 2007

Question:

Page 29 of Appendix A-1 of the Petition states:

> As explained in section 4.5, additional sensitivity work is still pending for the eastern bias case, both at the 6300 MW level and the slow growth scenario.

Regarding this statement, has the additional sensitivity work been completed? If so, please explain the results of the analysis.

Response:

In the Vision Plan (Appendix A-1), planning engineers assumed three generation location scenarios: Minnesota Bias, North/West Bias, and an Eastern Bias. Each of the generation location assumptions was analyzed using a 6,300 MW growth level from 2009 to 2020 and a "slow growth" analysis of 4,500 MW. The results of these six sets of assumptions were then compared to identify transmission facilities that were common across all scenarios. The facilities proposed in this proceeding were common facilities.

The sentence quoted above from page 29 of the Vision Plan, which refers to a sensitivity work discussion in section 4.5, was erroneously included in the document, Appendix A-1. The sentence was contained in an earlier draft of the document, at a time when the Eastern Bias analysis had not been done. Between that time and the October 2005 Vision Plan, this work was completed. *See* Vision Plan, Table 8 and Diagram 12 (6,300 MW level) and Table 15 (on page 36) and Diagram 15 (4,500 MW level). Accordingly, in the October 2005 Vision Plan, the sensitivity discussion in section 4.5 was removed. The sentence on page 29 should also have been removed prior to the October 2005 publication.

Response By: Amanda King
Title: Sr. Transmission Planning Engineer
Department: Transmission Planning
Company: Xcel Energy
Telephone: 612-330-5931
Date: December 10, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 15
Date Received: October 31, 2007

Question:

Please provide a copy of Appendices B and C of the transmission study provided in Appendix A-1 of the Petition. If possible, please provide this data on a CD rather than on paper.

Response:

The information requested is enclosed on CD, Bates No. CapX2020 000001.

Response By: Jim Alders
Title: Manager Regulatory Projects
Department: Government and Regulatory Affairs
Company: Xcel Energy
Telephone: 612-330-6732
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow Information Request No. 16
MN Department of Commerce
Date Received: October 31, 2007

Question:

Page 2 of Appendix A-2 of the Petition indicates that the next steps are incremental transfer simulation studies and system dynamics (stability) analysis. Has this analysis been completed? If so, please summarize the results of the analysis.

Response:

System dynamics studies evaluate the dynamics stability of the overall system with the addition of the proposed facilities. The analysis evaluates whether the system can withstand the loss of a line under high system power transfer conditions. Generally, when new transmission facilities are added to a system, dynamic stability is improved. System dynamics studies were not done at the time of the Rochester/La Crosse Study because dynamics studies are time intensive, and it was uncertain when the project would receive funding. In addition, changes in the line that can be brought about by the regulatory process (line length, routing, number, and location of interconnections) can affect the performance of the transmission line. These studies are generally completed before facilities can be placed in service.

Incremental transfer simulation studies evaluate how the proposed facilities benefit bulk power transfers from one area to another. These studies are typically completed in conjunction with the system dynamics study and are frequently one part of the system dynamics study.

Preliminary system dynamics and incremental transfer simulation studies for the three 345 kV Projects in this Application are scheduled to be done in 2008. Additional study work will be undertaken after the configuration and route are finally determined and prior to the lines being placed in service.

Response By: Amanda King
Title: Sr. Transmission Planning Engineer
Department: Transmission Planning
Company: Xcel Energy
Telephone: 612-330-5931
Date: December 10, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow Information Request No. 17
MN Department of Commerce
Date Received: October 31, 2007

Question:

Page 7 of Appendix A-2 of the Petition indicates that analysis is being done to determine the effects of the options on the Minnesota Wisconsin Stability Index. Has this analysis been completed? If so, please summarize the results of the analysis.

Response:

The impact of a project on interstate constraints, such as the Minnesota Wisconsin Stability Index ("MWSI"), is a type of system stability study. This type of system stability study is dependent, in significant part, on a project's route, *e.g.,* topology, length and interconnections. As a result, these studies are typically undertaken when route, length, and interconnections have been determined. For example, in the case of the Arrowhead – Weston 345 kV line, a study team comprised of operations and planning engineers from the area utilities, as well as a MISO representative, was formed in early 2007 and significant study work was undertaken during the summer of 2007. The line is expected to be in service in 2008.

It is anticipated that a similar group will be formed to conduct an analysis of the Twin Cities – La Crosse 345 kV Project after regulatory approvals are obtained.

Response By: Amanda King
Title: Sr. Transmission Planning Engineer
Department: Transmission Planning
Company: Xcel Energy
Telephone: 612-330-5931
Date: December 10, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 18
Date Received: October 31, 2007

Question:

Please reconcile the differences between the $191.6 million cost estimate provided on page 145 of Appendix A-2 and the $330 to $360 million cost estimate provided on page 1.17 for the Twin Cities-La Crosse component of the proposed project.

Response:

The initial cost figures were planning-level estimates produced in late 2005 or early 2006 for the purpose of screening alternatives in electrical performance analysis. Since that time, Xcel Energy has designed and begun construction of the Lakefield Junction to Split Rock 345 kV line. Data from this recent project was updated further and used to establish new estimates for the CapX2020 projects.

The increase in estimated costs primarily can be attributed to: 1) actual design data from a recent, robustly designed 345 kV project and 2) recent significant cost increases in materials and labor necessary to construct these projects.

Response By: Grant Stevenson
Title: Senior Project Manager
Department: Xcel Energy Transmission
Company: Xcel Energy
Telephone: 612-330-6330
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 19
Date Received: October 31, 2007

Question:

Please reconcile the differences between the $140 million installed cost estimate provided on page 56 of Appendix A-3 for the "South Source" option and the $390 to $560 million cost estimate provided on page 1.17 for the Twin Cities-Fargo component of the proposed project.

Response:

The initial cost figures were planning-level estimates produced in late 2005 or early 2006 for the purpose of screening alternatives in electrical performance analysis. Since that time, Xcel Energy has designed and begun construction of the Lakefield Junction to Split Rock 345 kV line. Data from this recent project was updated further and used to establish new estimates for the CapX2020 projects.

The increase in estimated costs primarily can be attributed to: 1) actual design data from a recent, robustly designed 345 kV project and 2) recent significant cost increases in materials and labor necessary to construct these projects.

Response By: Grant Stevenson
Title: Senior Project Manager
Department: Xcel Energy Transmission
Company: Xcel Energy
Telephone: 612-330-6330
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 20
Date Received: October 31, 2007

Question:

Please reconcile the differences between the ($304 + $50=) $354 million cost estimates provided on pages 53 and 56 of Appendix A-4 and the $600 to $665 cost estimate provided on page 1.17 for the Twin Cities-Brookings County component of the proposed project.

Response:

The initial cost figures were planning-level estimates produced in late 2005 or early 2006 for the purpose of screening alternatives in electrical performance analysis. Since that time, Xcel Energy has designed and begun construction of the Lakefield Junction to Split Rock 345 kV line. Data from this recent project was updated further and used to establish new estimates for the CapX2020 projects.

The increase in estimated costs primarily can be attributed to: 1) actual design data from a recent, robustly designed 345 kV project and 2) recent significant cost increases in materials and labor necessary to construct these projects.

Response By: Kevin Lennon
Title: Manager Regional Transmission Projects
Department: Regional Transmission
Company Great River Energy
Telephone: 763-241-2216
Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 21
Date Received: October 31, 2007

Question:

Please provide a copy of volume 2 (Appendices D through K) of the transmission study provided in Appendix A-4 of the Petition. If possible please provide this data on a CD rather than on paper.

Response:

The information requested is enclosed on CD, Bates No. CapX2020 0000002.

Response By: Jim Alders
Title: Manager Regulatory Projects
Department: Government and Regulatory Affairs
Company: Xcel Energy
Telephone: 612-330-6732
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 22
Date Received: October 31, 2007

Question:

Are the "Brookings Co – Yankee 115 kV #2" and "Brookings Co – Toronto 115 kV" lines mentioned on page 4 of Appendix A-4 of the Petition part of the Applicants' cost estimates and/or certification requests in this proceeding? If not, please explain why not.

Response:

The transmission system in the Buffalo Ridge area is comprised of lower voltage facilities that are internal to the Ridge (primarily 115 kV and lower voltage lines) and higher voltage lines that are external to the Ridge (*e.g.*, Lakefield Junction Substation – Split Rock Substation 345 kV line). The higher voltage lines are designed to transfer large amounts of power to the larger load centers to the east. The lower voltage lines are designed to provide access to the high voltage "bulk transmission system" lines. To use a transportation analogy, the higher voltage lines are the freeway and the lower voltages lines are the on-ramps to the freeway.

In analyzing options for further increasing generation outlet capability in the Buffalo Ridge area and points west in the Southwestern Minnesota Study, planning engineers made certain assumptions about where generation will likely develop and how to collect that power and connect it with the bulk transmission system. Planning engineers concluded that the Twin Cities – Brookings County 345 kV line is needed to provide additional capacity to move power from the Buffalo Ridge area to load centers to the east, primarily the Twin Cities. Planning engineers also identified two potential smaller voltage lines, on-ramps, to connect the generation with the bulk power system. These two lines were the Brookings County – Yankee 115 kV #2 line and the Brookings County – Toronto 115 kV line. Neither of these lines affects the level of generation outlet capacity that can be achieved by the Twin Cities –

Brookings County 345 kV Project. However, each of the lines provides additional opportunities for interconnection on the north end of the Ridge.

The Brookings County – Yankee 115 kV #2 line is part of the Buffalo Ridge Incremental Generation Outlet project which was approved in Docket No. E-002/CN-06-154, Order Granting Certificates of Need (Sept. 14, 2007). Xcel Energy anticipates filing a route application for this line by year end.

There are no current plans to construct the Brookings County – Toronto 115 kV line. Further improvements are needed around Buffalo Ridge to connect generators to the bulk power system, add transmission capacity, and address local system deficiencies. Depending on how much generation develops on the north end of the Ridge, this line may be constructed at a future date.

Response By: Jared Alholinna
Title: Senior Transmission Planning Engineer
Department: Transmission Planning, Contracts & Strategy
Company: Great River Energy
Telephone: 763-241-5797

Date: December 10, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow Information Request No. 23
MN Department of Commerce
Date Received: October 31, 2007

Question:

Page 4 of Appendix A-4 of the Petition states that "This option also coordinates with the planned Big Stone II generation addition and its identified interconnection facility additions." Are any of the Big Stone II generation and associated interconnection facility additions necessary for the transmission lines proposed in this proceeding to perform adequately? If so, please list the necessary facilities.

Response:

The transmission lines in this proceeding will perform adequately regardless of whether or not any of the Big Stone II generation and associated interconnection facility additions are constructed.

The Twin Cities – Brookings County 345 kV line is a major system connection that provides additional capacity to move power from the Buffalo Ridge area to the Twin Cities. The Twin Cities – Brookings County 345 kV Project is needed to relieve the power transfer limitation between the Ridge and the Twin Cities regardless of the other system additions that may be constructed along the Ridge. Additional transmission lines are needed around Buffalo Ridge to connect generators to the bulk power system, add transmission capacity, and address local system deficiencies. The Big Stone II interconnection facilities help achieve those functions. Without the Big Stone II interconnection facilities, an alternative local transmission configuration would need to be designed for the Buffalo Ridge area.

If one assumes the Big Stone II interconnection facility additions are not constructed, either the assumed incremental generation injection points for the Twin Cities - Brookings County 345 kV line would have to change, or additional transmission lines would need to be installed in the northern part of the Buffalo Ridge to restore outlet capability to the levels demonstrated in the Southwestern Minnesota "EHV" study. Appendix A-4.

It is also known that with any significant increase in generation in the Buffalo Ridge area, the existing Ortonville to Morris 115 kV transmission line (which would be rebuilt as a 230 kV line as part of the Big Stone II outlet plan) would need to be upgraded in some fashion. This issue is addressed by the Big Stone II transmission facilities. Without the proposed Big Stone II transmission this issue would have to be addressed in some other way.

Response By: Tim Rogelstad
Title: Manager
Department: Delivery Planning
Company: Otter Tail Power Company
Telephone: 218-739-8583

Date: December 4, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 24
Date Received: October 31, 2007

Question:

Page 7 of Appendix A-4 of the Petition states

> there is no 'reconductor only' option because it is known that this strategy was exhausted in the BRIGO development, as also confirmed in the MISO interconnection studies (Group 2 and Group 3) for proposed Buffalo Ridge generation additions.

Regarding this statement, please provide a copy of the relevant sections of the MISO interconnection studies (Group 2 and Group 3) if available.

Response:

At the time of the Southwestern Minnesota Study (Appendix A-4), the individual interconnection studies for the Group 2 generation projects had been completed and the results had been consolidated into the "Draft Final Report Coordinated Studies #2 – Sensitivity Studies to Resolve Local and Regional Stability Limitations" ("Group 2 Studies").

Individual interconnection studies had also been completed for Group 3 projects. *See e.g.,* Final Report, Generation Interconnection Study – Project #G426 100 MW Wind Farm in Dickinson County, IA MISO Queue # 3811-01 ("G426 Study"). The results of the Group 3 individual studies were never consolidated into a "Coordinated Studies" report.

The G426 Study is typical of other individual interconnection studies that showed numerous lines with overloads exceeding 200 percent of nominal ratings. *See* G426 Study, Tables 3.6 and 3.8. While reconductoring is a system improvement that can

address overloads, the appropriateness of reconductoring is line specific and typically not a practical option if the overload exceeds 200 percent. In such cases, a much higher capacity conductor must be used for reconductoring. When these larger capacity conductors are loaded to their nominal ratings or beyond, they have much higher loss profiles than lower capacity conductors of the same voltage. The benefits of reconductoring a line to achieve an increase of more than 200 percent of the nominal rating of the existing line is offset by the higher losses profile of the larger conductor under high loading conditions. To avoid these system losses, it is typically more appropriate to build a new line or rebuild the existing line at a higher voltage to achieve the same capacity with lower losses.

Attached is a CD, Bates No. CapX2020 000003, which contains all of the Group 2 study information that is posted on MISO's website. Pages 2 and 3 of the study report explain the reasons for not correcting the steady state base case overloads by reconductoring. The CD also contains the G426 Study.

Response By:	Jason Standing
Title:	Specialty Engineer
Department:	Transmission Reliability and Asset Management
Company:	Xcel Energy
Telephone:	612-330-7768
Date:	December 21, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 25
Date Received: October 31, 2007

Question:

Please explain the following terms:

a. series compensation;
b. switching stations;
c. shunt capacitor banks; and
d. shunt reactors

Response:

a. Series compensation is the addition of capacitors to a transmission line (the devices are also sometimes referred to as series capacitors). Series compensation lowers the overall electrical resistance of a transmission line, which encourages power flow on the transmission line. For example, series compensation has been placed on the Manitoba Hydro 500 kV line at two locations (Roseau County Substation and Chisago County Substation). This has the effect of moving more power up to the 500 kV system and off-loads the lower voltage system. Raising power to a higher voltage level for transmission is generally a desirable outcome because higher voltage lines have lower electrical losses when compared to lower voltage lines.

b. Switching Station is a term that is generally used when referring to a substation in which all of the facilities are installed at the same voltage level, *e.g.* 69 kV. In other words, there are no transformers at either the transmission or distribution level. These stations are usually used to increase system reliability by shortening the exposure of transmission lines and allowing transmission lines to intersect one another, which allows more flexibility when operating the system.

There are times when a switching station is constructed and then later there is a need to install transformers. In these cases, the "switching station" moniker is generally kept for continuity, even though the name may no longer be entirely accurate.

c. A shunt capacitor bank is a device that stores electric potential and is connected between a transmission line and the ground. The device acts to inject reactive power into the power system which helps support system voltages. A system that has shunt capacitors in operation has the advantage of being able to use generators more efficiently. Shunt capacitors can help to avoid some transmission line installations, because they can increase the reactive power flow into an area in need of voltage support.

d. A shunt reactor is a device which, when connected between a transmission line and the ground, will reduce the electric potential of the transmission line. In other words, higher than desired voltage levels on transmission circuits can be lowered by inserting a shunt reactor.

Response By: Daniel Kline
Title: Transmission Planning Engineer
Department: Transmission Reliability & Assessment
Company: Xcel Energy
Telephone: 612-330-7547
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 26
Date Received: October 31, 2007

Question:

Regarding Graph 6 on page 33 of Appendix A-4 of the Petition, is it correct that the "Double ckt LYC-Franklin-Helena 345" and "Base + Series Comp LYC-FRA-HLN" alternatives are substitutes for one another in that they are different methods to solve the same problem?

Response:

Yes. The "Double ckt LYC-Franklin-Helena 345" and "Base + Series Comp LYC-FRA-HLN" alternatives are substitutes for one another in that they are different methods to solve the same problem.

The problems to be solved or the goals of the Double Circuit and Series Compensation alternatives are to reduce line losses and reduce inadvertent "loop" flows through remote power systems. This is accomplished by reducing the impedance of the "direct" southwest Minnesota to Twin Cities transmission path by either series compensating the new line, or by the installing of a second circuit. The Applicants are proposing the double circuit alternative.

Response By: Jared Alholinna
Title: Senior Transmission Planning Engineer
Department: Transmission Planning, Contracts & Strategy
Company: Great River Energy
Telephone: 763-241-5797
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 27
Date Received: October 31, 2007

Question:

Please explain the peer-review process at Mid-continent Area Power Pool/Midwest Reliability Organization/Midwest ISO that the engineering studies in Appendices A-1 to A-4 went through.

Response:

All of the utilities in the Mid-continent Area Power Pool ("MAPP") region participate in Sub-regional Planning Groups ("SPGs") that address issues in their areas. These meetings are a chance for utilities to bring forward projects and discuss potential planning issues. These meetings are open to the public. Various generation developers, interested public parties, Public Utilities Commission staff members and Department of Commerce staff members have historically attended these meetings.

Each of the engineering studies in Appendices A-1 through A-4 was presented to both the Missouri Basin SPG and the Northern MAPP SPG multiple times. Typically, when a study is brought through the SPG process, it is presented once at the start of the study process. For some large studies, a list of interested parties is gathered and these people receive occasional study updates as public study information becomes available. Another presentation typically occurs when the actual modeling (power flow and dynamic stability) study work is completed, and a third presentation may occur once the study is completed and ready to be published.

For any regional transmission project proposed by a member utility, the Midwest ISO conducts a separate and independent review for its own transmission expansion plan ("MTEP"). This review is closely coordinated with the utilities proposing the project. Midwest ISO's analysis includes an examination of study assumptions and involves power flow study work which details the impact of the project on the Midwest ISO transmission grid and the Midwest ISO market.

The Midwest ISO is currently reviewing all three of the projects proposed in this application.

Response By: Daniel Kline
Title: Transmission Planning Engineer
Department: Transmission Reliability & Assessment
Company: Xcel Energy
Telephone: 612-330-7547

Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 28
Date Received: October 31, 2007

Question:

Please provide a CD of the spreadsheet showing hourly, real-time prices at the Minnesota hub as discussed in Appendix D-9 of the Petition.

Response:

The information requested is enclosed on CD, Bates No. CapX2020 0000004.

Response By: Jim Alders
Title: Manager Regulatory Projects
Department: Government and Regulatory Affairs
Company: Xcel Energy
Telephone: 612-330-6732
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 29
Date Received: October 31, 2007

Question:

Regarding the CapX northwest line, treating a Maple River-Alexandria-Western St. Cloud-Benton County line as the base case (zero cost, zero losses), please provide the estimated incremental capital cost, on-peak line losses, and off-peak line losses associated with the Maple River-Alexandria-Western St. Cloud-Sherburne County alternative.

Response:

The Maple River-Alexandria-Western St. Cloud-Sherburne alternative and the Maple River-Alexandria-Western St. Cloud-Benton County alternative are both 345 kV transmission line proposals that provide similar electrical performance. They would use the same structures and conductors and have geographically similar endpoints. As a result, the losses profiles of both options are similar.

The cost profiles of the two configurations, assuming overhead construction, are also comparable. For the Maple River -Benton County configuration, the estimated range is $390 to $530 million. For the Maple River-Sherburne County configuration, the estimated range is $390-$550 million. These estimates are dependent upon the ultimate route selected, either the direct route along Interstate 94, or a more indirect route away from the interstate.

Response By: Warren Hess
Title: Senior Planning Engineer
Department: Transmission Asset Management
Company: Xcel Energy

Telephone: 612-330-6311
Date: November 29, 2007

Response By: Grant Stevenson
Title: Senior Project Manager
Department: Xcel Energy Transmission
Company: Xcel Energy
Telephone: 612-330-6330
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 30
Date Received: October 31, 2007

Question:

Regarding the CapX northwest line, treating a Maple River – Alexandria-Western St. Cloud – Benton County line as the base case (zero cost, zero losses), please provide the estimated incremental capital cost, on-peak line losses, and off-peak line losses associated with the Maple River – Alexandria-Western St. Cloud – Monticello alternative.

Response:

The proposed Maple River – Alexandria – Western St. Cloud-Monticello and the Maple River – Alexandria – Western St. Cloud – Benton County alternative are both 345 kV transmission line proposals that would provide similar electrical performance. They would use the same structures and conductors and have geographically similar endpoints. As a result, the losses profiles of both options are similar.

The cost profiles of the two configurations, assuming overhead construction, are also comparable. For the Maple River – Benton County configuration, the range is $390 to $530 million. For the Maple River – Monticello configuration, the range is $390 to $560 million. These estimates are dependent upon the ultimate route selected, either the direct route along Interstate 94, or a more indirect route away from the interstate.

Response By: Warren Hess
Title: Senior Planning Engineer
Department: Transmission Asset Management
Company: Xcel Energy

Telephone: 612-330-6311
Date: November 29, 2007

Response By: Grant Stevenson
Title: Senior Project Manager
Department: Xcel Energy Transmission
Company: Xcel Energy
Telephone: 612-330-6330
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 31
Date Received: October 31, 2007

Question:

Regarding the CapX southeast line, assuming a Hampton Corner-North Rochester-(Winona crossing)-North La Crosse line as the base case (zero cost, zero losses), please provide the estimated incremental capital cost, on-peak line losses, and off-peak line losses associated with the Hampton Corner-North Rochester-(La Crescent crossing)-La Crosse alternative.

Response:

The proposed Hampton Corner – North Rochester (Winona crossing) – North La Crosse and the alternative Hampton Corner – North Rochester (La Crescent crossing) – La Crosse alternative are both 345 kV transmission line proposals, would use the same structures and conductors and have geographically similar endpoints. As a result, the losses profiles of both options are comparable.

The cost profiles of the two configurations, assuming overhead construction, are also comparable. The proposed Hampton Corner – North Rochester (Winona crossing) – North La Crosse is estimated to cost approximately $340 million. The alternative Hampton Corner – North Rochester (La Crescent crossing) – La Crosse alternative is estimated to cost approximately $330 million.

Response By: Warren Hess
Title: Senior Planning Engineer
Department: Transmission Asset Management
Company: Xcel Energy

Telephone: 612-330-6311
Date: November 29, 2007

Response By: Grant Stevenson
Title: Senior Project Manager
Department: Xcel Energy Transmission
Company: Xcel Energy
Telephone: 612-330-6330
Date: November 29, 2007

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Xcel Energy
Docket No.: E002, ET2/CN-06-1115
Response To: Steve Rakow, MN Department of Commerce — Information Request No. 32
Date Received: October 31, 2007

Question:

Regarding the CapX southwest line, assuming the proposed Lyon County – Franklin-Helena line with a Lyon County – Hazel Creek-Minnesota Valley spur as the base case (zero cost, zero losses), please provide the estimated incremental capital cost, on-peak line losses, and off-peak line losses associated with the Lyon County – Hazel Creek-Minnesota Valley – West Waconia-Helena alternative.

Response:

To clarify and supplement the information provided in the Application, descriptions of the proposal and the "West Waconia Alternative" are provided below, along with the requested information.

The proposed Twin Cities – Brookings County 345 kV Project consists of a single circuit 345 kV line from Brookings County Substation to Lyon County Substation, a double circuit 345 kV line from Lyon County Substation to Franklin Substation to Helena Substation, a single-circuit 345 kV line from Helena Substation to Lake Marion Substation to Hampton Corner Substation, a single circuit 345 kV line from Lyon County Substation to Hazel Creek Substation and a 230 kV line from Hazel Creek Substation to Minnesota Valley Substation.

The West Waconia Alternative is a modification of an alternative studied in the Southwestern Minnesota Study. In the Southwestern Minnesota Study, planning engineers considered a "System Alternative Revised" which had the following configuration: a single circuit 345 kV line from Brookings County Substation to Lyon County Substation to Minnesota Valley Substation to West Waconia Substation to Blue Lake Substation and a single circuit 345 kV line from West Waconia Substation to Helena Substation to Lake Marion Substation and Hampton Corner Substation.

After the Southwestern Minnesota Study was completed, CapX2020 planning engineers developed the West Waconia Alternative. This alternative does not include the West Waconia – Blue Lake 345 kV connection, but does include a Hazel Creek – Minnesota Valley 230 kV line.

This alternative would generally bypass the Franklin Substation and parallel the existing 230 kV line between Minnesota Valley Substation and the Blue Lake Substation. Specifically, the West Waconia Alternative consists of a single circuit 345 kV line from Brookings County Substation to Lyon County Substation to Hazel Creek Substation to West Waconia Substation to Helena Substation to Lake Marion Substation to Hampton Corner Substation and a 230 kV line from Hazel Creek Substation to Minnesota Valley Substation.

The losses profile of the West Waconia Alternative is inferior to that of the proposed Twin Cities – Brookings County 345 kV Project. Relative to the proposed project, the West Waconia Alternative has an estimated 91 MW of loss increase during on-peak periods and 101 MW loss increase during off-peak periods.

The cost profiles of the two configurations, the Twin Cities – Brookings County 345 kV Project and the West Waconia Alternative, assuming overhead construction, are similar. The proposed Twin Cities – Brookings County 345 kV Project is estimated to cost between approximately $600 and $665 million depending on the route selected. The West Waconia Alternative is estimated to cost approximately $615 million.

Since the West Waconia Alternative was identified, events have occurred and continue to occur that may impact the appropriateness of this alternative. At the time of the Southwestern Minnesota Study, planning engineers made certain assumptions about the demand for wind generated power from the west based on the then governing renewable energy objectives. In 2007, the Renewable Energy Standard ("RES") legislation became law. The RES law has dramatically increased the demand for transmission service to deliver wind-generated power necessary to meet the standards. The Twin Cities – Brookings County 345 kV line alone will not be sufficient to meet these increased needs for generation outlet from western Minnesota.

Additional analyses are currently underway to identify additional transmission improvements to provide additional generation outlet capability. One of the potential transmission projects is a system upgrade of the 230 kV Minnesota Valley – Blue Lake transmission line. Past transmission studies have repeatedly concluded that the existing line limits transfer capability from the western portion of Minnesota to the Twin Cities. A study, estimated to be completed in 2008, will focus on identifying

transmission alternatives that will eliminate this constraint, thus allowing more renewable generation development in the Buffalo Ridge Area. One alternative that will be explored is rebuilding the Minnesota Valley – Blue Lake 230 kV line to a higher voltage.

Should planning engineers conclude that this alternative is the best alternative to address the limitation, the West Waconia Alternative for the Twin Cities – Brookings County 345 kV Project would be less desirable because it would result in a high concentration of bulk transmission lines along the Minnesota Valley Substation – West Waconia Substation corridor. As currently envisioned, the two lines would likely be placed in relatively close geographic proximity, potentially as close as sharing common (parallel) rights-of-way. While the two circuits would be treated separately in system analyses, that is, the loss of both lines would not be assumed in an N-1 analysis, the risk of an outage of both lines increases due to a storm or other event, placing the system at risk of instability due to the loss of multiple major transmission lines.

Response By: Warren Hess
Title: Senior Planning Engineer
Department: Transmission Asset Management
Company: Xcel Energy
Telephone: 612-330-6311
Date: December 21, 2007

Response By: Jared Alholinna
Title: Senior Transmission Planning Engineer
Department: Transmission, Planning, Contracts & Strategy
Company: Great River Energy
Telephone: 763-241-5797
Date: December 21, 2007