414 Nicollet Mall
Minneapolis, Minnesota 55401-1993

March 9, 2012

--Via Electronic Filing--

Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: CERTIFICATE OF NEED APPLICATION
SCOTT COUNTY – STRUCTURE #57 115/115 KV CONVERSION AND
STRUCTURE #57 – WESTGATE 115 KV UPGRADE
DOCKET NO. E002/CN-11-332

Dear Dr. Haar:

Northern States Power Company doing business as Xcel Energy submits to the Minnesota Public Utilities Commission this Certificate of Need application for approval by the Minnesota Public Utilities Commission. The Company is proposing 115 kV conversions and upgrades to the 69 kV Scott County - Bluff Creek – Westgate transmission line. The Project is needed to address overload and low voltage conditions in the Project area during certain transmission line outages.

Also, enclosed is a check in the amount of $14,600 for the application processing fee as required by Minn. R. 7849.0210, subp. 1.

Please contact Mark Suel at 612-330-6750 if you have questions or need additional information.

SINCERELY,

TERESA MOGENSEN
Vice President Transmission

Enclosure
c: Service List

APPLICATION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION FOR A CERTIFICATE OF NEED FOR THE SCOTT COUNTY – STRUCTURE #57 115/115 KV CONVERSION AND STRUCTURE #57 – WESTGATE 115 KV UPGRADE

PUC Docket No. E-002/CN-11-332

March 9, 2012

Submitted by
Northern States Power Company

COMPLETENESS CHECKLIST

AUTHORITY	REQUIRED INFORMATION	WHERE
Minn. R. 7849.0200, Subp. 2	Title Page	Title Page
Minn. R. 7849.0200, Subp. 2	Table of Contents	xxii-xvii
Minn. R. 7849.0200, Subp. 4	Cover Letter	Cover Letter
Minn. R. 7849.0220, Subp. 3	Joint Ownership and Multiparty use	Section 1.3
Minn. R. 7849.240	Need summary and additional considerations	Section 1.2
Subp. 1	Summary of the major factors that justify the need for the proposed facility	Section 1.2
Subp. 2	Relationship of the proposed facility to the following socioeconomic considerations:	Section 1.6
A.	Socially beneficial uses of the output of the facility	Section 1.6.1
B.	Promotional activities that may have given rise to the demand for the facility	Section 1.6.2
C.	Effects of the facility in inducing future development	Section 1.6.3
Minn. R. 7849.0260	Proposed LHVTL and Alternatives	Sections 1.1, 1.7, and 3.2
A.	A description of the type and general location of the proposed line, including:	Sections 1.1., 1.7, and 3.2
(1)	Design voltage	Sections 1.1., 1.7, and 3.2
(2)	Number, sizes and types of conductors	Sections 1.1., 1.7, and 3.2
(3)	Expected losses under projected maximum loading and under projected average loading in the length of the line and at terminals or	EXEMPT[1]

[1] A copy of the Minnesota Public Utilities Commission Order approving Applicant's exemption request is attached as Appendix A.

AUTHORITY	REQUIRED INFORMATION	WHERE
	substations	
(4)	Approximate length of the proposed line	Section 1.0, Section 3.2
(5)	Approximate locations of DC terminals or AC substations on a map	Figure 1
(6)	List of likely affected counties	Section 6.1
B.	Discussion of the available alternatives including:	_____
(1)	New generation	Section 3.5
(2)	Upgrading existing transmission lines	Section 3.4
(3)	Transmission lines with different voltages or conductor arrays	Sections 3.2, 3.3, and 3.4
(4)	Transmission lines with different terminals or substations	Sections 3.2, 3.3, and 3.4
(5)	Double circuiting of existing transmission lines	Section 3.5.6
(6)	If facility for DC (AC) transmission, an AC (DC) transmission line	Section 3.5.8
(7)	If proposed facility is for overhead (underground) transmission, an underground (overhead) transmission line	Section 3.5.9
(8)	Any reasonable combination of alternatives (1) – (7)	Sections 3.2, 3.3, 3.4, and 3.5
C.	For the facility and for each alternative in B, a discussion of:	_____
(1)	Total cost in current dollars	Sections 3.2, 3.3, 3.4, and 3.5
(2)	Service life	Sections 5.4
(3)	Estimated average annual availability	Section 5.4

AUTHORITY	REQUIRED INFORMATION	WHERE
(4)	Estimated annual O&M costs in current dollars	Section 5.4
(5)	Estimate of its effect on rates system wide and in Minnesota	Section 3.2.1 and Appendix C
(6)	Effeciency	Section 3 and Appendix B
(7)	Major assumptions made in subitems (1) – (6)	Section 3 and Appendix B
Minn. R. 7849.0270	Content of Forecast	Section 2.2. and Appendix B
Minn. R. 7849.0270, Subp. 1	Peak demand and annual consumption data	Section 2.2. and Appendix B
Minn. R. 7849.0270, Subp. 2	For each forecast year the following data:	EXEMPT
A.	Minnesota forecast data	EXEMPT
B.	Estimates of the number of ultimate consumers and annual electrical consumption by those consumers:	EXEMPT
(1)	Farm, excluding irrigation and drainage pumping	EXEMPT
(2)	Irrigation and drainage pumping	EXEMPT
(3)	Nonfarm residential	EXEMPT
(4)	Commercial	EXEMPT
(5)	Mining	EXEMPT
(6)	Industrial	EXEMPT
(7)	Street and highway lighting	EXEMPT

AUTHORITY	REQUIRED INFORMATION	WHERE
(8)	Electrified transportation[2]	EXEMPT
(9)	Other	EXEMPT
(10)	Sum of subitems (1) – (9)	EXEMPT
C.	Estimate of the demand for power in system at the time of annual system peak demand	EXEMPT
D.	System peak demand by month	EXEMPT
E.	Estimated annual revenue requirement per kWh in current dollars	Appendix C
F.	Estimated average weekday load factor by month	EXEMPT
Minn. R. 7849.0270, Subp. 3	Forecast Methodology	EXEMPT
	Detail of forecast methodology including:	EXEMPT
A.	Overall methodological framework used	EXEMPT
B.	Specific analystical techniques used	EXEMPT
C.	Manner in which specific techniques are related in producing the forecast	EXEMPT
D.	Where statistical techniques are used:	EXEMPT
(1)	Purpose of the technique	EXEMPT
(2)	Typical computations	EXEMPT
(3)	Results of statistical tests	EXEMPT

[2] Electrified transportation is included in the column labeled "other."

AUTHORITY	REQUIRED INFORMATION	WHERE
E.	Forecast confidence levels for annual peak demand and annual electrical consumption	EXEMPT
F.	Brief analysis of methodology including:	EXEMPT
(1)	Stenghths and weaknesses	EXEMPT
(2)	Suitability to the system	EXEMPT
(3)	Cost considerations	EXEMPT
(4)	Data requirements	EXEMPT
(5)	Past accuracy	EXEMPT
(6)	Other significant factors	EXEMPT
G.	Explanation of discrepancies	EXEMPT
Minn. R. 7849.0270, Subp. 4	Discussion of data base used for forecasts including:	EXEMPT
A.	List of data sets including a brief description of each	EXEMPT
B.	Identification of adjustments made to raw data including nature, reason and magnitude	EXEMPT
Minn. R. 7849.0270, Subp. 5	Assumptions and Special Information	EXEMPT
	Discussion of each essential assumption including need and nature of assumption and sensitivity of forecast results to assumptions	EXEMPT
	Discussion of assumptions regarding:	EXEMPT
A.	Availability of alternative sources of energy	EXEMPT

AUTHORITY	REQUIRED INFORMATION	WHERE
B.	Expected conversion from other fuels to electricity or vice versa	EXEMPT
C.	Future prices for customers and their effect on demand	EXEMPT
D.	Data requested in Subp. 2 not historically available or generated by applicant for demand forecast	EXEMPT
E.	Effect of energy conservation programs on long term demand	EXEMPT
F.	Other factors considered when preparing forecast	EXEMPT
Minn. R. 7849.0270, Subp. 6	Coordination of Forecasts with Other Systems	Section 2.2 and Appendix B
A.	Extent of coordination of load forecasts with those of other systems	Section 2.2 and Appendix B
B.	Description of the manner in which those forecasts are coordinated	Section 2.2 and Appendix B
Minn. R. 7849.0280	System Capacity	Section 2.2 and Appendix B
	Description of ability of existing system to meet demand forecast including:	Section 2.2 and Appendix B
A.	Power planning programs	Section 2.2 and Appendix B
B.	Seasonal firm purchases and sales	EXEMPT
C.	Seasonal participation purchases and sales	EXEMPT
D.	For each forecast year load and generating capacity for:	EXEMPT
(1)	Seasonal system demand	EXEMPT
(2)	Annual system demand	EXEMPT

AUTHORITY	REQUIRED INFORMATION	WHERE
(3)	Total seasonal firm purchases	EXEMPT
(4)	Total seasonal firm sales	EXEMPT
(5)	Seasonal adjusted net demand	EXEMPT
(6)	Annual adjusted net demand	EXEMPT
(7)	Net generating capacity	EXEMPT
(8)	Total participation purchases	EXEMPT
(9)	Total participation sales	EXEMPT
(10)	Adjusted net capability	EXEMPT
(11)	Net reserve capacity obligation	EXEMPT
(12)	Total firm capacity obligation	EXEMPT
(13)	Surplus or defecit capacity	EXEMPT
E.	Summer and winter season load generation and capacity in years subsequent to application contingent on proposed facility	EXEMPT
F.	Summer and winter season load generation and capacity including all projected purchases, sales and generation in years subsequent to application	EXEMPT
G.	List of proposed additions and retirements in generating capacity for each forecast year subsequent to application	EXEMPT
H.	Graph of monthly adjusted net demand and capability with difference between capability and maintenance outages plotted	EXEMPT
I.	Appropriateness and method of determining system reserve margins	EXEMPT

AUTHORITY	REQUIRED INFORMATION	WHERE
Minn. R. 7849.0290	Conservation Programs	EXEMPT
A.	Persons responsible for energy conservation and efficiency programs	EXEMPT
B.	List of energy conservation and effeciency goals and objectives	EXEMPT
C.	Description of programs considered, implemented and rejected	EXEMPT
D.	Description of major accomplishments in conservation and efficiency	EXEMPT
E.	Description of future plans with respect to conservation and effeciency	EXEMPT
F.	Quantification of the manner by which these programs impact the forecast	EXEMPT
Minn. R. 7849.0300	Consequence of Delay	EXEMPT
Minn. R. 7849.0310	Required Environmental Information	Section 6
Minn. R. 7849.0330	Transmission Facilities	_____
	Data for each alternative that would require LHVTL construction including:	_____
A.	For overhead transmission lines	_____
(1)	Schematics showing dimensions of support structures	Section 1.7
(2)	Discussion of electric fields	Section 4.5
(3)	Discussion of ozone and nitrogen oxide emissions	Section 4.1
(4)	Discussion of radio and television interference	Section 4.3

AUTHORITY	REQUIRED INFORMATION	WHERE
(5)	Discussion of audible noise	Section 4.2
B.	For underground transmission facilities:	N/A
(1)	Types and dimensions of cable systems	N/A
(2)	Types and qualities of cable system materials	N/A
(3)	Heat released in kW per foot of cable	N/A
C.	Estimated right-of-way required for the facility	Sections 1.7 and 5.1
D.	Description of construction practices	Section 5.2
E.	Description of O&M practices	Section 5.4
F.	Estimated workforce required for construction and O&M	Section 5.2
G.	Description of region between endpoints in likely area for routes emphasizing a three mile radius of endpoints including:	Section 6
(1)	Hydrological features	Section 6.6
(2)	Vegetation and wildlife	Section 6.7
(3)	Physiographic regions	Section 6.2
(4)	Land use types	Section 6.3
Minn. R. 7849.0340	No-Facility Alternative	EXEMPT
	For each of the three levels of demand:	

AUTHORITY	REQUIRED INFORMATION	WHERE
A.	Expected operation of exisiting and committed facilities	EXEMPT
B.	Description of the changes in resource requirements and waste produced including:	EXEMPT
(1)	Amount of land required	EXEMPT
(2)	Induced traffic	EXEMPT
(3)	Fuel requirements	EXEMPT
(4)	Airborne emissions	EXEMPT
(5)	Water appropriation and consumption	EXEMPT
(6)	Discharges to water	EXEMPT
(7)	Reject heat	EXEMPT
(8)	Radioactive releases	EXEMPT
(9)	Solid waste production	EXEMPT
(10)	Audible noise	EXEMPT
(11)	Labor requirements	EXEMPT
C.	Description of possible methods of reducing environmental impact	EXEMPT
Minn. R. 7829.2500, Subp. 2	Single Page Summary for Interested Parties	Filing Summary
Exemption Order		

AUTHORITY	REQUIRED INFORMATION	WHERE
Exemption Order	In lieu of Minn. R. 7849.0260 A(3) and C(6) requiring line-specific loss information, Applicants will provide system loss information.	Section 3.2.2
Exemption Order	In lieu of Minn. R. 7849.0270, subp. 2 (A-D and F) and Subps. 3-5, requiring information regarding system peak, annual energy consumption, and load factors for applicant's service area and system, Applicants will provide data supporting the load serving needs of the substations serving the area served by the proposed Project, including information related to substation forecast methodology, databases, and assumptions.	Section 2.2
Exemption Order	In lieu of Minn. R. 7849.0280, (B) through (I) requiring load and capability information, Applicants will provide information regarding reliability concerns resulting from forecasted peak demand in the local area.	Section 2.1 and 2.2
Exemption Order	In lieu of Minn. 7849.0290 requiring conservation information and impact of conservation on forecast data, Applicants will provide a discussion of demand management programs used by Applicants to manage peak load and how these programs affect the substation loads in the specific project area and a summary of the most recent filing made by Applicants pursuant to the Energy Conservation Improvement Statutes.	Appendix D
Exemption Order	In lieu of Minn. R. 7849.0300 and 7849.0340, requiring detailed information regarding the consequences of delay and no facility alternative on three levels of demand and energy consumption, Applicants will identify the threshold level of demand that places service at risk and the incremental change in growth.	Sections 2.1, 2.2, 3.5.1and 3.7

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APPENDICES

Appendix A: Order Approving Exemption Request, *In the Matter of the Application of Northern States Power Company d/b/a Xcel Energy for a Certificate of Need for the Upgrade of the Southwest Twin Cities Bluff Creek – Westgate Area 69 kV Transmission Line to 115 kV Capacity*, Docket No. E002/CN-11-332 (Nov. 16, 2011).

Appendix B: *Southwest Twin Cities Phase 2 Study Update* (July 8, 2011).

Appendix C: Rate Impact Information

Appendix D: Xcel Energy Demand Side Management Data

1 INTRODUCTION AND SUMMARY

Northern States Power Company, a Minnesota corporation ("Xcel Energy," "Company," or the "Applicant"), submits this Application to the Minnesota Public Utilities Commission ("Commission") for a Certificate of Need to remove the existing 69 kV transmission line between the double circuit Structure #57 of Line #5516 (north of the Bluff Creek Substation) and the Westgate Substation and replace it with a new 115 kV transmission line near the cities of Chanhassen, Shorewood, Excelsior, Deephaven, Greenwood, Minnetonka, and Eden Prairie, Minnesota. The approximately 14.6 mile 69 kV transmission line that Xcel Energy proposes to upgrade runs in a northeast loop beginning from the City of Chanhassen located in Carver County and terminating at the City of Eden Prairie located in Hennepin County (the "Project"). Structure #57 is the starting point for the rebuild portion of the Project as this is where the existing double circuit 115/69 kV line (Line #5516/Line #0734) from the Scott County Substation divides with the 115 kV line (Line #5516) heading east and the 69 kV line (Line #734), which will be proposed rebuilt as part of this Project, heading north toward the Excelsior Substation. Structure #57 is located north of the Bluff Creek Substation which is located along County Road 18 (Lyman Boulevard) northeast of Hazeltine Lake in the City of Chanhassen. The end point for the rebuild portion of the Project is the Westgate Substation which is located northeast of the intersection of U.S. Highway 212 and State Highway 5 along Venture Lane in the City of Eden Prairie.

The Project also includes converting approximately 5.3 miles of an existing 115/69 kV double circuit transmission line between the Scott County Substation and Structure #57 to a 115/115 kV double circuit line near the cities of Shakopee and Chaska. This 5.3 miles of 115/69 kV double circuit line was constructed for 115/115 kV operation in 1987 and no physical modifications of the existing transmission line or structures are needed to convert to 115 kV. The end point for the conversion, the Scott County Substation, located north of U.S. Highway 169 between the intersection of County Road 69 and Chestnut Boulevard. This Application is being submitted pursuant to Minnesota Statute § 216B.243 and Minnesota Rules 7849.0020 – 7849.0400.

These upgrades and conversions along with substation modifications, additions and new transmission line were identified in the *Southwest Twin Cities Phase 2 Study Update Review* dated July 8, 2011 (also referred to herein as the "Study") prepared by Xcel Energy Services Inc. The Study was conducted to address existing and pending load serving problems in the rapidly-developing regions of Scott, Carver, McLeod, and Hennepin counties located in the western Twin Cities. The Study showed that existing facilities in the western portion of this high-growth region are not able to meet current demand and will not be able to support projected load growth. The proposal in this Application is one of several transmission projects that will be required to ensure reliable transmission service in the western metro area during the next several years. While a single Study identified several areas of need with resultant transmission project solutions for each area of need, this Project addresses a localized need and provides a localized solution to that need.

1.1 Proposal

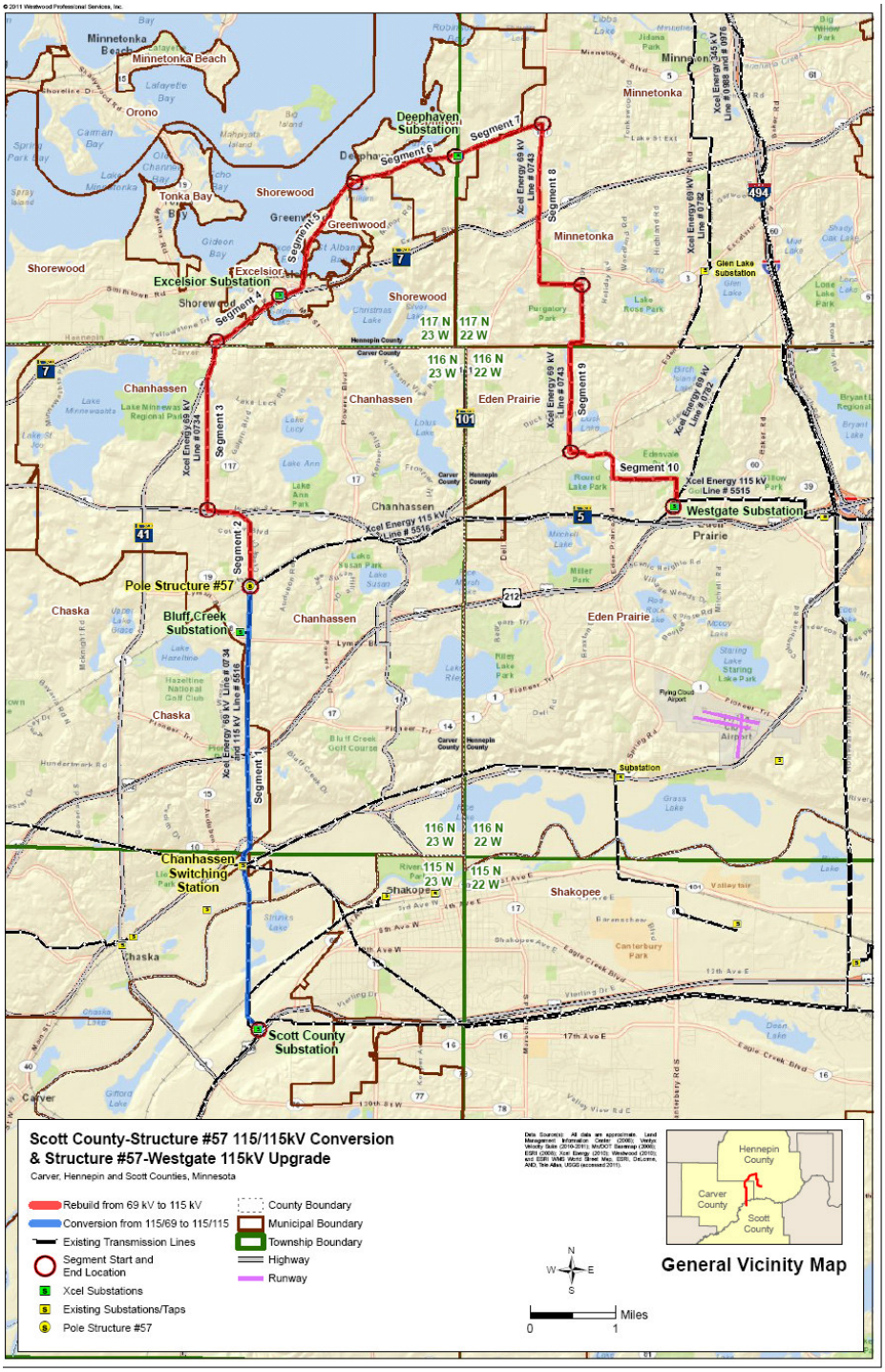
The proposed Project entails converting or upgrading approximately 20 miles of 69 kV transmission line to 115 kV capacity including the following upgrades and additions for which a Certificate of Need is required:

- Change the voltage of approximately 5.3 miles of 115/69 kV transmission line to 115/115 kV operation between the Scott County Substation and Structure #57;
- Removing approximately 4.2 miles of existing 69 kV transmission line and replacing it with a 115 kV transmission line between Structure #57 and the Excelsior Substation;
- Removing approximately 3.0 miles of existing 69 kV transmission line and replacing it with a 115 kV transmission line between the Excelsior Substation and the Deephaven Substation;
- Removing approximately 7.4 miles of existing 69 kV transmission line and replacing it with a 115 kV transmission line between the Deephaven Substation and Westgate Substation;
- Modifications to the Scott County Substation and Westgate Substation; and

- Upgrading the Excelsior Substation and Deephaven Substation for the 115 kV line upgrades.

The proposed upgrades are depicted in Figure 1, below.

Figure 1
Scott County – Structure #57 115/115 kV Conversion &
Structure #57 – Westgate 115 kV Upgrade



Applicant proposes to construct the entire 69 kV rebuild between Structure #57 and the Westgate Substation along existing right-of-way, which will reduce costs and environmental impacts. The existing 69 kV single wood pole structures will be removed and a new 115 kV transmission line will be strung on new steel structures within the right-of-way maintained by Xcel Energy for the existing 69 kV line. If new right-of-way is required, Xcel Energy typically requires a right-of-way width up to 75 feet wide for the construction of new 115 kV transmission lines.

Steel poles with horizontal braced post insulators are proposed to be used for the majority of the single circuit 115 kV transmission line rebuild between Structure #57 and the Westgate Substation. Other structure types that may be used for the rebuild include horizontal post, H-frame, and Y-frame structures. For portions of the rebuild, a cantilever design may be used. This design would require installation of a single pole transmission structure with all arms and conductors installed on the side of the pole that overhanging the public road or public right-of-way. The proposed structures will be approximately 60 to 105-feet tall with average spans of approximately 200 to 400 feet for post structures and 400 to 900 feet for H-frame and Y-frame structures.

The reconstructed 115 kV line would use 795 kcmil 26/7 Aluminum Conductor Steel Supported ("ACSS") conductors.

For the conversion from 115/69 kV to 115/115 kV operation between the Scott County Substation and Structure #57, the existing structures and insulation are sufficient for 115 kV operation, and no physical modifications are required for this section of the line.

Xcel Energy anticipates a 2014 in-service date for the Project.

1.2 Need Overview

The need for this Project is identified in the *Southwest Twin Cities Phase 2 Study Update Review* dated July 8, 2011 (the "Study"). A copy of the Study is included in Appendix B. The Project is needed to address overload and low voltage conditions in the Project area during certain transmission line outages. There are existing overloads and low voltages that need to be addressed immediately and the Study indicates that, without the proposed Project, there would be additional overloads of transmission line facilities and low voltages in the Project area in the future.

Depending on the duration of a low voltage condition, equipment such as electronic power supplies could also malfunction or fail when output voltage drops below certain levels, damaging customer equipment such as process controls, motor drive controls, and automated machines. Thermal overload on transmission lines is not acceptable as it could damage the facilities due to excessive heat, this could also cause safety concerns due to unsafe ground clearance of transmission lines. In addition overload on facilities, that operate at a voltage greater than 100 kV, is a violation of NERC standards. Without the proposed transmission upgrades, overloading and low voltage conditions will worsen as the area experiences continued growth and development.

The loss of the Eden Prairie-Westgate 115/115 kV double circuit transmission line is the most critical transmission line outage identified in the Study. This line is the only tie between Eden Prairie 345/115 kV Substation, which serves the largest load in the area, and Westgate 115/69 kV Substation. When the Eden Prairie-Westgate 115/115 kV double circuit line is out of service, the 345 kV source to the area is disconnected. As a result, the entire load at the Westgate Substation would be served from Scott County Substation, resulting in overloads or potential overloads on the transmission lines in the area and in low voltages between the Minnesota River Substation and the Westgate Substation. Forecast data indicates that an outage of the Westgate – Eden Prairie double circuit 115 kV line will result in several 115 kV line overloads near Scott County Substation by 2016.

The proposed Project would eliminate the overloads on the Scott County Substation transformer and 69 kV lines. The proposed upgraded 115 kV lines also prevent potential future overloads on the 115 kV lines near Scott County Substation as the proposed Project would provide a parallel 115 kV path from the Scott County Substation to the Westgate Substation.

This Project is designed to meet the near and long-term transmission needs for the area. Based on the current load forecasts, the proposed Project will meet the area's needs until 2023.

1.3 Cost, Timing & Ownership

Depending on the route of the line and potential need for additional right-of-way, Applicant estimates the overall cost of the proposed improvements at approximately $26 million (estimate accuracy +/- 30%). Therefore, the total Project cost could be between $18 million and $34 million. Cost estimates for Project segments are provided in Table 1 below. Construction of the upgrades is scheduled to begin in late 2013 with an anticipated in-service date in 2014.

Table 1
Project Costs

Proposed Facility Upgrades	Cost in Million $	Year
Scott County Substation termination	$1.5	2014
Westgate Substation termination	$1.3	2014
Deephaven Substation conversion	$6.3	2014
Excelsior Substation conversion	$4.4	2014
Westgate – Deephaven Line rebuild	$5.7	2014
Deephaven – Excelsior Line rebuild	$2.8	2014
Excelsior – Scott County Line rebuild	$4.1	2014
Total Cost Estimate	**$26.1**	2014

Xcel Energy would construct and own the entire proposed Project. As the proposed transmission lines will neither be jointly owned by two or more utilities nor are designed to meet the long term needs, in excess of 80 MW, of a particular utility that is not an owner, Xcel Energy is not required to submit additional information regarding any other utility under Minn. R. 7849.0220, Subp. 3.

1.4 Environmental Analysis and Permitting Summary

The Project area contains both urban and rural land uses, as well as natural resource, cultural resource, and recreation areas. Xcel Energy has not identified any environmental factors that would preclude construction of the proposed facilities. Impacts can be mitigated by utilizing existing right-of-ways and through best management construction practices. A detailed environmental analysis is provided in Chapter 6.

As part of the Certificate of Need process, the Minnesota Department of Commerce, Energy Facility Permitting ("EFP") Staff will also conduct an environmental assessment independent of the information provided in this Application. A Route Permit application will be filed soon after the Certificate of Need application is filed. Accordingly, members of the public will have several opportunities to participate in both the Certificate of Need and routing processes.

1.5 Certificate of Need Criteria

Minnesota rules and statutes specify the criteria the Commission is to apply in determining whether to grant a Certificate of Need. Minn. Stat. § 216B.243 and Minn. R. 7849.0120.

Minn. R. 7849.0120 provides that a Certificate of Need is to be granted by the Commission to an applicant on a determination that:

(A) The probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the

applicant, to the applicant's customers, or to the people of Minnesota and neighboring states;

(B) A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record;

(C) By a preponderance of the evidence of the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health; and

(D) The record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

The Company's proposal satisfies these four criteria as discussed below.

Denial of the Project would have an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the Applicants' customers

- Denial of a Certificate of Need for this Project would result in adverse effects upon present and future adequacy, reliability, and efficiency because of low voltage conditions and overloading in the area. Low voltage conditions can damage customer equipment such as process controls, motor drive controls and automated machines. Overload on transmission facilities reduce the life, or damage the transmission equipment. To remedy this condition, the transmission operators will be forced to curtail service to customers. This would result in outages for residential, retail, commercial and industrial customers. Outages can be extremely costly and inconvenient.

A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence

- The Study considered costs, system losses, technical performance, and other factors. The proposed transmission upgrades, including the size, type, and timing, were identified in the Study as the best performing option among alternatives reviewed.

The proposed transmission lines will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments

- The proposed Project will provide electric reliability and allow additional load to be added to the area grid.
- The Project upgrades will utilize existing rights-of-way to the maximum extent possible, thereby reducing the impact to the natural and socioeconomic environments.

The proposed transmission lines will comply with relevant policies, rules, and regulations of other state and federal agencies and local governments

- Applicant will secure all necessary permits and authorizations prior to commencing construction of the Project.
- The Project will comport with State of Minnesota policies of providing safe and reliable electric service to all customers.

1.6 Socioeconomic Considerations

Minnesota Rules 7849.0240, Subp. 2 requires the applicant for a Certificate of Need to address the socially beneficial uses of the facility output, promotional activities that may have given rise to the demand, and effects of the facility in inducing future development. Following is a discussion of each consideration:

1.6.1 Socially Beneficial Uses of Facility Output

The purpose of the Project is to ensure system reliability in the greater southwest area of the Twin Cities. Existing low voltage and overloading conditions, as well as worsening conditions in the future, will arise if the Project is not constructed. Low voltage conditions can damage electronic equipment resulting in significant economic

costs to commercial and manufacturing companies. Overloading conditions can result in costly outages and inconvenience to area customers.

1.6.2 Promotional Activities

Xcel Energy has not conducted any promotional activities or events that have triggered the need for the Project. The Project is needed due to continued and anticipated growth in this rapidly growing region of the Twin Cities. The Project is required to ensure system reliability and to allow for future growth and development in the area.

1.6.3 Effect in Inducing Future Development

The Project is not necessarily intended to induce future development; however, it may allow future economic development that otherwise would not be possible if the upgrades are not implemented. The upgrades are being proposed based on existing conditions and forecasted demand that will continue to cause worsening electrical conditions. The upgrades will ensure system reliability and will also accommodate approximately 30 MW of additional load growth, beyond 2016, before further upgrades are required around 2023. This is based on an assumed 1% growth rate.

1.7 Transmission Lines – Type, Heights, and Spans

1.7.1 115 kV Rebuild between Structure # 57 to Westgate Substation

Steel poles with horizontal braced post insulators are proposed to be used for the majority of the 115 kV single circuit rebuild transmission line between the double circuit Structure #57 of Line #5516 (north of Bluff Creek Substation) and the Westgate Substation. Other structure types that may be used along the rebuild route include horizontal post, H-frame, and Y-frame structures. For portions of the rebuild, a cantilever design may be used. This design would require installation of a single pole transmission structure with all arms and conductors installed on the side of the pole that overhanging the public road or public right-of-way. Pictures of the proposed structure types are shown below in **Figure 2.**

Rock-filled culvert foundations may be required in areas with poor soils. Self-supporting weathering or galvanized steel poles on drilled pier concrete foundations are proposed to be used for all long span, angle and dead-end structures.

Portions of the existing 69 kV transmission line between the double circuit Structure #57 of Line #5516 (north of Bluff Creek Substation) and the Westgate Substation have distribution underbuild. In locations where the Proposed Route can be constructed with the existing distribution line, the structures will be single circuit 115 kV poles with distribution underbuild.

The steel structures proposed for the rebuild portion of the Project will be approximately 60 to 90 feet tall with spans of approximately 200 to 400 feet for post structures and approximately 400 to 900 feet for H-frame and Y-frame structures. This spacing is appropriate to keep the conductor within existing right-of-ways where applicable. **Table 2** summarizes the structure design for the line.

The proposed transmission line will be designed to meet or surpass relevant local and state codes including the National Electric Safety Code ("NESC") and Company standards. Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation.

The 115 kV conductor proposed for the Project will be 795 kcmil 26/7 Aluminum Conductor Steel Supported ("ACSS"). The average service life of high voltage transmission lines is 50 to 60 years.

1.7.2 115/115 kV Conversion between Scott County Substation to Structure #57

The existing 115/69 kV transmission line between the Scott County Substation and Structure #57 utilizes double circuit structures. These structures will remain in place when this line is converted to 115/115 kV operation. A picture of typical double circuit 115/115 kV structure is shown below in **Figure 2**.

Figure 2
Photos of Proposed Structure Types

Typical 115 kV Braced Post Structure

Typical Y-Frame Steel Structure

Typical 115 kV Horizontal Post Steel Structure

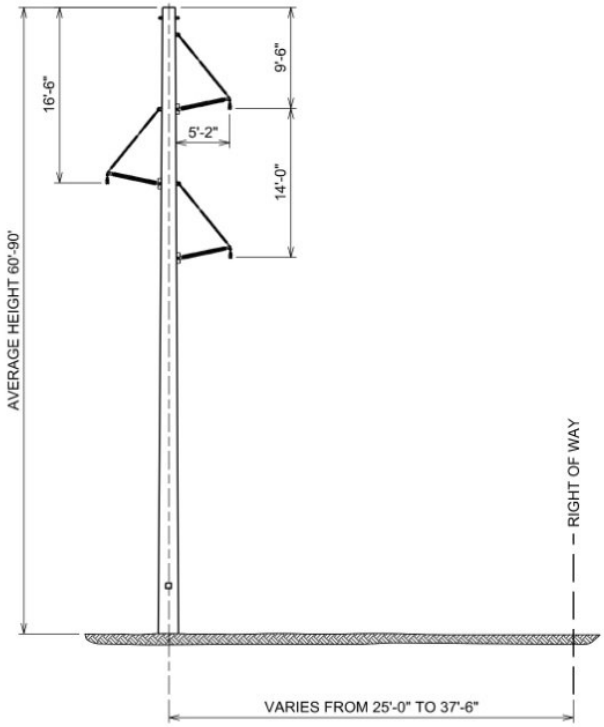
Typical 115 kV Single Circuit Cantilever Design

Typical H-Frame Steel Structure

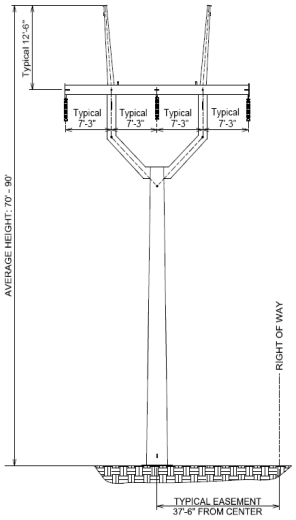
Typical 115/115 kV Steel Davit Arm Structure)

Typical Single Circuit 115 kV Structure with Distribution Underbuild

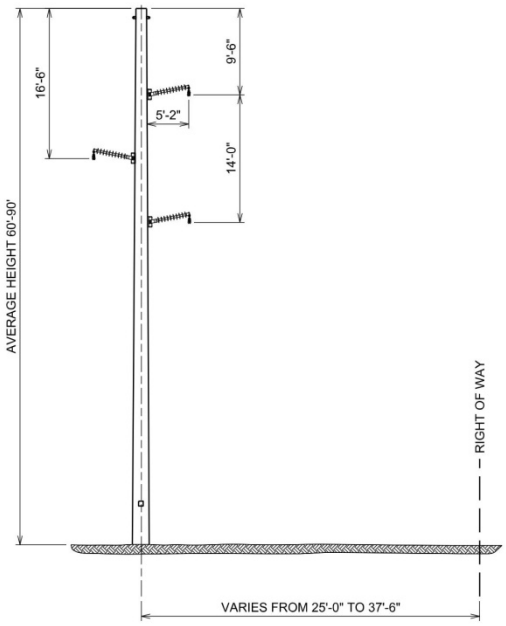
Figure 3
Typical Dimensions and Right-of-Way Requirements for Proposed Structure Types



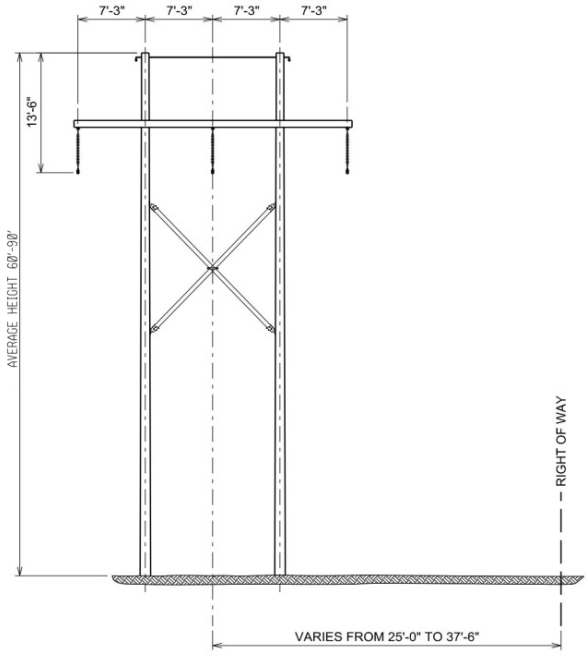
115 kV Braced Post Structure



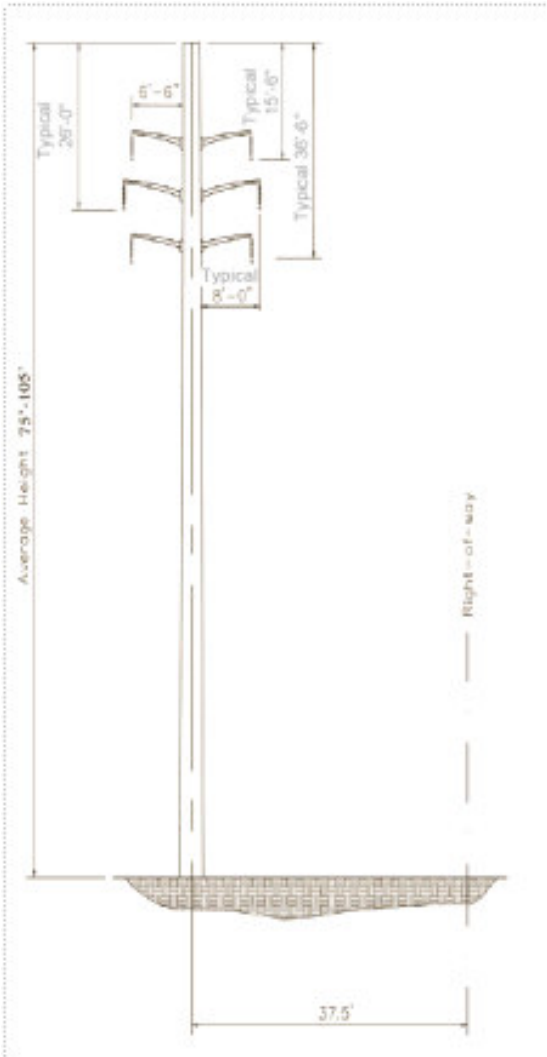
115 kV Y-Frame Structure



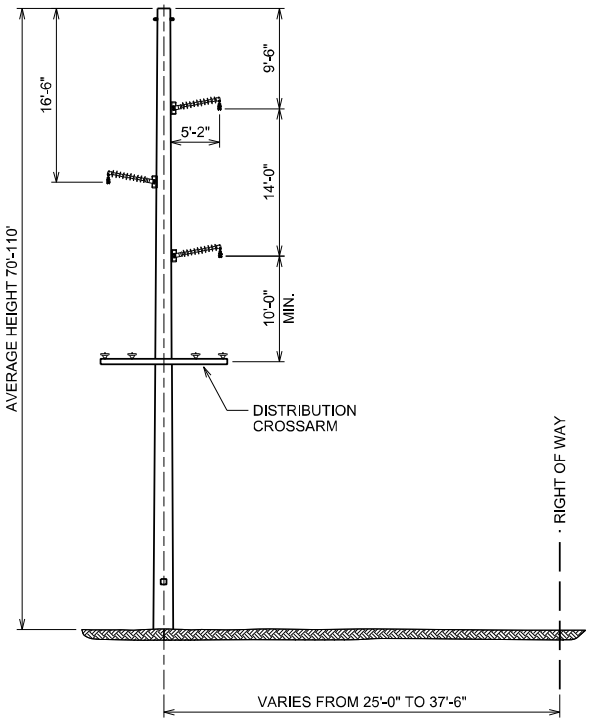
115 kV Horizontal Post Structure



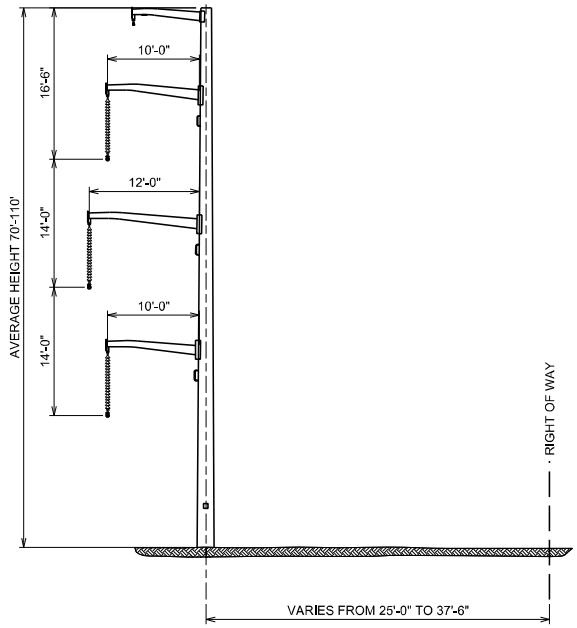
115 kV H-Frame structure



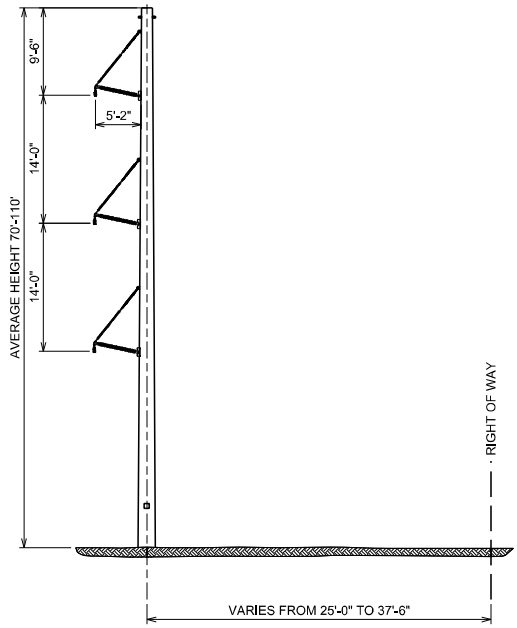
Double Circuit 115/115 kV Davit Arm Structure



Single Circuit 115 kV Structure with Distribution Underbuild



Single Circuit 115 kV Davit Arm Structure with Cantilever Design



Single Circuit 115 kV Braced Post Structure with Cantilever Design

Table 2 summarizes the structure design for the line.

Table 2
Structure Design Summary

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Foundation	Foundation Diameter (feet)	Span Between Structures (feet)
115 kV Single Circuit	Single pole, horizontal post or horizontal braced post insulator	Galvanized steel or weathering steel	75	60-90	Direct embedded for tangents and self-supporting for angle/ dead-end structures	Direct embedded in 4 foot diameter culvert or 5 to 8 foot concrete	200 to 400

115 kV Single Circuit	Two pole, H-Frame or Y-Frame	Galvanized steel or weathering steel	75	60-90	Direct embedded for tangent H-Frame and self-supporting for Y-Frame or angle/ dead-end structures	Direct embedded in 4 foot diameter culvert or 5 to 8 foot concrete	400 to 900
115 kV Single Circuit with Distribution Underbuild	Single pole, horizontal post or braced post with distribution crossarm	Galvanized Steel or Weathering Steel	75	70 to 110	Direct embedded for tangents and self-supporting for angle/ dead-end structures	Direct embedded in 4 foot diameter culvert or 5 to 8 foot concrete	200 to 500
115 kV Single Circuit	Single pole, horizontal post or braced post with vertical configuration (Cantilever design)	Galvanized Steel or Weatherin g Steel	25 on davit arm side	70-100	Direct embedded for tangents and self-supporting for angle/ dead-end structures	Direct embedded in 4 foot diameter culvert or 5 to 8 foot concrete	200 to 400

1.8 Need for New Right-of-Way

The Company proposes to upgrade the existing 69 kV transmission line to 115 kV within right-of-way that is currently maintained for the existing line. In evaluating the route for the proposed Project, Xcel Energy also evaluated a route alternative that would follow State Highway 7 ("Highway 7") and Vinehill Road in response to public comments received during public meetings regarding the proposed Project ("Highway 7 Alternative"). If the Highway 7 Alternative is selected by the Commission, new right-of-way will be required for the Excelsior-Deephaven segment of the line. New right-of-way would also be required if the Commission determines that some other route alternative, that does not follow the existing 69 kV line right-of-way, is more appropriate for the line.

For the 115/69 kV to 115/115 kV conversion between the Scott County Substation and Structure #57, no new right-of-way will be required as the existing structures will remain in place and no physical modifications of the existing line will be required.

1.9 Substations

1.9.1 Scott County Substation Modifications

The existing Scott County Substation will be modified as part of the Project. All modifications to the existing Scott County Substation will take place on Xcel Energy property. The existing line termination for the line to Excelsior Substation that is 115 kV capable but operating at 69 kV will be removed from the 69 kV bus within the Scott County Substation and relocated to the 115 kV bus.

A new 115 kV portion of the substation to tie in a 115 kV line from West Waconia Substation will already be in place and this project will be tying into the 115 kV structures in that area. The line will terminate on the north end of an existing 115 kV box structure in the new 115 kV yard.

Equipment that will be installed include one new 145 kV (operated at 115 kV) circuit breaker, and associated electrical equipment, such as switches, to accommodate the new 115 kV line.

1.9.2 Deephaven Substation Modifications

The existing Deephaven Substation will be modified as part of the Project. The existing Deephaven Substation is a 69-13.8 kV distribution substation that will be partially demolished and replaced with a new 115-13.8 kV distribution substation. To facilitate the new 115 kV yard and distribution transformers, an area approximately 40' x 115' to the south of the existing substation and an irregularly shaped area approximately 20' x 115' x 105' outside of the existing north and northeast fence-line will be cleared of trees, graded, and fenced. In addition, the existing fence will be replaced with a new seven-foot tall fence with a one-foot topper of barbed wire on a 45° outrigger. The new fence will be grounded and counterpoised.

115 kV equipment additions at the existing Deephaven Substation will include two 118-13.8 kV, 50 MVA transformers, two 115 kV circuit interrupters, one 145 kV (operated at 115 kV) circuit breaker, and associated electrical equipment, such as switches, to accommodate the new 115 kV line. The existing 69-13.8 kV, 28 MVA transformers, 69 kV circuit interrupters, and associated 69 kV and 15 kV switches and the existing 69 kV steel structures will be removed. The existing distribution structures will remain and additional 115 kV steel structures and electrical equipment will be installed to accommodate the new 115-13.8 kV transformation.

The existing Electrical Equipment Enclosure will be removed and a new 24' x 40' Electrical Equipment Enclosure will be installed for the new control and protection equipment installed during the voltage conversion.

Future plans for the substation include the installation of up to four additional 13.8 kV distribution feeders (including new steel structures, circuit breakers, voltage regulators, and associated equipment, such as switches).

1.9.3 Excelsior Substation Modifications

The existing Excelsior Substation will be modified as part of the Project. The existing Excelsior Substation is a 69-13.8 kV distribution substation that will be partially demolished and replaced with a new 115-13.8 kV distribution substation. The existing fence will be replaced with a new seven-foot tall fence with a one-foot topper of barbed wire on a 45° outrigger. The new fence will be grounded and counterpoised.

New 115 kV steel structures will be erected and new 115 kV equipment will be installed. 115 kV equipment additions at the existing Excelsior Substation include one 115-13.8 kV, 28 MVA transformer, one 115 kV circuit interrupter, and associated electrical equipment, such as switches, to accommodate the new 115 kV line.

The existing 69-13.8 kV, 19 MVA transformer, two 69 kV oil circuit breakers, the 69 kV capacitor bank, the 69 kV circuit interrupter, and associated electrical equipment, such as switches, and the existing 69 kV and 4 kV steel structures will be removed. The existing distribution structures will remain.

In order to fit the new 115 kV equipment on the substation property, the old generating plant building (which has an area dedicated as a control room for the existing transmission and distribution protection) will be demolished. A new 24'x40' Electrical Equipment Enclosure will be installed for the new control and protection equipment installed during the voltage conversion project.

Future plans for the substation include the installation of a second 118-13.8 kV, 28 MVA transformer, one 115 kV circuit interrupter, one 145 kV (operated at 115 kV) circuit breaker, and associated 115 kV equipment, such as switches, and two 13.8 kV distribution feeders (including new steel structures, circuit breakers, voltage regulators, and associated equipment, such as switches).

1.9.4 Westgate Substation Modifications

The existing Westgate Substation will be modified as part of the Project. The existing 69 kV line to Excelsior Substation will be removed and a new 115 kV line to Excelsior Substation will be terminated at Westgate Substation. The existing 69 kV box structure will be used as a pass through structure for the converted line. In order for this to work, the upgraded line will terminate on the 69 kV structure on the west side rather than the south side where the 69 kV line presently terminates.

Equipment that will be installed include two 145 kV (operated at 115 kV) circuit breakers, and associated electrical equipment, such as switches, to accommodate the new 115 kV line. One existing 115-69 kV, 47 MVA transformer, one 69 kV breaker, and associated electrical equipment, such as switches, will be removed.

2 NEED

2.1 Overload and Low Voltage Mitigation

The Project is needed to address overload and low voltage conditions in the Study Area, shown in Figure 4, during certain transmission line outages. The analysis of the 2013 summer peak model indicates that there are existing overloads and low voltages that need to be addressed immediately (See Section 3.7 regarding Consequences of Delay). The analysis of the 2016 model also indicates that, without the proposed Project, there would be additional overloads of transmission line facilities and low voltages in the Study Area. Depending on the duration of a low voltage condition, equipment such as electronic power supplies could also malfunction or fail when output voltage drops below certain levels, damaging customer equipment such as process controls, motor drive controls, and automated machines. Thermal overload on transmission lines is not acceptable as it could damage the facilities due to excessive heat, this could also cause safety concerns due to unsafe ground clearance of transmission lines. In addition overload on facilities, that operate at a voltage greater than 100 kV, is a violation of NERC standards. Without the proposed transmission upgrades, overloading and low voltage conditions will worsen as the area experiences continued growth and development. Electric power systems are planned and operated to be capable of withstanding the most severe contingency that can occur on the system. In other words, the system must be able to suffer the most serious single contingency (often called the N-1 criterion) without overloads, low voltages, system instability, or loss of customer load.

Figure 4 below shows the current electricity supply system to the Study Area under system intact conditions.

Figure 4
System Intact

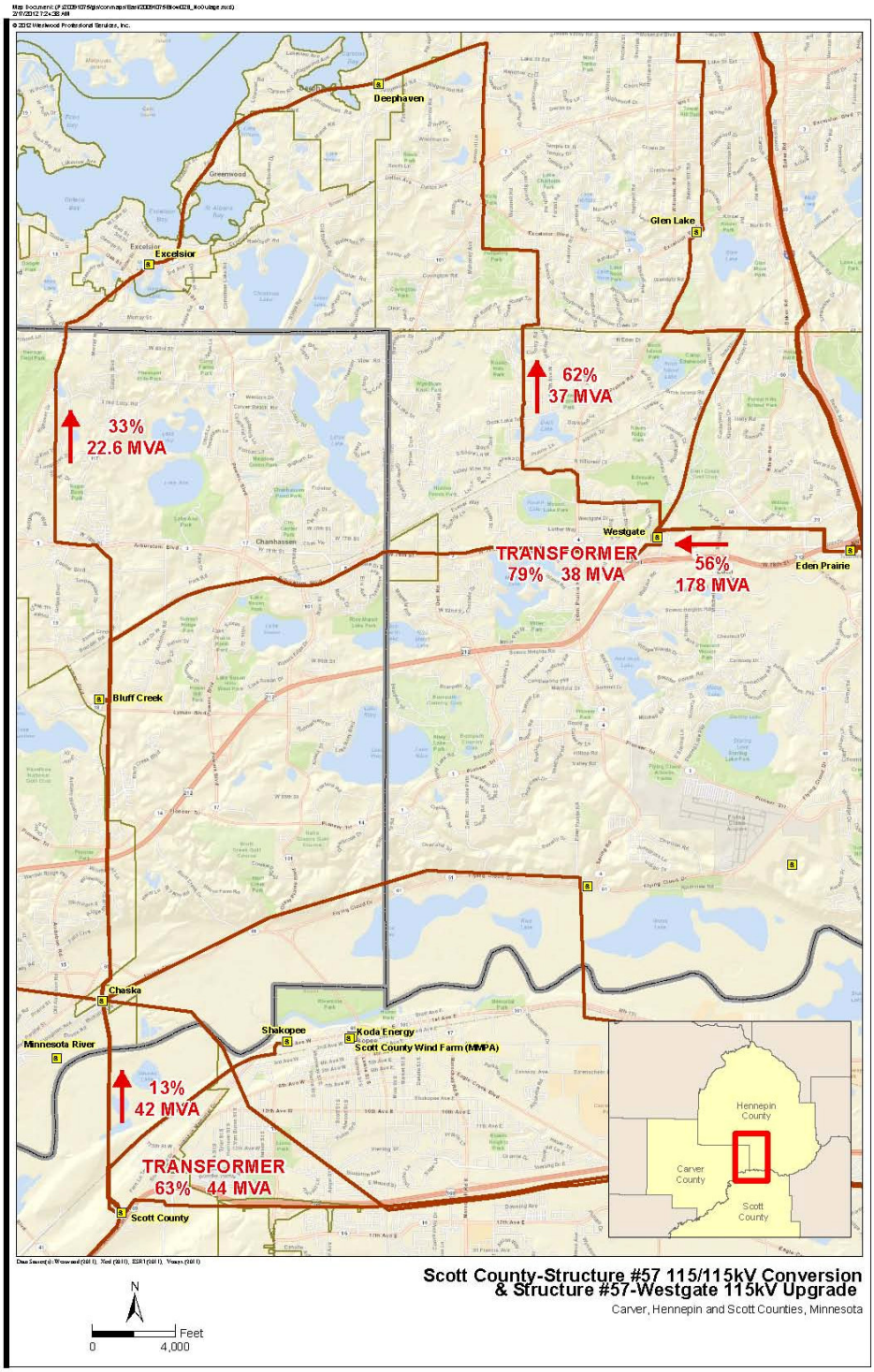


Table 3 provides Xcel Energy's criteria for transmission system performance. Any facility loaded above 100% and those approaching 100% are documented. Similarly, low voltage conditions less than 92% or approaching that benchmark are also documented. For substation performance, transformer loading above 115% and those approaching 115% are documented.

The deficiencies identified in the Study Area are listed in Table 4. The deficiencies marked in red indicate violation of criteria listed in Table 3. While the remaining deficiencies identified do not violate the criteria identified in Table 3, these deficiencies could be potential violations in the future.

Table 3
Performance Criteria

Transmission Condition	% Line loading	% Transformer loading	Minimum %Voltage	Maximum %Voltage
System intact	100	100	95	105
Contingency	110	115	90% for load serving buses 95% for generator buses	105

Table 4
Identified Contingencies (Overloads)

Contingency	Facility	Rating	MVA flow	Overload
Loss of Scott County – Excelsior 69 kV line	Westgate 115-69 kV transformer #2	47	70	130%
Loss of Scott County – Excelsior 69 kV line	Westgate – Deephaven 69 kV line	59	60.3	102%
Loss of Scott County transformer #1	Scott County transformer #2	70	76.9	110%

Table 4 Cont. (Overloads)

Contingency	Facility	Rating	MVA flow	Overload
Loss of Scott County transformer #2	Scott County transformer #1	70	77.3	110%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Scott County – Minnesota River 115 kV line	316.3	388.7	123%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Minnesota River – Chanhassen 115 kV line	316.3	349	110%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Chanhassen – Bluff Creek 115 kV line	316.3	339.4	107%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Scott County– Excelsior 69 kV line	68	70	103%

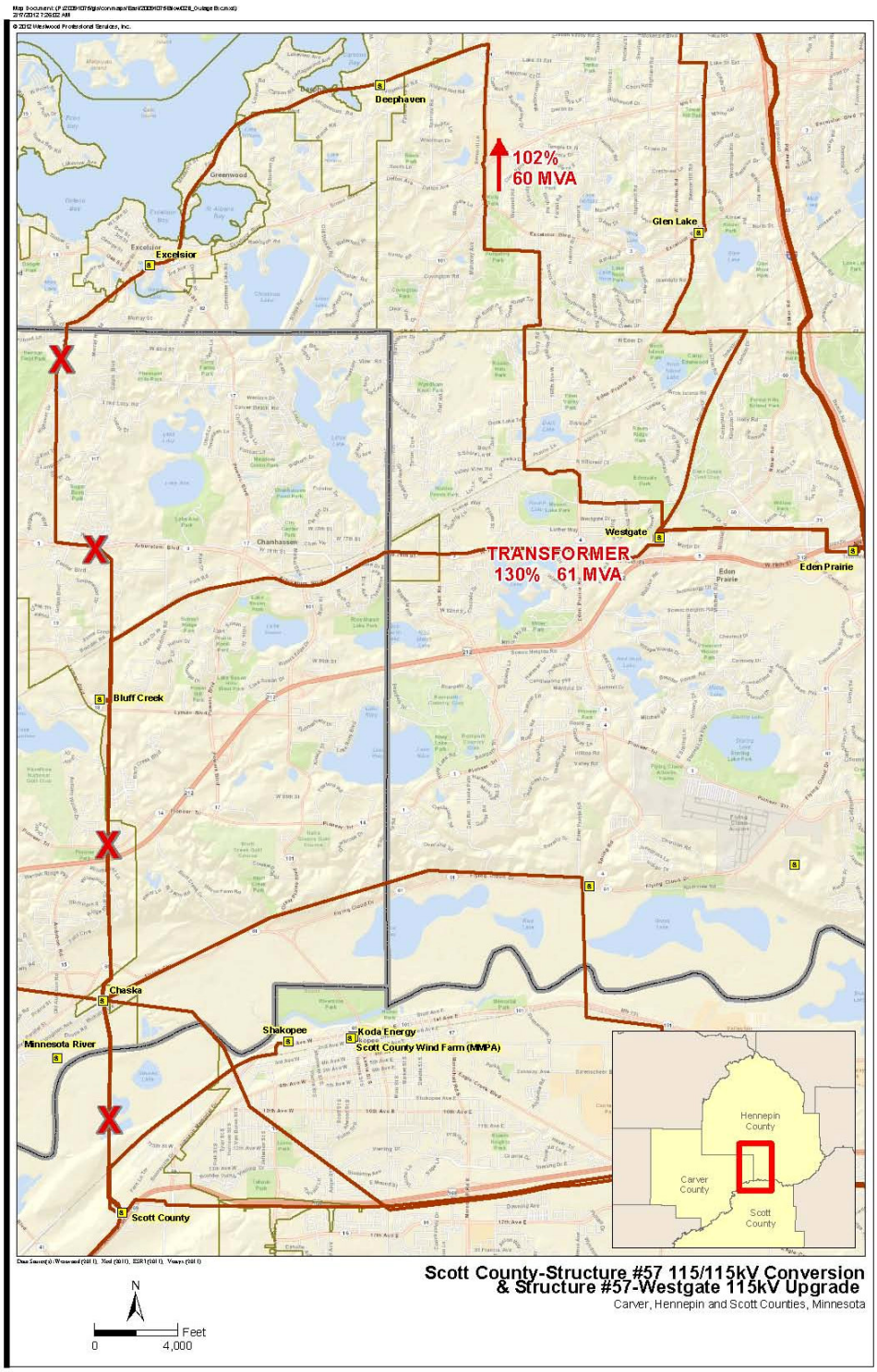
Table 4 Cont. (Low Voltage Conditions)

Contingency	Facility			Voltage
Loss of Eden Prairie – Westgate double ckt 115 kV line	Westgate Substation			91.4%
	Deephaven Substation			91.6%
	Bluff Creek Substation			92.4%
	Excelsior Substation			92.9%
	Minnesota River generating station			94%
	Chanhassen Substation			93.7%

The Study focused on two major contingencies including loss of the Scott County – Excelsior 69 kV line and the Eden Prairie – Westgate 115 kV double circuit line. At times when these transmission lines or related transformers are out of service, several overloading and low voltage conditions were identified based on 2016 peak summer load forecasts, as illustrated in Table 4 above.

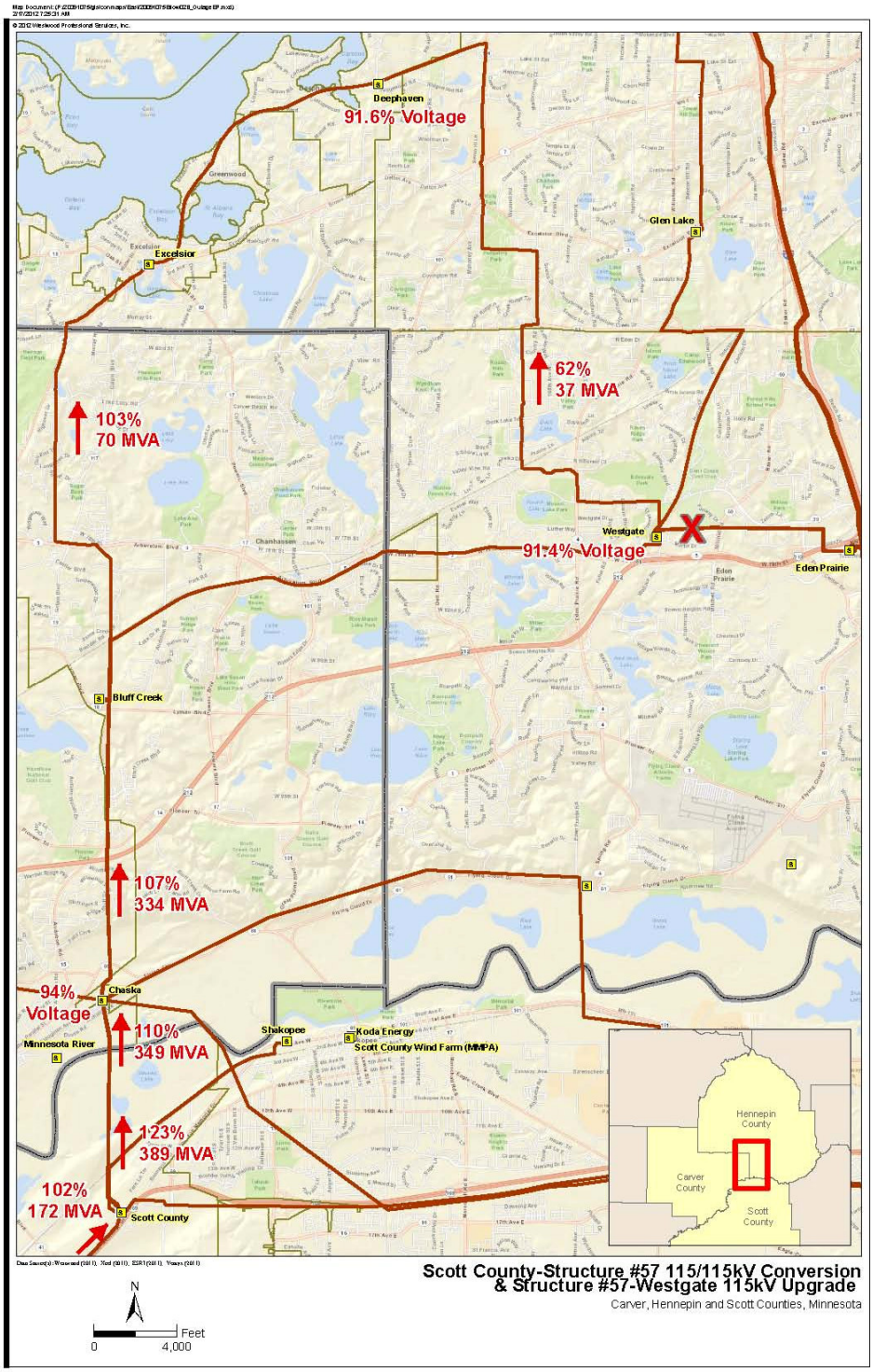
As shown in Table 4, the loss of the Scott County – Excelsior 69 kV line results in an overload of the Westgate Substation 115-69 kV transformer #2. Figure 5 below illustrates this contingency and the resulting overload.

Figure 5
Outage of Scott County –Excelsior 69 kV Line



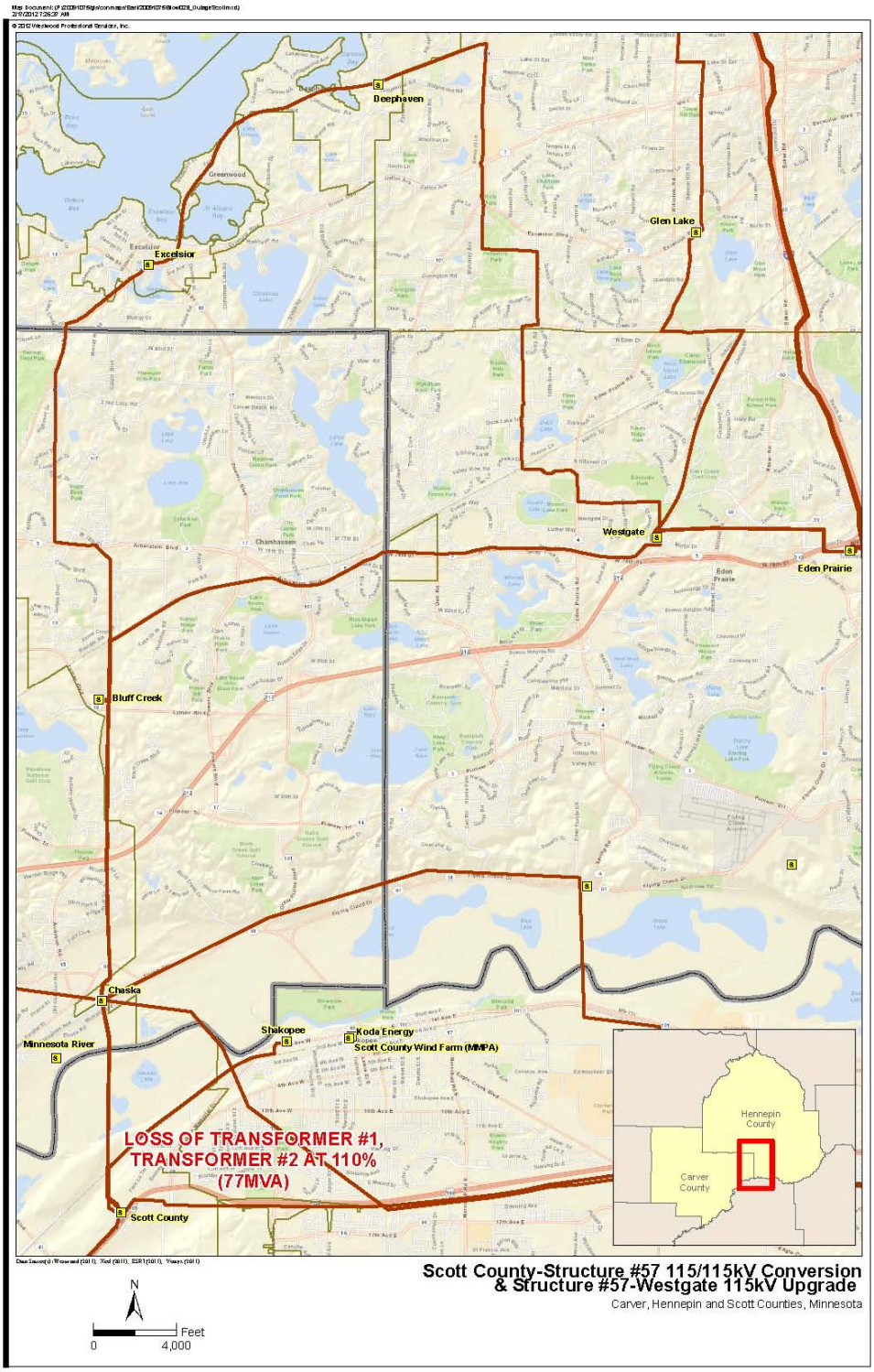
In addition, loss of the Eden Prairie – Westgate 115/115 kV double circuit line results in overloads on the Scott County – Minnesota River –Chanhassen 115 kV line and low voltages between Minnesota River Substation and the Westgate Substation. The loss of the Eden Prairie-Westgate 115/115 kV double circuit transmission line is the most critical contingency identified in the Study. This line is the only tie between Eden Prairie 345/115 kV Substation, which serves the largest load in the area, and Westgate 115/69 kV Substation. When the Eden Prairie-Westgate 115/115 kV double circuit line is out of service, the 345 kV source to the area is disconnected. As a result, the entire load at the Westgate Substation would be served from Scott County Substation, resulting in overloads or potential overloads on the transmission lines in the area and in low voltages between the Minnesota River Substation and the Westgate Substation. Figure 6 illustrates the loss of the Eden Prairie – Westgate 115/115 kV double circuit line and the resulting overloads and low voltages.

Figure 6
Outage of Eden Prairie – Westgate 115/115 kV line



Finally, the loss of one of the transformers at the Scott County Substation also has the potential to cause overloads on the remaining Scott County Substation transformer. Figure 7 illustrates this Scott County Substation contingency and the resulting overload condition.

Figure 7
Outage of Scott County Substation Transformer # 1



2.2 Substation Load Data

The Minnesota Public Utilities Commission granted Xcel Energy an exemption to Minnesota Rule 7849.0270 which requires Applicant to submit "peak demand and annual consumption forecasts for the applicant's service area and system…" A copy of the Exemption Order is attached as Appendix A. In lieu of the system forecasts required by Minn. R. 7849.0270, Xcel Energy is submitting peak demand forecasts for the substations within the Study area. Xcel Energy considers this information more informative because it focuses on demand in the region where pending electrical problems were discovered.

To assess the immediacy of the Study area need, planning engineers developed a peak load forecast for the area's load-serving substations as part of the 2011 Study. NSP's distribution capacity planning looks at loads on key elements of the system, such as feeders and transformers, on an annual basis. The load readings are gathered from multiple sources and take out the switching peaks to get each year's peak reading. Planning looks at growth trends and predicts load growth from information from area engineers, new load additions and economic factors. For the study, actual loads from 2004 to 2010 were used to forecast future substation load (Table 5). The loads for Minnesota Valley Electric Co-op and City of Chaska were obtained from Great River Energy and City of Chaska, respectively. Based on the forecast completed for the Study, the peak load in the Study area is expected to increase by approximately 13 percent between 2011 (388 MW) and 2020 (440 MW) as illustrated in Table 6 below. Based on the 2013 summer peak model analysis the overload on transformer at Westgate and Scott County – Minnesota River 115 kV line appear before 2013 (See Section 3.7 regarding Consequences of Delay).

Following issuance of the Study, actual 2011 peak substation load data was compiled. The 2011 actual substation load total (374.4 MW) for the Study area is slightly lower (3.6%) than the forecasted 2011 total (388 MW). This slight decrease in actual peak substation load does not impact the need for the Project as there are existing low voltage conditions.

Table 5
Actual Substation Load Data (MWs)

Substation	2004	2005	2006	2007	2008	2009	2010
Westgate	137.9	156.4	163.4	152.9	160.6	159.1	163.3
Excelsior	17.03	15.2	15.5	12.4	14.7	15.8	12.2
Deephaven	42.87	40.7	42.1	40.2	36.3	41.1	41
Minnesota River	24.48	25.5	26.9	26.0	27.3	27.3	26.7
Chanhassen	------	------	8.7	7.0	7.1	8.0	10.8
Glen Lake	38.3	41.6	39.4	35.7	38.1	36	35.8
Bluff Creek (NSP)	39.6	36.1	37.2	35.9	34.5	34.1	35.5
Bluff Creek (GRE and Chaska)	42.3	43.1	39.1	40.1	36.6	35.1	40.2
Totals	**342.5**	**358.6**	**372.3**	**350.2**	**355.2**	**356.5**	**365.5**

Table 6
Peak Substation Load Forecast (MWs)

Substation	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Westgate	171.28	173.86	176.49	179.17	181.89	184.65	187.47	190.33	193.24	196.20
Excelsior	12.88	13.01	13.14	13.27	13.40	13.54	13.67	13.81	13.95	14.09
Deephaven	43.78	44.22	44.66	45.11	45.56	46.01	46.47	46.94	47.41	47.88
Minnesota River	31.00	36.00	32.00	35.00	36.00	36.00	37.00	38.00	38.00	39.00
Chanhassen	8.40	8.49	8.57	8.66	8.74	8.83	8.92	9.01	9.10	9.19
Glen Lake	43.39	43.82	44.26	44.70	45.15	45.60	46.05	46.51	46.98	47.45
Bluff Creek (NSP)	40.02	40.42	40.82	41.23	41.64	42.06	42.48	42.91	43.33	43.77
Bluff Creek (GRE)	6.48	6.55	6.61	6.68	6.75	6.81	6.88	6.95	7.02	7.09
Bluff Creek (Chaska)	31.00	32.00	32.00	33.00	34.00	34.00	35.00	35.00	36.00	36.00
Totals	**388**	**398**	**399**	**407**	**413**	**417**	**424**	**429**	**435**	**440**

3 ALTERNATIVES ANALYSIS

This chapter summarizes Applicant's analysis of alternative transmission options, as analyzed in the Study. The performance of each option was tested to meet the voltage and line loading criteria for North American Electric Reliability Corporation ("NERC") category A, B, and C contingencies. The analysis was performed on the Midwest Reliability Organization ("MRO") 2010 series 2016 summer peak model. The loads in the study region were updated using the non-coincident peak loads for each substation.

3.1 Study Methodology

When evaluating system performance, engineers rely on performance criteria established by the industry to ensure reliable performance. The bulk electric system should be planned to meet the NERC transmission planning standards.
When evaluating the performance of the electric system, engineers use computer simulations of the interconnected system to evaluate performance under a range of scenarios to evaluate the performance of alternative solutions. The computer models consider the capability of each of the transmission elements of the system and simulate the power flows on the system.

The primary strengths of the methodology employed in the Study are its reliance on the latest modeling software and most recent load forecast data available at the time. The methodology incorporated the use of existing rights-of-way to the maximum extent possible and it considered the likely long-term growth in the region. Lastly, the plans presented in the Study not only address current needs, they also provide the framework for future development of 115 kV and 345 kV transmission infrastructure in the Study region.

3.1.1 Modeling Assumptions

Several modeling assumptions were made in the Study to reflect recent plans and corrections. These modeling assumptions are discussed below.

3.1.1.1 Glen Lake Load Modeling Assumption

Glen Lake Substation load is currently served from Westgate and Gleason Lake substations, with each substation serving approximately 50% of the load. Recent studies have indicated that the loss of Gleason Lake 115-69 kV transformer would lead to severe low voltages at Glen Lake Substation. To mitigate this low voltage, Xcel Energy has proposed to move the load, served by Gleason Lake Substation, to the Westgate Substation. To reflect this change, the normally open switch between the distribution transformers at Glen Lake load is moved to the north side of the load. To implement this change in topology, the Westgate Substation transformer serving Glen Lake, has been upgraded to 70 MVA.

3.1.1.2 Related Projects Modeling Assumption

The Glencoe – Waconia 115 kV upgrade (Docket No. E002/CN-09-1390) and the Chaska Area 115 kV upgrade (Docket No. E002/CN-11-826) projects are included in the models to ensure that only the deficiencies between the Scott County and Westgate substations are identified and addressed by the Study.

3.1.1.3 Minnesota River Generator Modeling Assumption

The model assumes that the Minnesota River generator is offline. This assumption was made because the generator is not considered a base load unit and would be expensive to dispatch out of merit order.

3.1.2 Selection of Termination Points

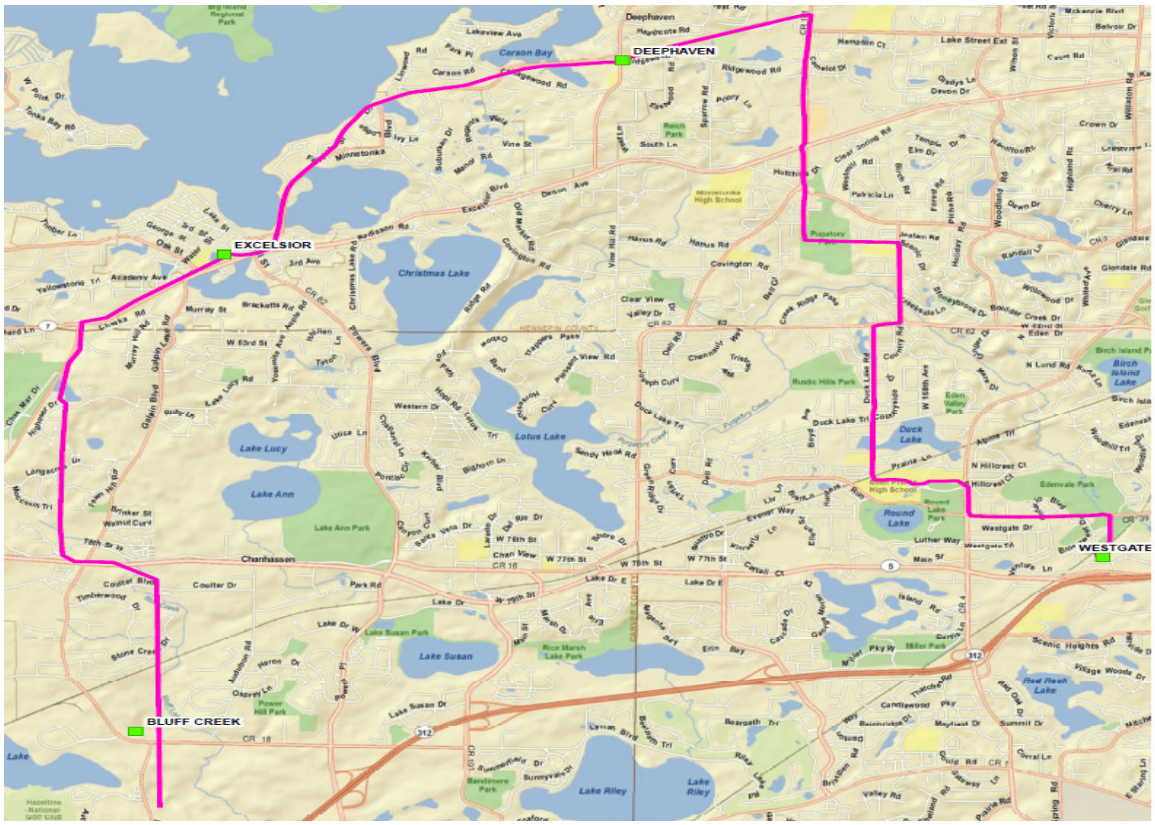
The selection of termination points for each of the options was based on the areas requiring transmission upgrades for load serving and voltage benefits. As the majority of the load serving need is between the Scott County and Westgate substations, those locations were chosen as end points for the upgraded 115 kV transmission line.

3.2 Transmission Alternatives

Two options were analyzed to address pending low voltage conditions and overloads in the Study area. The two options were selected based on the assumption that it

would be far less costly to utilize the existing transmission right-of-way. Applicant's proposed Project, Option 1, is shown in Figure 4 below. Option 1 upgrades the existing 69 kV line between Structure #57 and the Westgate Substation to 115 kV and converts the existing 115/69 kV line between the Scott County Substation and Structure #57 to 115/115 kV operation. Option 2, the alternative option, consists of upgrading all facilities in the Study Area that overload to a higher capacity. This includes upgrading the Westgate 115-69 kV transformer to a higher capacity (70 or 112 MVA), upgrading the double circuit 115 kV transmission line from Scott County – Minnesota River to 2-795 ACSS conductor and upgrading the Minnesota River – Chanhassen – Bluff Creek 115 kV line to 2-795 ACSS conductor.

Figure 5
Preferred Option 1



Both options address the low voltage and overload issues that were discovered in the Study area and both provide approximately 30 megawatts of incremental load growth before new mitigation measures would be needed in the Study area.

Option 1, which includes upgrading the existing 69 kV line between Structure #57 and the Westgate substation to 115 kV, will eliminate the overload conditions at the Westgate 115-69 kV transformer, currently serving Deephaven and Excelsior substations, as it will no longer be needed since all load will be converted to 115 kV. Option 1 also eliminates the overload on the Scott County-Minnesota River-Chanhassen 115 kV transmission line, as a new parallel 115 kV circuit will be created. In addition, the upgrades will prevent pending overloading on the Scott County—Excelsior and Chanhassen-Bluff Creek transmission lines. Pending low voltage conditions at the Westgate Substation will also be prevented by the 115 kV upgrades. Option 1 will also reduce the load on the Scott County Substation 115-69 kV transformers because the load at the Excelsior and Deephaven substations will be converted from 69 kV to 115 kV.

3.2.1 Cost Analysis of Options 1 and 2

In conformity with Minnesota Rule 7849.0260(C), the planning cost estimate of the preferred Option 1 is approximately $26 million. The planning cost estimate for the alternative Option 2 is approximately $15 million. Since the estimates are +/- 30% accurate, the range of costs is between $18 million and $34 million for the preferred Option 1 and $10 million and $19 million for the alternative Option 2.

The 2014 Minnesota jurisdiction revenue requirement for the preferred Option 1 is $3.2 million or a cost/kWh of 0.000096. The 2014 Minnesota jurisdiction revenue requirement for the alternate Option 2 is $1.8 million or a cost/kWh of 0.000055. See Appendix C for detailed cost analysis of the Company's Minnesota revenue requirement.

The planning cost estimates for Option 1 have been updated to anticipated Project cost estimates in Section 1.3 of this Application.

Table 7
Preferred Option 1 (Planning Cost Estimates)

Facility Option 1	Cost in Million $
Scott County Line termination	$1.5
Westgate line termination	$1.3
Deephaven substation conversion	$6.3
Excelsior substation conversion	$4.4
Westgate – Deephaven conversion	$5.7
Deephaven – Excelsior conversion	$2.8
Excelsior – Bluff Creek Conversion	$4.1
Total Cost Estimate	**$26.1**

Table 8
Alternative Option 2 (Planning Cost Estimates)

Facility Option 2	Cost in Million $
Westgate Transformer Upgrade	$2.0
Scott County-Bluff Creek Line Upgrade	$13.0
Total Cost Estimate	**$15.0**

Both options can be expanded in future years to accommodate continued growth in the area. Based on the model projections, both options would require expansion in the year 2023 and Option 2 would require expansion in 2030. The ultimate costs, including future expansion estimates are provided in

Table 9 below.

Table 9
Ultimate Costs of Preferred and Alternative Options

Facility	Cost in Million $	year
Preferred Option		
Scott County Line termination	1.47	2014
Westgate line termination	1.26	2014
Deephaven substation conversion	6.34	2014
Excelsior substation conversion	4.39	2014
Westgate – Deephaven conversion	5.70	2014
Deephaven – Excelsior conversion	2.77	2014
Excelsior – Bluff Creek Conversion	4.12	2014
Scott County 345-115 kV addition	21.7	2023
Bluff Creek in-out (ring bus)[3]	-	2054
Total Cost	**47.75**	
NPV in 2010 dollars	**37**	
NPV Cost in million $/MW of incremental growth, assuming 200 MW of capability (total incremental load growth/NPV)	**0.185**	
Alternative Option		
Westgate transformer upgrade	2.03	2014
Scott County – Bluff Creek line upgrade	13.0	2014
Scott County transformer upgrade	4.16	2023
Westgate – Deephaven line upgrade	2.7	2023
Scott County 345-115 kV addition	21.7	2023
Scott County – Excelsior line upgrade	1.5	2030
Total Cost	**45.1**	
NPV in 2010 dollars	**30**	
NPV Cost in million $/MW of incremental growth, assuming 168 MW of capability (total incremental load growth/NPV)	**0.18**	

Based on the year in which each upgrade is needed, the cost of each upgrade, and the net present value of each option are identified in the above table. Since the two options have different load serving capability, comparison of cost is not sufficient, therefore $/MW of incremental load serving capability is used as a comparison tool.

3.2.2 Total System Losses (MW) by Option

Table 10 below provides the losses for Base case, Option 1 and Option 2. The losses are based on total losses in NSP and GRE control areas.

Table 10
Base Case Losses – NSP & GRE

	Base Case	Option 1	Option 2
NSP	295.5	294.2	295.5
GRE	85.7	85.7	85.7
Total	**381.2**	**379.9**	**381.1**

The results indicate that the losses do not change significantly due to either option, therefore no further analysis was performed to identify the economic benefit of loss reduction.

3.2.3 Rationale for Option 1

The Company proposes Option 1 for several reasons. In the long run, Option 1 is more economical in terms of ultimate capacity; it has a total incremental load serving capacity of 200 MW at a cost of approximately $0.185M/MW, as opposed to Option 2, which has a lower total incremental capacity of 168 MW at nearly the same cost of $0.18M/MW (Study at Page 24). Moreover, as the load grows in the Study Area, Option 1 would provide better load serving benefit to the area because it offers better voltage support during an Eden Prairie – Westgate double circuit 115 kV outage. In addition, Option 1 provides an inherent advantage for future expansion of the area transmission system because the major substations in the area are primarily 345/115 kV capacity. Option 2, an upsizing of the overloaded facilities, would create an

isolated 69 kV transmission loop between the Scott County and Westgate substations, which would present future challenges for transmission expansion if the area experiences high load growth.

Option 2 is considered an inferior alternative to Option 1, due to operating challenges:

1) Option 1 provides the better system capability to meet the needs of the system by providing an additional 115 kV line between Scott County and Westgate. After 30 MW of load growth, the loss of the Scott County – Minnesota River 115 kV line, combined with the loss of one of the Eden Prairie – Westgate 115 kV lines will result in overloading the other line. In order to meet the requirements of NERC standards (in particular TPL-003 standard for Category C3 contingencies), either the load in the area has to be shed or the generator at Minnesota River has to be run after the first contingency.
2) The FERC interpretation of TPL-003 standard would require studying Category C contingencies, for expected maintenance outages on the bulk electric system. This would require the ability of the system to handle maintenance outages, combined with a category C outage, at least during light load conditions. Option 2 does not provide the ability to take an outage on the 115 kV line between Scott County and Bluff Creek, as an outage of the Eden Prairie – Westgate 115 kV double circuit would result in voltage collapse in the area, even during light load conditions. This would make it extremely difficult to schedule maintenance outages on the transmission system, and put significant burden on the transmission system operators.
3) In case of Option 2, any new large load (approximately 50-60 MW) near Minnesota River Substation could cause the voltages near Minnesota River Substation to drop close to 95%, for the loss of the Scott County – Minnesota River 115 kV line. This results in violation of the NERC TPL-002 standard, as the generator at Minnesota River Substation cannot be turned on. Option 1 can mitigate this problem by expanding Bluff Creek Substation and connecting the Scott County and Excelsior substations, into Bluff Creek Substation.

3.2.4 New Construction Alternative

Applicant did not specifically analyze an alternative that would include all new transmission facilities. The cost and environmental impacts would be significantly greater than the proposed alternatives, which focus on using as much existing right-of-way as possible. Applicant's approach comports with Minnesota Rules 7849.0260 B(2), which appears to favors upgrading existing facilities as opposed to constructing all new transmission lines and components.

3.3 Other Transmission Voltages

An alternative voltage solution was considered by Applicant and presented as Option 2 of this Application. As previously discussed, Option 2, an upsizing of the overloading facilities, would create an isolated 69 kV transmission loop between the Scott County and Westgate substations, which would present future challenges for transmission expansion if the area experiences high load growth.

Adding new 161 kV lines were not considered because they would require new 115-161 kV transformers to be able to connect the 161 kV lines to the existing transmission system, a significantly more expensive option when compared to 115 kV lines (Option 1). Additionally, 230 kV and 345 kV lines are generally used for transferring large amount of power over long distances or providing a back bone for 161 kV or 115 kV transmission systems. Therefore 345 kV and 230 kV transmission options are not appropriate to address the load serving needs in the Study Area.

3.4 Upgrading Existing Transmission Lines

The proposed Project upgrades the existing 69 kV line between Structure #57 and the Westgate Substation to 115 kV and converts the existing 115/69 kV line between the Scott County Substation and Structure #57 to 115/115 kV operation.

3.5 Additional Alternatives

Applicant also considered several additional alternatives to constructing the proposed facilities. These alternatives included: (1) demand side management programs; (2) generation; (3) double-circuiting and upgrading existing facilities; (4) DC lines; (5)

undergrounding; and (6) a "no build" alternative. These options are discussed below. In the end, Applicant concluded that the proposed Project best meets the identified needs.

3.5.1 Demand Side Management

Applicant presents their efforts to reduce energy consumption via demand side management ("DSM") in Appendix D. Xcel Energy's proposed 2010-2012 Triennial Plan[4] represents a budget of over $240 million, energy savings of 1,116 GWh and demand savings of 315 MW over the three years. Although significant reductions in energy consumption have been realized, such efforts are not a feasible alternative to the proposed transmission upgrades because there are existing overloads. Demand in the Study area is projected to increase well beyond projected reductions realized from the Applicant's DSM programs. Thus, while energy conservation is a tool to help in meeting future needs, it will not be able to address issues related to meeting existing demand at the levels indicated in the Study.

3.5.2 Distributed Generation

Distributed generation is generally considered to be small generation sources, usually less than 10 MW, that are located close to the ultimate users. However, in some cases generators larger than 10 MW are considered to be distributed generation as well. Distributed generation would not satisfy the identified needs for the Project.

3.5.3 Distributed Generation between Scott County & Westgate

Distributed generation is not considered a viable alternative to the proposed Project as multiple generators were required at different locations to strategically mitigate the overloads on the 69 and 115 kV transmission lines, 115-69 kV transformers at Scott County Substation, and the low voltages at Westgate Substation. Currently there is approximately 50 MW of generation located at Minnesota River Substation, this generation could potentially mitigate the overload on the 115 kV line between Scott

[4] Docket No. E,G002/CIP-09-198.

County and Minnesota River substations, but does not help in alleviating the overload on the 69 kV system serving the Deephaven Substation.

In addition, due to the residential nature of the area around Deephaven and Excelsior substations, it would be difficult to site generation in these areas along with the gas or oil infrastructure and interconnection facilities required to run the generating plant. Therefore this option was not studied.

In conclusion, the proposed transmission option is superior when these additional costs are factored into the distributed generation option.

Additionally, any generation alternative would need to replace the reliability provided by adding transmission. Transmission lines have the ability to operate more than 99% of the time. This reliability level is one of the benefits of constructing transmission lines. For comparison purposes, peaking generation cannot be assumed to be available to operate more than 95% of the necessary hours. Consequently, to replicate the 99% reliability found in transmission, redundant generation would need to be installed.

3.5.4 Renewable Energy Generation

Applicant considered the public policy preference for renewable energy generation. The state policy is embodied in two sections of state law. The first renewable energy preference is contained in Minn. Stat. § 216B.243, subd. 3a. This statute provides:

> Subd. 3a. Use of renewable resource. The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy

> source. For purposes of this subdivision, "renewable energy source" includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.

The second renewable energy preference is found at Minn. Stat. § 216B.2422, subd. 4, which states:

> The Commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need, pursuant to section 216B.243, nor shall the Commission allow rate recovery pursuant to section 216B.16 for such a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest.

The Commission has recognized that the renewable energy preference statutes create unique issues when applied to transmission projects. The Commission has found that the preference is not a bar to granting Certificates of Need for transmission facilities where the proposed transmission facility does not immediately interconnect to a new generation source and will not interconnect with a specific generation source. As the proposed transmission lines are not proposed for and will not interconnect any particular generation resource, the renewable energy preference statutes do not establish additional standards that the Applicant must satisfy as part of this Certificate of Need proceeding. *In the Matter of the Application of Otter Tail Power Company for a Certificate of Need for Appleton-Canby 115 kV High Voltage Transmission Line*, Order Granting Certificate of Need, Docket No. E-017/CN-06-677, p. 9 (April 18, 2007).

3.5.5 C-BED Generation

In evaluating generation as an alternative, Applicant also considered the use of Community-Based Energy Development ("C-BED") generation. C-BED generation, like distributed generation, generally refers to small generation projects. The distinguishing characteristics of a C-BED project are that it is renewable and that it

meets certain ownership requirements.[5] As discussed in the Distributed Generation section above, use of generation to meet the load supply needs of the Study area is not economical. This conclusion holds true even if the generation used is C-BED generation.

3.5.6 Double Circuiting Existing Transmission Lines

Double circuiting is the construction of two separate circuits on the same structures to reduce the overall amount of right-of-way required. Double circuiting prevents the need for new right-of-way and expansion of the overall footprint of the transmission system. In the case of the transmission line between Structure #57 and the Westgate Substation, the Company is taking advantage of existing right-of-way by increasing the conductors from 69 kV to 115 kV. Planning engineers examined whether double circuiting was an appropriate solution, in part, to the pending electrical deficiencies in the Study area. Double circuiting is not appropriate in this case because upgrading the existing line as a single circuit is adequate to serve the long-term needs of the Study area. The line from Scott County Substation to Structure #57 is currently double circuited.

3.5.7 Non-Certificate of Need Alternatives

Applicant examined whether transmission improvements that do not require Certificates of Need, including reconductoring existing transmission lines, could meet the identified needs in the area and determined that reconductoring the existing transmission system in the Project area and upgrading other components to 115 kV capacity is a reasonable and prudent alternative to constructing significant amounts of new transmission corridors in the Project area. By reconductoring the existing

[5] The distinguishing feature of a C-BED project is the ownership structure. "C-BED project" means a new renewable energy project that is either a stand-alone project or part of a partnership under subdivision 8:
(1) has no single qualifying owner owning more than 15% of a C-BED wind energy project unless: (i) the C-BED wind energy project consists of only one or two turbines; or (ii) the qualifying owner is a public entity listed under paragraph (b), clause (5), that is not a municipal utility;
(2) demonstrates that at least 51% of the gross revenues from a power purchase agreement over the life of the project will flow to qualifying owners and other local entities; and
(3) has a resolution of support adopted by the county board of each county in which the project is to be located, or in the case of a project located within the boundaries of a reservation, the tribal council for that reservation.
Minn. Stat. § 216B.1612, subd. 2(g) (amended 2007).

transmission system in the Project area, the need for new right-of-way will be avoided, which will considerably reduce environmental impacts that would be associated if new construction and rights-of-way were being proposed for the entire Project.

3.5.8 DC Lines

Applicant further considered the alternative of a direct current ("DC") line in place of the proposed alternating current ("AC") facilities. DC transmission lines normally consist of two current-carrying conductors instead of the three associated with an AC configuration. A DC transmission line's primary intended purpose is to deliver electricity from a distant generation location (several hundred miles away) to a load center. Such lines also do not have the capability to provide community service reliability support to an AC system because there are no intermediate substation connections. Rather, there are converter stations at each end of the line. This characteristic of a DC line makes it unsuitable for the needs sought to be addressed by the proposed transmission line, which is to improve system reliability due to increased demand.

3.5.9 Underground Transmission Line

The alternative of placing the proposed transmission line underground was also considered, but ultimately rejected because of cost considerations. Generally, for transmission voltages of 115 kV or greater, overhead construction is the preferred configuration due to costs. Underground transmission lines also have substantially longer construction times and longer repair times than equivalent overhead lines. For example, an overhead 115 kV transmission line constructed with single pole structures spaced 300 to 400 feet apart cost approximately $350,000 - $500,000 per mile. The same facility placed underground could cost up to seven to 10 times as much.

This cost differential is based on the different design requirements for overhead and underground lines. Overhead transmission lines rely on the dielectric properties of air to provide insulation, thereby preventing the occurrence of short circuits. The properties of the air also efficiently dissipate heat away from the conductor surface.

When a transmission line is placed underground, the conductors must be adequately insulated from the ground and each other, and adequately cooled to prevent equipment failure. Thus, the conductors are wrapped with insulating materials and placed inside oil filled pipes. The oil is circulated through cooling stations every few thousand feet along the line.

Some electric cables have been designed with a specially formulated plastic covering that does not require circulating oil to dissipate heat. However, the amount of current that can be applied to such conductors is limited.

Because of the significantly greater expense associated with underground transmission, the use of underground technology is limited to locations where the impacts of overhead construction are completely unacceptable or where physical circumstances allow for no other option. Examples include congested downtown centers where there is no space available between city streets and adjacent buildings for adequate clearance, or airport approaches where an overhead transmission line cannot be constructed for safety reasons. No circumstance warrants underground construction based on Applicant's examination of the environmental and land use setting associated with the proposed Project.

3.6 Rebuilding the Existing 69 kV line

Rebuilding the existing 69 kV line to a higher load carrying capacity would help alleviate the overloads and low voltages on the 69 kV line between Structure #57 and the Westgate Substation. However, the incremental load serving capability of such an upgrade would be significantly less than that provided by a new 115 kV line. If a higher growth rate is experienced in the area, the newly rebuilt 69 kV transmission line may need to be prematurely removed before the end of its 40-50 year useful life to be upgraded to 115 kV to meet the higher demand. Alternatively, a new 115 kV line on a new right-of-way may need to be built to avoid removing the 69 kV line prematurely. Due to these reasons, options involving upgrading the 69 kV line to 115 kV were determined to be more prudent.

3.7 Consequences of Delay and No Facility Alternative

In lieu of the requirements of Minn. R. 7849.0300 and 7849.0340 requiring detailed information regarding the consequences of delay and no facility alternative on three levels of demand and energy consumption, the Exemption Order requires Applicant to identify the threshold level of demand that places service at risk and the incremental change in growth.

Based on the results in Table 11 below, the 2013 year model indicates that the initial overloads in the near term occur on the Westgate transformer #2 and the 69 kV line serving Deephaven substation. In addition to that the Scott County transformers and the 115 kV line between Scott County and Minnesota River substations is also expected to overload. As the load increases in the area, the overloads and low voltages progressively get worse.

Table 11
Consequences of Delay

		Overload	
Outage	**Facility**	**2013**	**2016**
Loss of Scott County – Excelsior 69 kV line	Westgate 115-69 kV transformer #2	127%	130%
	Westgate – Deephaven 69 kV line	101%	102%
Loss of Scott County 115-69 kV transformer 1 or 2	Scott County 115-69 kV transformer 1 or 2	102-103%	110%
Loss of Eden Prairie – Westgate 115 kV line	Scott County – Minnesota River 115 kV line	113%	123%
	Minnesota River – Chanhassen 115 kV line	102%	110%
	Chanhassen – Bluff Creek 115 kV line	100%	107%
	Scott County – Excelsior 69 kV line	97%	103%
		Low voltage	
	Westgate Substation – Voltage	94.8%	91.4%
	Deephaven Substation – Voltage	93.9%	91.6%
	Bluff Creek Substation – Voltage	95.2%	92.4%
	Excelsior Substation – Voltage	95.2%	95.2%
	Chanhassen Substation – Voltage	96.2%	96.2%

4 TRANSMISSION LINE OPERATING CHARACTERISTICS

During operation, transmission lines are for the most part passive elements of the environment. Their primary impact is aesthetic, i.e., a man made structure in the landscape. Because of the line's electrical characteristics, some chemical reactions occur around conductors in the air; noise can occur in some circumstances; interference with electromagnetic signals can occur; and electrical and magnetic fields are created around the conductors. All of these operating characteristics are considered as part of the design of a transmission line to prevent any significant impacts.

4.1 Ozone and Nitrogen Oxide Emissions

Corona consists of the breakdown or ionization of air within a few centimeters of conductors. Usually some imperfection such as a scratch on the conductor or a water droplet is necessary to cause corona. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor. Ozone also forms in the lower atmosphere from lightning discharges, and from reactions between solar ultraviolet radiation and air pollutants, such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight, and inversely proportional to humidity. Thus humidity or moisture, the same factor that increases corona discharges from transmission lines, inhibits the production of ozone. Ozone is a very reactive form of oxygen molecules and combines readily with other elements and compounds in the atmosphere. Because of its reactivity, it is relatively short lived.

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The state and national ambient air quality standards for ozone are similarly restrictive. The national standard is 0.075 ppm on an eight hour averaging period. The state standard is 0.08 ppm based upon the fourth highest eight hour daily maximum average in one year. Both averages must be compared to the national and state standards because of the different averaging periods. Calculations done for a 345 kV project showed that the maximum one hour concentration during foul weather (worst case) would be 0.0007 parts per million.

This is well below both federal and state standards. Lower voltage lines would have correspondingly lower concentrations. Most calculations of the production and concentration of ozone assume high humidity or rain, with no reduction in the amount of ozone due to oxidation or air movement. These calculations would therefore overestimate the amount of ozone that is produced and concentrated at ground level. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility.

There is not a state or national standard for general oxides of nitrogen (NOx). The national standard for nitrogen dioxide (NO_2), one of several oxides of nitrogen, is 0.053 ppm on an annual basis and the Minnesota State Air Quality Standard for NO_2 is 0.08 ppm. The operation of the proposed transmission lines would not create any potential for the concentration of these pollutants to exceed the nearby (ambient) air standards.

4.2 Noise

Transmission Line Noise

Transmission lines can generate a small amount of sound energy during corona activity where a small electrical discharge caused by the localized electric field near energized components and conductors ionizes the surrounding air molecules. Corona is the physical manifestation of energy loss and can transform discharge energy into very small amounts of sound, radio noise, heat, and chemical reactions of the air components. Several factors, including conductor voltage, shape and diameter, and surface irregularities such as scratches, nicks, dust, or water drops can affect a conductor's electrical surface gradient and its corona performance.

Noise emission from a transmission line occurs during certain weather conditions. In foggy, damp, or rainy weather, power lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain the background noise level of the rain is usually greater than the noise from the

transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain.

Since human hearing is not equally sensitive to all frequencies of sound, the most noticeable frequencies of sound are given more "weight" in most measurement schemes. The A-weighted scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA, which is the A-weighted sound level recorded in units of decibels.

A noise level change of 3 dBA is barely perceptible to human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise level is perceived as a doubling of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. Table 12 below shows noise levels associated with common, everyday sources.

In Minnesota, statistical sound levels (L Level Descriptors) are used to evaluate noise levels and identify noise impacts. The L5 is defined as the noise level exceeded 5% of the time, or for three minutes in an hour. The L50 is the noise level exceeded 50% of the time, or for 30 minutes in an hour.

Table 12
Common Noise Sources and Levels

Sound Pressure Level (dBA)	Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

Source: Minnesota Pollution Control Agency (2008).

Land areas, such as picnic areas, churches, or commercial spaces, are assigned to an activity category based on the type of activities or use occurring in the area. Activity categories are then categorized based on their sensitivity to traffic noise. The Noise Area Classification ("NAC") is listed in the MPCA noise regulations to distinguish the categories.

Table 13 identifies the MPCA established daytime and nighttime noise standards by NAC. The standards are expressed as a range of permissible dBA within a one hour period; L50 is the dBA that may be exceeded 50 percent of the time within an hour, while L10 is the dBA that may be exceeded 10 percent of the time within the hour.

Table 13
Noise Standards by Noise Area Classification (dBA)

Noise Area Classification	Daytime		Nighttime	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

There are approximately 621 residences and businesses are located within 400 feet of the Proposed Route. The closest residential structure is located approximately 3 feet from the route. This residence is located in Segment 9 along Valley View Road in Eden Prairie, Minnesota. The closest commercial structure is located approximately 11 feet from the route. This commercial structure is located in Segment 4 along Highway 7 in Excelsior, Minnesota. Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. Noise levels should not be noticeably greater than existing levels.

The EPRI "Transmission Line Reference Book, 345 kV and Above", Chapter 6, provides empirically-derived formula for predicting audible noise from overhead transmission lines. Computer software produced by the Bonneville Power Administration (BPA) (BPA, 1977) is also frequently used to predict the level of audible noise from power transmission lines that is associated with corona discharge. Audible noise is predicted for dry and wet conditions, with wet conditions representing a worst case. These procedures are considered to be reliable and represent International best practice.

The Project consists of a rebuild of a 69 kV transmission line to 115 kV and converting a 115/69 kV transmission line to 115/115 kV. Computer modeling performed by Xcel Energy using the BPA 1977 software under the worst case wet conditions scenario indicated that the audible L5 and L50 noise levels (discussed below) measured at the edge of the 75-foot-wide right-of-way (37.5 feet from

centerline) would be at 22.2 and 18.7 dBA, respectively, well below the MPCA nighttime L50 limit of 50 dBA for Noise Area Classification 1. These findings are shown in **Table 14.**

Table 14
Calculated Audible Noise (db) for Proposed 115 kV Transmission Line Designs (3.28 Feet Above Ground)

	Noise L5 (37.5 Feet From Centerline) (Decibels A- weighted)	**Noise L50 (37.5 feet From Centerline) (Decibels A- weighted)**
Horizontal Post 115kV Steel Pole Single Circuit	22.2	18.7
Y-Frame or H-Frame 115kV Steel Pole Single Circuit	17.9	14.4
Braced Post 115kV Steel Pole Single Circuit With 13.8kV Distribution Underbuild	22.7	20.7
Davit Arm 115kV/115kV Steel Pole Double Circuit	20.1	16.6

Transformer Substation Noise

Transformer "hum" is the dominant noise source at substations. The nearest occupied home to the Deephaven Substation is located approximately 200 feet to the southeast. The nearest non-residential structure to the Deephaven Substation is the Deephaven Elementary School which located approximately 160 feet to the west. The new transformer specifications requested for this substation design will result in a quieter transformer than what exists today.

The nearest home to the Excelsior Substation is 70 feet to the southeast and the nearest business is 48 feet to the south. The new transformer specifications requested for this substation design will result in a quieter transformer than what exists today.

With respect to the Westgate Substation, the nearest home is 400 feet to the northwest and the nearest business is 100 feet to the east. The structural features closest to the Scott County Substation are a gravel pit 900 feet to the west and a mobile home park approximately 380 feet to the southeast (across Highway 169). No change in noise levels from either of these substations are expected from the Project. The substations will be designed and constructed to comply with state noise standards established by the Minnesota Pollution Control Agency ("MPCA").

4.3 Radio and Television Interference

Corona from transmission line conductors can generate electromagnetic "noise" at the same frequencies that radio and television signals are transmitted. This noise can cause interference with the reception of these signals depending on the frequency and strength of the radio and television signal. Tightening loose hardware on the transmission line usually resolves the problem.

If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations previously providing good reception can be restored by appropriate modification of (or addition to) the receiving antenna system. AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the right-of-way to either side.

FM radio receivers usually do not pick up interference from transmission lines because:

- Corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz); and
- The excellent interference rejection properties inherent in FM radio systems make them virtually immune to amplitude type disturbances.

A two-way mobile radio located immediately adjacent to and behind a large metallic structure (such as a steel tower) may experience interference because of signal-blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a metallic tower.

Television interference is rare but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. Loose and/or damaged hardware may also cause television interference. If television

or radio interference is caused by or from the operation of the proposed facilities in those areas where good reception is presently obtained, Applicant will inspect and repair any loose or damaged hardware in the transmission line, or take other necessary action to restore reception to the present level, including the appropriate modification of receiving antenna systems if deemed necessary.

4.4 Safety

The Project will be designed in compliance with local, state, and NESC standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. Appropriate standards will be met for construction and installation, and all applicable safety procedures will be followed during and after installation.

The proposed transmission lines will be equipped with protective devices to safeguard the public from the transmission lines if an accident occurs, such as a structure or conductor falling to the ground. The protective devices include breakers and relays located where the line connects to the substation(s). The protective equipment will de-energize the line should such an event occur. Proper signage will be posted warning the public of the risk of coming into contact with the energized equipment.

4.5 Electric and Magnetic Fields

The term electromagnetic fields ("EMF") refer to electric and magnetic fields that are coupled together such as in high frequency radiating fields. For the lower frequencies associated with power lines (referred to as "extremely low frequencies" ("ELF")), EMF should be separated into electric fields ("EFs") and magnetic fields ("MFs"), measured in kilovolts per meter ("kV/m") and milliGauss ("mG"), respectively. These fields are dependent on the voltage of a transmission line (EFs) and current carried by a transmission line (MFs). The intensity of the electric field is proportional to the voltage of the line, and the intensity of the magnetic field is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 hertz (cycles per second).

4.5.1 Electric Fields

There is no federal standard for transmission line electric fields. The Commission, however, has imposed a maximum electric field limit of 8 kV/meter measured at one meter above the ground. *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota,* Docket No. ET-2/TL-08-1474, Order Granting Route Permit (*adopting* ALJ Findings of Fact, Conclusions and Recommendation at Finding 194 (April 22, 2010 and amended April 30, 2010)) (September 14, 2010). The standard was designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater. The maximum electric field, measured at one meter above ground, associated with the Project is calculated to be 1.19 kV/m.

The calculated electric fields for the Project are provided in Table 15.

Table 15
Calculated Electric Fields (KV/M) for Proposed Transmission Line Designs (One meter above ground)

Structure Type	Maximum Operating Voltage (kV)	Distance to Proposed Centerline										
		-300'	-200'	-100'	-50'	-25	0'	25	50'	100'	200'	300'
Segments 2-10: Horizontal Post 115kV Steel Pole Single Circuit*	121	0.01	0.01	0.04	0.15	0.39	1.13	0.51	0.15	0.05	0.01	0.01
Segments 2-10: H-Frame and Y-Frame 115kV Steel Pole Single Circuit	121	0.00	0.01	0.09	0.52	1.48	0.68	1.48	0.52	0.09	0.01	0.00

Structure Type	Maximum Operating Voltage (kV)	Distance to Proposed Centerline										
		-300'	-200'	-100'	-50'	-25	0'	25	50'	100'	200'	300'
Segments 2-10: Braced Post 115kV Steel Pole Single Circuit With 13.8kV Distribution Underbuild	121/15	0.007	0.016	0.054	0.121	0.197	0.180	0.195	0.145	0.053	0.014	0.007
Segment 1: 115/115 kV Steel or Wood Pole Double Circuit	121	0.012	0.024	0.043	0.151	0.689	1.139	0.689	0.151	0.043	0.024	0.012

*The EF levels for the cantilever design options being considered on this Project are not significantly different from the braced post or horizontal post design.

4.5.2 Magnetic Fields

There are presently no Minnesota regulations pertaining to MF exposure. Applicant provides information to the public, interested customers, and employees so they can make informed decisions about MFs. Such information includes the availability for measurements to be conducted for customers and employees upon request.

The magnetic field profiles around the proposed transmission lines for each structure and conductor configuration proposed for the Project are shown in Table 16. Magnetic fields were calculated for each section of the Project under peak and average current flows as projected for the year 2025 under normal (system intact) conditions. The peak magnetic field values are calculated at a point directly under the transmission line and where the conductor is closest to the ground. The same method is used to calculate the magnetic field at the edge of the right-of-way. The calculated magnetic fields show that fields decrease rapidly as the distance from the centerline increases (proportional to the inverse square of the distance from source).

The magnetic field produced by the transmission line is dependent on the current flowing on its conductors. Therefore, the actual magnetic fields when the Project is placed in service are typically less than shown in Table 16. This is because the table represents the magnetic field with current flow at expected normal peak based on projected regional load growth through 2025, the maximum load projection timeline available. Actual current flow on the line will vary with system conditions, so magnetic fields would be less than peak levels during most hours of the year.

Table 16
Calculated Magnetic Flux density (milligauss) for Proposed 115 kV Transmission Line Designs (One meter above ground)

Segment	System Condition	Current (Amps)	Distance to Proposed Centerline										
			-300'	-200'	-100'	-50'	-25	0'	25	50'	100'	200'	300'
Westgate to Deephaven 115 kV Single Circuit	Peak	296	0.44	0.83	2.60	7.68	17.19	32.82	18.21	7.39	2.10	0.55	0.27
	Average	178	0.27	0.50	1.56	4.62	10.34	19.73	10.95	4.45	1.26	0.33	0.16
Deephaven to Excelsior 115 kV Single Circuit	Peak	71	0.11	0.20	0.62	1.84	4.12	7.87	4.37	1.77	0.50	0.13	0.07
	Average	43	0.06	0.12	0.38	1.12	2.50	4.77	2.64	1.07	0.31	0.08	0.04
Excelsior to Scott County 115kV Single Circuit	Peak	31	0.05	0.09	0.27	0.43	1.80	3.44	1.91	0.77	0.22	0.06	0.03
	Average	19	0.03	0.05	0.17	0.49	1.10	2.11	1.17	0.47	0.13	0.04	0.02
Excelsior to Scott County 115/115 kV Double Circuit	Peak	31	0.13	0.24	0.71	1.83	3.08	3.87	3.00	1.81	0.72	0.24	0.13
	Average	19	0.08	0.14	0.44	1.12	1.89	2.37	1.84	1.11	0.44	0.15	0.08
Braced Post 115kV Steel Pole Single Circuit With 13.8kV Distribution Underbuild	Peak	296/25	0.27	0.56	2.03	5.64	9.67	12.48	10.18	6.12	2.46	0.82	0.43
	Average	178/15	0.16	0.34	1.22	3.39	5.81	7.51	6.12	3.68	1.48	0.49	0.26

*The MF levels for the cantilever design options being considered on this Project are not significantly different from the braced post or horizontal post design.

Considerable research has been conducted throughout the past three decades to determine whether exposure to power-frequency (60 hertz) MFs causes biological responses and health effects. Epidemiological and toxicological studies have shown

no statistically significant association or weak associations between MF exposure and health risks. Public health professionals have also investigated the possible impact of exposure to EMF upon human health for the past several decades. While the general consensus is that EFs pose no risk to humans, the question of whether exposure to MFs can cause biological responses or health effects continues to be debated.

In 1999, the National Institute of Environmental Health Sciences ("NIEHS") issued its final report on "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" in response to the Energy Policy Act of 1992. The NIEHS concluded that the scientific evidence linking MF exposure with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, because of the weak scientific evidence that supports some association between MFs and health effects, passive regulatory action, such as providing public education on reducing exposures, is warranted.

In 2007, the World Health Organization ("WHO") concluded a review of the health implications of electromagnetic fields. In this report, WHO stated:

> Uncertainties in the hazard assessment [of epidemiological studies] include the role that control selection bias and exposure misclassification might have on the observed relationship between magnetic fields and childhood leukemia. In addition, virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level [extremely low frequency] magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern. (*Environmental Health Criteria Volume N°238 on Extremely Low Frequency Fields* at p. 12, WHO (2007)).

Also, regarding disease outcomes, aside from childhood leukemia, WHO stated:

> A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease. (*Id.* at p. 12.)

Furthermore, in its "Summary and Recommendations for Further Study" WHO emphasized that:

> The limit values in [ELF-MF] exposure guidelines [should not] be reduced to some arbitrary level in the name of precaution. Such practice undermines the scientific foundation on which the limits are based and is likely to be an expensive and not necessarily effective way of providing protection. (*Id.* at p. 12).

Although WHO recognized epidemiological studies indicate an association on the range of three to four mG, WHO did not recommend these levels as an exposure limit but instead provided: "The best source of guidance for both exposure levels and the principles of scientific review are international guidelines." *Id.* at pp. 12-13. The international guidelines referred to by WHO are the International Commission on Non-Ionizing Radiation Protection ("ICNIRP") and the Institute of Electrical and Electronic Engineers ("IEEE") exposure limit guidelines to protect against acute effects. *Id.* at p. 12. The ICNIRP-1998 continuous general public exposure guideline is 833 mG and the IEEE continuous general public exposure guideline in 9,040 mG. In addition, WHO determined that "the evidence for a casual relationship [between ELF-MF and childhood leukemia] is limited, therefore exposure limits based on

epidemiological evidence is not recommended, but some precautionary measures are warranted." *Id.* at 355-56.

WHO concluded that:

> given the weakness of the evidence for a link between exposure to ELF magnetic fields and childhood leukemia, and the limited impact on public health, the benefits of exposure reduction on health are unclear and thus, the costs of precautionary measures should be very low… Provided that the health, social and economic benefits of electric power are not compromised, implementing very low-cost precautionary procedures to reduce exposure is reasonable and warranted. (*Id.* at p. 372).

In 2010, ICNIRP revised its continuous general public exposure guideline increasing it from 833 mG to 2,000 mG. The WHO has not provided any analysis of the ICNIRP-2010 continuous general public exposure guideline to date.

Wisconsin, Minnesota and California have all conducted literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group ("Working Group") to evaluate the body of research and develop policy recommendations to protect the public health from any potential problems resulting from HVTL (High Voltage Transmission Lines) EMF effects. The Working Group consisted of staff from various state agencies and published its findings in a White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options in September 2002, (Minnesota Department of Health, 2002). The report summarized the findings of the Working Group as follows:

> Research on the health effects of [MF] has been carried out since the 1970s. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to [MF] and health effects, some have shown a weak association. More recently, laboratory studies have failed to

> show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most researchers concluded that there is insufficient evidence to prove an association between [MF] and health effects; however, many of them also concluded that there is insufficient evidence to prove that [MF] exposure is safe. (*Id.* at p. 1.)

The Public Service Commission of Wisconsin ("PSCW") has periodically reviewed the science on MFs since 1989 and held hearings to consider the topic of MF and human health effects. The most recent hearings on MF were held in July 1998. Recently, January 2008, the PSC published a fact sheet regarding MFs. In this fact sheet the PSC noted that:

> Many scientists believe the potential for health risks for exposure to [MFs] is very small. This is supported, in part, by weak epidemiological evidence and the lack of a plausible biological mechanism that explains how exposure to [MFs] could cause disease. The [MFs] produced by electricity are weak and do not have enough energy to break chemical bonds or to cause mutations in DNA. Without a mechanism, scientists have no idea what kind of exposure, if any, might be harmful. In addition, whole animal studies investigating long-term exposure to power frequency [MF] have shown no connection between exposure and cancer of any kind. (*EMF-Electric & Magnetic Fields*, PSC (January 2008)).

The Minnesota Public Utilities Commission, based on the Working Group and World Health Organization findings, has repeatedly found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects." *In the Matter of the Application of Xcel Energy for a Route Permit for the Lake*

Yankton to Marshall Transmission Line Project in Lyon County, Docket No. E-002/TL-07-1407, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Xcel Energy for the Lake Yankton to Marshall Transmission Project at p. 7-8 (Aug. 29, 2008); *See also*, *In the Matter of the Application for a HVTL Route Permit for the Tower Transmission Line Project*, Docket No. ET-2, E015/TL-06-1624, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Minnesota Power and Great River Energy for the Tower Transmission Line Project and Associated Facilities at p. 23 (Aug. 1, 2007)("Currently, there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects.").

The Commission again confirmed its conclusion regarding health effects and MFs in the Brookings County – Hampton 345 kV Route Permit proceeding ("Brookings Project"). In the Brookings Project Route Permit proceeding, Applicants Great River Energy and Xcel Energy and one of the intervening parties provided expert evidence on the potential impacts of electric and magnetic fields on human health. The ALJ in that proceeding evaluated written submissions and a day-and-half of testimony from these two expert witnesses. The ALJ concluded: "there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for [EF or MF] exposure." *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, ALJ Findings of Fact, Conclusions and Recommendation at Finding 216 (April 22, 2010 and amended April 30, 2010). The Commission adopted this finding on July 15, 2010. *In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (September 14, 2010).

4.6 Stray Voltage

"Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors. Because transmission lines convey power for

subsequent distribution and are not connected to non-utility structures, stray voltage is not encountered in such lines.

4.7 Farming Operations, Vehicle Use, and Metal Buildings Near Power Lines

Insulated electric fences used in livestock operations can pick up an induced charge from transmission lines. Usually, the induced charge will drain off when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. Potential shocks can be prevented by using a couple of methods, including:

i. one or more of the fence insulators can be shorted out to ground with a wire when the charger is disconnected; or
ii. an electric filter can be installed that grounds out charges induced from a power line while still allowing the charger to be effective.

Farm equipment, passenger vehicles and trucks may be safely used under and near power lines. The power lines will be designed to meet or exceed minimum clearance requirements with respect to roads, driveways, cultivated fields and grazing lands specified by the NESC. Recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet.

There is a potential for vehicles under high voltage transmission lines to build up an electric charge. If this occurs, the vehicle can be grounded by attaching a grounding strap to the vehicle long enough to touch the earth. Such buildup is a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, vehicles will not normally build up a charge unless they have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground.

Buildings are permitted near transmission lines but are generally discouraged within the right-of-way itself because a structure under a line may interfere with safe operation of the transmission facilities. For example, a fire in a building on the right-of-way could damage a transmission line. As a result, NESC guidelines establish clear zones for transmission facilities. Metal buildings may have unique issues. For example, metal buildings near power lines of 200 kV or greater must be properly grounded. Any person with questions about a new or existing metal structure can contact Xcel Energy for further information about proper grounding requirements.

5 TRANSMISSION LINE CONSTRUCTION AND MAINTENANCE

In this chapter we describe the sequence of activities that occur during the process of construction of a transmission line, some of the measures that can be taken to mitigate potential impacts during construction, and activities associated with normal maintenance of a transmission line.

5.1 Right-of-Way Evaluation and Acquisition

Where the Project is expected to use existing rights-of-way , the right-of-way agent will evaluate all existing easements. If the terms of the existing easement are sufficient and no new right-of-way is needed, the right-of-way agent will continue to work with the landowner to address any construction needs, impacts, damages or restoration issues. To the extent new right-of-way acquisition is necessary, the right-of-way agent will work with landowners to determine how to expand existing easements.

For those segments of the Project where new right-of-way will be necessary, the acquisition process begins early in the detailed design phase. For transmission lines, utilities acquire easement rights across certain parcels to accommodate the facilities. The evaluation and acquisition process includes title examination, initial owner contacts, survey work, document preparation and purchase. Each of these activities, particularly as it applies to easements for transmission line facilities, is described in more detail below.

The first step in the right-of-way process is to identify all persons and entities that may have a legal interest in the real estate upon which the facilities will be built. To compile this list, a right-of-way agent or other persons engaged by the utility will complete a public records search of all land involved in the project. A title report is then developed for each parcel to determine the legal description of the property and the owner(s) of record of the property, and to gather information regarding easements, liens, restriction, encumbrances and other conditions of record.

After owners are identified, a right-of-way representative contacts each property owner or the property owner's representative. The right-of-way agent describes the

need for the transmission facilities and how the Project may affect each parcel. The right-of-way agent also seeks information from the landowner about any specific construction concerns.

The next step in the acquisition process is evaluation of the specific parcel. For this work, the right-of-way agent may request permission from the owner for survey crews to enter the property to conduct preliminary survey work. Permission may also be requested to take soil borings to assess the soil conditions and determine appropriate foundation design. Surveys are conducted to locate the right-of-way corridors, natural features, man-made features and associated elevations for use during the detailed engineering of the line. The soil analysis is performed by an experienced geotechnical testing laboratory.

During the evaluation process, the location of the proposed transmission line or substation facility may be staked with permission of the property owner. This means that the survey crew locates each structure or pole on the ground and places a surveyor's stake to mark the structures or substation facility's anticipated location. By doing this, the right-of-way agent can show the landowner where the structure(s) will be located on the property. The right-of-way agent may also delineate the boundaries of the easement area required for safe operation of the line.

Prior to the acquisition of easements or fee purchase of property, land value data will be collected. Based on the impact of the easement or purchase to the market value of each parcel, a fair market value offer will be developed. The right-of-way agent then contacts the property owner(s) to present the offer for the easement and discuss the amount of just compensation for the rights to build, operate and maintain the transmission facilities within the easement area and reasonable access to the easement area. The agent will also provide maps of the line route or site, and maps showing the landowner's parcel. The landowner is allowed a reasonable amount of time to consider the offer and to present any material that the owner believes is relevant to determining the property's value. This step is often performed prior to full evaluation in the form of an "option to purchase" contract and can be very helpful in obtaining permission for completion of all necessary evaluations.

In nearly all cases, utility companies are able to work with the landowners to address their concerns and an agreement is reached for the utility's purchase of land rights. The right-of-way agent prepares all of the documents required to complete each transaction. Some of the documents that may be required include: easement; purchase agreement; contract; and deed.

In rare instances, a negotiated settlement cannot be reached and the landowner chooses to have an independent third party determine the value of the rights taken. Such valuation is made through the utility's exercise of the right of eminent domain pursuant to Minnesota Statutes, Chapter 117. The process of exercising the right of eminent domain is called condemnation.

Before commencing a condemnation proceeding, the right-of-way agent must obtain at least one appraisal for the property proposed to be acquired and a copy of that appraisal must be provided to the property owner. Minn. Stat. § 117.036, subd. 2(a). The property owner may also obtain another property appraisal and the company must reimburse the property owner for the cost of the appraisal according to the limits set forth in Minnesota Statute § 117.036, Subd. 2(b). The property owner may be reimbursed for reasonable appraisal costs up to $1,500 for single-family and two-family residential properties, $1,500 for property with a value of $10,000 or less, and $5,000 for other types of properties.

To start the formal condemnation process, a utility files a Petition in the district court where the property is located and serves that Petition on all owners of the property. If the court grants the Petition, the court then appoints a three-person condemnation commission that will determine the compensation for the easement. The three people must be knowledgeable of applicable real estate issues. Once appointed, the commissioners schedule a viewing of the property over and across which the transmission line easement is to be located. Next, the commission schedules a valuation hearing where the utility and landowners can testify as to the fair market value of the easement or fee. The commission then makes an award as to the value of the property acquired and files it with the court. Each party has 40 days from the

filing of the award to appeal to the district court for a jury trial. In the event of an appeal, the jury hears land value evidence and renders a verdict. At any point in this process, the case can be dismissed if the parties reach a settlement.

As part of the right-of-way acquisition process, the right-of-way agent will discuss the construction schedule and construction requirements with the owner of each parcel. To ensure safe construction of the line, special consideration may be needed for fences, crops or livestock. For instance, fences may need to be moved, temporary or permanent gates may need to be installed; crops may need to be harvested early; and livestock may need to be moved. In each case the right-of-way agent and construction personnel coordinate these processes with the landowner.

5.2 Transmission Line Construction

Construction will begin after all federal, state, and local approvals are obtained, property and rights-of-way are acquired, soil conditions are determined and the design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, available workforce and materials. Line construction will be carried out by a crew of approximately 10 workers and substation work will be carried out by a crew of approximately 6 workers.

The actual construction will follow standard construction and mitigation practices that have been developed from experience with past projects. These best practices address right-of-way clearance, staging, erecting transmission line structures and stringing transmission lines. Construction and mitigation practices to minimize impacts will be developed based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain and other practices. In certain cases some activities, such as schedules, are modified to minimize impacts to sensitive environments.

Typical construction equipment used on transmission projects includes: tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers,

flatbed trucks, pickup trucks, concrete trucks and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Poles are transported on tractor-trailers.

Steel poles are proposed to be used for the structures for the Project. Steel pole tangent structures are proposed to be directly embedded into the ground if soil conditions warrant. Rock-filled culvert foundations may be required in areas with poor soils. This method typically involves digging a hole for each pole, filling it partially with crushed rock and then setting the pole on top of the rock base. The area around the pole is then backfilled with crushed rock and/or soil. Culvert foundations involve auguring a hole for each pole, installing a galvanized steel culvert, filling the annular space outside the culvert with hole spoils, filling the culvert partially with crushed rock and then setting the pole on top of the rock base. The annular space between the pole and culvert is filled with crushed rock.

Long span, angle and dead end structures along the route will require concrete foundations. In those cases, holes will need to be drilled in preparation for the concrete foundations. Drilled pier foundations may vary from five to eight feet in diameter and 20 to 30 feet deep, depending on soil conditions. Steel reinforcing bars and anchor bolts are installed in the drilled holes prior to concrete placement. Concrete trucks are required to bring the concrete in from a local concrete batch plant. Steel pole structures are hauled unassembled on pole trailers to the staked location and placed within the right-of-way until the pole sections are assembled and the arms attached. Insulators and other hardware are attached while the steel pole is on the ground. The pole is then lifted, placed, and secured on the foundation using a crane.

Construction staging areas are usually established for transmission projects. Staging involves delivering the equipment and materials necessary to construct the new transmission line facilities. Construction of the Project will likely include one or two staging areas. Structures are delivered to staging areas and materials are stored until they are needed for the Project. The materials are then sorted and loaded onto structure trailers for delivery to the staked location.

In some cases, additional space (temporary lay down areas) may be required. These areas will be selected for their location, access, security and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. The temporary lay down areas outside of the transmission line right-of-way will be secured from affected landowners through rental agreements.

Typically, access to the transmission line right-of-way corridor is made directly from existing roads or trails that run parallel or perpendicular to the transmission line right-of-way. In some situations, private field roads or trails are used. Where easements exist, the Company notifies the property owner that it will access the easement area. Where necessary to accommodate the heavy equipment used in construction, including cranes, concrete trucks and foundation drilling equipment, existing access roads may be upgraded or new roads may be constructed. New access roads may also be constructed where no current access is available or the existing access is inadequate to cross roadway ditches.

Environmentally sensitive areas and wetland areas may also require special construction techniques in some circumstances. During construction, the most effective way to minimize impacts to wet areas will be to span wetlands, streams, and rivers. In addition, the Company will not allow construction equipment to be driven across waterways except under special circumstances and only after discussion with the appropriate resource agency. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. These construction practices help prevent soil erosion and ensure that equipment fueling and lubricating will occur at a distance from waterways.

Wetlands present within the Project Area are dominated by Palustrine or grassland/meadow type wetlands with a lesser number of Lacustrine or open water wetlands. Impacts to wetlands will be minimized through construction practices. Construction crews will maintain sound water and soil conservation practices during construction and operation of the facilities to protect topsoil and adjacent water resources and to minimize soil erosion. Practices may include: containing excavated

material, protecting exposed soil and stabilizing restored soil. Crews will avoid major disturbance of individual wetlands and drainage systems during construction. This will be accomplished by strategically locating new access roads and spanning wetlands and drainage systems where possible.

When it is not feasible to span the wetland, construction crews will consider the following options during construction to minimize impacts:

- When possible, construction will be scheduled during frozen ground conditions;
- Crews will attempt to access the wetland with the least amount of physical impact to the wetland (i.e., shortest route);
- The structures will be assembled on upland areas before they are brought to the site for installation; or
- When construction during winter is not possible, construction mats will be used where wetlands would be impacted.

5.3 Right-of-Way Restoration and Clean Up

During construction, crews will attempt to limit ground disturbance wherever possible. However, areas are typically disturbed during the normal course of work, which can take several weeks in any one location. As construction on each parcel is completed, disturbed areas will be restored to their original condition to the maximum extent practicable. The right-of-way agent contacts each property owner after construction is completed to determine whether any damage has occurred as a result of the project.

If damage has occurred to crops, fences or the property, the Company will fairly reimburse the landowner for the damages sustained. In some cases, the Company may engage an outside contractor to restore the damaged property to as near as possible to its original condition. Portions of vegetation that are disturbed or removed during construction of transmission lines will naturally reestablish to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish with few problems after disturbance. Areas with significant soil compaction and

disturbance from construction activities along the proposed transmission line corridor will require assistance in reestablishing vegetation and controlling soil erosion.

Commonly used methods to control soil erosion and assist in reestablishing vegetation include, but are not limited to:

- Erosion control blankets with embedded seeds;
- Silt fences;
- Hay bales;
- Hydro seeding; and
- Planting individual seeds or seedlings of native species.

These erosion control and vegetation establishment practices are regularly used in construction projects and are referenced in the construction storm water permit plans. Long-term impacts are also minimized by utilizing these construction techniques.

5.4 Maintenance Practices

Transmission lines and substations are designed to operate for decades and require only moderate maintenance, particularly in the first few years of operation.

The estimated service life of the proposed transmission line for accounting purposes is approximately 50 years. However, practically speaking, high voltage transmission lines are seldom completely retired. Transmission infrastructure has very few mechanical elements and is built to withstand weather extremes that are normally encountered. With the exception of severe weather such as tornadoes and heavy ice storms, transmission lines rarely fail.

Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent. The average service life is approximately 40 years.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, which is usually done monthly by air. Annual operating and maintenance costs for transmission lines in Minnesota and surrounding states vary. However, past experience shows that costs are approximately $300 to $500 per mile for voltages from 69 kV through 345 kV. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line. The workforce size for maintenance efforts is dependent on the scope of work to be conducted.

Substations require a certain amount of maintenance to keep them functioning in accordance with accepted operating parameters and the National Electric Safety Code ("NESC") requirements. Transformers, circuit breakers, batteries, protective relays, and other equipment need to be serviced periodically in accordance with the manufacturer's recommendations. The substation site must be kept free of vegetation and adequate drainage must be maintained.

6 ENVIRONMENTAL INFORMATION

This section provides a description of the environmental setting, potential impacts and mitigative measures Xcel Energy has proposed, where appropriate, to minimize the impacts of siting, constructing and operating the Project. If the proposed transmission lines were removed in the future, the land could be restored to its prior condition and/or put to a different use. The majority of the measures proposed are part of the standard construction process at Xcel Energy. Unless otherwise identified in the following text, the costs of the mitigative measures proposed are considered nominal. For the purpose of this Section, the "Project Area" refers to an area that extends a distance of three miles from the proposed route. The six-mile wide Project Area totals 83,340 acres.

6.1 Description of Environmental Setting

The proposed transmission line conversion and rebuild is located in Carver, Hennepin, and Scott Counties. Cities affected by the rebuild will include Chaska, Chanhassen, Shorewood, Excelsior, Greenwood, Deephaven, Minnetonka, and Eden Prairie. The Project Area begins at the Scott County Substation located in Jackson Township and proceeds north crossing the Minnesota River in the City of Chaska. The Project Area continues northward to the Bluff Creek Substation and to Structure #57 located on Xcel Energy 115 kV Transmission Line #5516 and follows the existing transmission right-of-way (Line #0734) terminating at the Westgate Substation (located Eden Prairie, MN). The proposed transmission line conversion and rebuild is located almost entirely within residential or commercial areas.

6.2 Geomorphology and Physiography

The Project Area is located within the Big Woods subsection of the Minnesota and Northeast Iowa Morainal Section (222M), a section within the biogeographic province known as the Eastern Broadleaf Forest Province under the Ecological Classification System ("ECS") developed by the Minnesota Department of National Resources ("MnDNR") and the United States Forest Service ("USFS") (MNDNR, 2010). The dominant landscape features in the general area are described as level topped hills bounded by smooth side slopes per the ECS. There are broad level areas between

these hills that contain lakes and peat bogs, with the area's drainage controlled by the level of these lakes. The topography of this ECS subsection is gently to moderately rolling. The topography of the Project Area, however, is relatively level and ranges from 1,025 feet above mean sea level in elevation in the west to 915 feet above mean sea level as the transmission line route travels to the east. The lowest portion of the Project Area is within Segment 1 where it ranges from 700 to 850 mean sea level as it crosses the Minnesota River.

Geologic and topographic information from the MnDNR and the United States Geological Survey ("USGS") was analyzed to determine the existing conditions within the Project Area and the potential effects on those conditions.
Pre-settlement vegetation consisted primarily of oak woodland and maple basswood forest with pockets of prairie. With the exception of areas around the Minnesota River, the majority of the Project Area has been nearly entirely developed for residential and commercial occupancy with only small portions of either upland forest or wetlands. Other portions cross or pass by water features (Minnesota River in Carver and Scott counties, Bluff Creek and Assumption Creek in Carver County and Purgatory Creek in Hennepin County; Strunk Lake, Harrison Lake, College Lake, Mud Lake, Galpin Lake, Lake Minnetonka, William Lake, Duck Lake, as well as numerous unnamed lakes and drainages).

6.3 Land Use and Human Settlement

6.3.1 Commercial, Industrial, Residential Land Use

Land use in the Project Area is primarily a mix of both residential and commercial land use with the exception of the portion of the Project in Scott county which is a mix of undeveloped land and rural industrial uses. The Project Area passes through eight individual municipalities located in Carver and Hennepin counties, and Jackson Township in Scott County. The City of Eden Prairie is the largest municipality located along the route with a population of over 60,000 (2000 Census).

6.3.2 Displacement

No displacement of residential homes or businesses will occur as a result of this Project. The NESC and Xcel Energy's standards require certain clearances between transmission line facilities and buildings for safe operation of the proposed transmission line. Xcel Energy will acquire a right-of-way for the transmission line that is sufficient to maintain these clearances.

6.3.3 Aesthetics

Because the proposed Project will mainly follow existing 69 kV transmission line routes, the Project will have nominal effects on the visual and aesthetic character of the area. The proposed structures for the 115 kV double circuit lines will be similar to the other 115 kV transmission lines used on the Xcel Energy system. The structures will be about 60 to 105 feet tall and will have an average span of 325 feet. A maximum span of 400 feet will be used between the structures, which will still keep the conductor within the right-of-way under blowout conditions. The usual right-of-way required for these types of structures is 75 feet wide. The existing transmission line structures vary in height between 50 to 90 feet. By comparison, the proposed transmission line structures will generally be slightly taller, ranging from 60 to 105 feet in height. The overall spacing of the poles will be comparable to the current layout, which varies greatly by engineering and land use constraints.

The finish of the proposed poles will be either galvanized steel or self-weathering steel. The existing transmission line structures in this area are a mix of wood poles, steel poles and some H-frame construction. The galvanized steel poles will give the transmission line a somewhat cleaner and more modern appearance, while the self-weathering steel poles will have a greater propensity to blend in with local environment.

Like the existing 69 kV transmission line, the new single circuit transmission line will be visible to area residents. The majority of the landscape in the Project Area is developed residential and light industrial. The visual effect will depend largely on the perceptions of the observers. The visual contrast added by the transmission structures and lines may be perceived as a visual disruption or as points of visual interest. The transmission lines and substations that already exist in the Project Area

will limit the extent to which the new line and substation are viewed as a disruption it the area's scenic integrity.

Mitigative Measures

Although the proposed line will alter views of surrounding land uses, Xcel Energy has identified the route that predominantly uses existing transmission corridors and avoids residences and businesses to the greatest extent practicable. Xcel Energy will work with landowners to identify concerns related to the transmission line aesthetics.

6.4 Socioeconomic

Population and economic characteristics based on the 2010 U.S. Census are presented in Table 17.

Table 17
Population and Economic Characteristics

Location	Population	Minority Population (Percent)	Caucasian Population (Percent)	Per Capita Income	Percentage of Individuals Below Poverty Level
State of Minnesota	5,303,925	16.9	83.1	$29,431	10.9
Carver County	91,042	9.3	90.7	$35,987	5.0
City of Chanhassen	22,952	8.2	91.3	$43,571	2.9
City of Chaska	23,770	16.6	83.4	$33,358	8.4
Hennepin County	1,1,152,425	28.3	71.7	$35,687	11.9
City of Eden Prairie	60,797	20.0	80.0	$48,916	5.0
City of Shorewood	7,307	5.4	94.6	$58,789	1.1
City of Excelsior	2,393	5.9	94.1	$29,127	5.7
City of Greenwood	729	3.4	96.6	$63,200	0.8
City of Deephaven	3,853	2.6	97.4	$58,544	2.6
City of Minnetonka	49,734	11.4	88.6	$47,036	4.2
Scott County	129,928	15.5	84.5	$33,750	4.8

Source: 2010 U.S. Census: General Demographic Characteristics

According to the 2010 Census data, Carver County is 90.7 percent Caucasian, while Hennepin County is 71.7 percent Caucasian, and Scott County is 84.5 percent Caucasian. The minority population percentage averages 4.8% in municipalities encompassing the Project Area.

In Carver County, the area proximal to the Project Area has an average household per capita income which is higher than the average for the county as a whole. This trend is similar in Hennepin County. Within the Project Area, the average percentages of minority populations and low-income populations are lower than both the county and state averages.
Approximately 8 to 12 workers will be required by Xcel Energy for transmission line construction. The transmission crews are expected to spend approximately 6 months constructing the project.

There will be short-term impacts to community services as a result of construction activity and an influx of contractor employees during construction of the various segments of the Project. Both utility personnel and contractors will be used for construction activities. The communities near the Project should experience short-term positive economic impacts through the use of the hotels, restaurants and other services by the various workers.

It is not expected that additional permanent jobs will be created by the Project. The construction activities will provide a seasonal influx of economic activity into the communities during the construction phase, and materials such as concrete may be purchased from local vendors. Long-term beneficial impacts from the Project include increased local tax base resulting from the incremental increase in revenues from utility property taxes.

6.4.1 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for community unity. The project area passes through

eight individual municipalities distributed between two counties, and Jackson Township in Scott County. According to the U.S. Census Bureau, the populations of all three counties derive from a diverse ethnic heritage. However, a majority of the reported ethnic backgrounds are of European origin. In Carver County, German and Scandinavian heritage comprises 76% of the total population, with German heritage being the most prevalent with nearly 50%. Hennepin County has a similar, yet less pronounced German and Scandinavian ethnic representation at 55%, with German heritage being nearly 30%. Cultural representation in community events appears to be more closely tied to geographic features (such as Lake Minnetonka), seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include the annual Fourth of July Celebrations in Chanhassen, Eden Prairie, and Excelsior; the Chan Jam Music Festival and Summer Concert Series in Chanhassen; the Art on the Lake and By the Bay Music Festival in Excelsior; the Arctic Fever event in Excelsior; and the Tour de Tonka regional bike race. Construction of the proposed Project is not expected to conflict with the cultural values along the route. No impacts to cultural values are anticipated and therefore no mitigative measures are proposed.

6.4.2 Recreation

The Project Area crosses eight municipalities. Moving west to east along the Project Area those municipalities include Chaska, Chanhassen, Shorewood, Excelsior, Greenwood, Deephaven, Minnetonka, and Eden Prairie. A total of fourteen parks intersect or about the 200-foot-wide Project Area (**Table 18**). The municipality and uses of the fourteen identified parks are summarized in **Table 18**. The Project is not expected to directly impact any of these recreational resources.

Table 18
Parks, Recreation Areas, and Preserves Within the 200-Foot-Wide Project Area

Park	Municipality	Park Amenities																		
		Playfield	Picnic Shelter	Tennis Courts	Play Structure	Hard Courts	Picnic Area	Walking Trails	Biking Trails	Outdoor Hockey	Warming House	Parking	Fishing	Nature Area	Restrooms	Handicap	Garden	Boat Access	Skate Park	Volleyball Court
Bluff Creek	Chaska				X	X	X	X												
Lake Minnewashta Regional Park	Chanhassen		X		X		X	X	X			X	X	X	X	X		X		X
Pinehurst Preserve at Lake Harrison	Chanhassen													X						
Bluff Creek Preserve	Chanhassen							X						X						
Village Hall Park	Deephaven	X	X	X	X		X			X	X	X								
Burton Park	Deephaven							X				X	X	X						
Lake Minnetonka L Regional Trail	Multiple							X	X											
Purgatory Park	Minnetonka		X				X	X	X			X		X	X	X				
Kelly Park	Minnetonka							X	X			X					X			
Edenbrook Conservation Area	Eden Prairie		X				X	X				X		X						
Round Lake Park	Eden Prairie	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Edenvale Conservation Area	Eden Prairie							X				X		X						
Edenvale Park	Eden Prairie	X	X		X	X	X	X		X	X	X				X				
Minnesota	Carver and		X				X	X	X			X	X	X	X			X		

Park	Municipality	Park Amenities																		
		Playfield	Picnic Shelter	Tennis Courts	Play Structure	Hard Courts	Picnic Area	Walking Trails	Biking Trails	Outdoor Hockey	Warming House	Parking	Fishing	Nature Area	Restrooms	Handicap	Garden	Boat Access	Skate Park	Volleyball Court
Valley State Recreational Area	Scott Counties																			

All parks, recreational areas, and preserves that lay within one mile of the project area were also identified. A total of 74 parks, recreation areas, and preserves (identified by municipality) are located within one mile of the Project Area and are summarized in **Table 19**.

Table 19
Parks, Recreational Areas, and Preserves Within One Mile of Project Area

Municipality	Area Name
Chaska	Riverview Park, Bluff Park, Shadow Wood Park, Schalow Park, Wood Ridge Park, and Pioneer Park
Chanhassen	Bluff Creek Preserve, Power Hill Park, Prairie Knoll Park, Lake Susan Park, Lake Susan Preserve Sunset Ridge Park, Bluff Creek Preserve North, Stone Creek Park, Chanhassen Nature Preserve, Bluff Creek Elementary School Park, Minnesota Landscape Arboretum, Bluff Creek Headwaters Preserve, Lake Ann Park, Sugarbush Park, Greenwood Shores Park, Lake Minnewashta Regional Park, Herman Field Park, Pinehurst Preserve at Lake Harrison, Pleasant Hill Park, Curry Farms Park.
Shorewood	Lake Minnetonka LRT Regional Trail, Badger Park, Manor Park, Shuman Woods Park.
Excelsior	Excelsior Commons, Lake Minnetonka LRT Regional Trail
Greenwood	Meadville Park, Lake Minnetonka LRT Regional Trail
Deephaven	Village Hill Park, Cottagewood Children's Park, Shuck Park,

Municipality	Area Name
	Nocomo Beach, Deephaven Beach Park, Lake Minnetonka LRT Regional Trail, Burton Park, Cleveland Park, unnamed park.
Minnetonka	Reich Park, Lake Charlotte, Woodgate Park, Holiday Lake Park, Kelly Gardens Park, Purgatory Park, Spring Hill Park, Covington Park, Boulder Creek Park, Gro Tonka Park, Elmwood-Strand Park, Mini Tonka Park, Lake Minnetonka LRT Regional Trail
Eden Prairie	Birch Island Park, Timbercreek Conservation Area, Edenbrook Conservation Area, Rustic Hills Park, Wyndham Knoll Park, Eden Valley Park, Edgewood Park, High Estates Trail Park, Prairie View School Park, Hidden Ponds Park, Sterling Field Park, Round Lake Park, Mitchell Marsh Conservation Area, Edenvale Conservation Area, Edenvale Park, Westgate Conservation Area, Willow Park, Pheasant Woods Park, Red Rock Conservation Area, Minnesota River Bluffs LRT Regional Trail, Miller Park
Carver and Scott Counties	Minnesota Valley Recreational Area

A total of 28 bikeways intersect the Project Area along its length. The Minnesota Valley State Recreation Area Trail intersects the Project Area in the Scott County portion of Segment 1. The Lake Minnetonka LRT Regional Trail intersects the Project Area in Excelsior near Galpin Lake and generally parallels the Project Area for approximately five miles until the Project Area turns south along Highway 101. Within the City of Chanhassen bikeways intersect the Project Area at eleven locations, three of which parallel the Project Area for 0.10 to 1.0 mile long segments. Within the City of Excelsior one intersect occurs where the LRT Trail intersects then runs parallel to the Project Area for approximately one-half mile before entering the municipality of Greenwood. Within the City of Greenwood the LRT Trail runs parallel to the Project Area for approximately 1 ½ miles before entering the municipality of Shorewood. No other bikeway intersects occur within the City of Greenwood. The LRT Trail parallels the Project Area through the municipality of Shorewood for approximately one-half mile before entering the municipality of Deephaven. No other bikeways intersect the Project Area within the City of

Shorewood. Within Deephaven, the LRT Trail parallels the Project Area for 1 ½ miles before entering the City of Minnetonka. A second bikeway intersects the Project Area within the municipality of Deephaven near the Deephaven substation. Within the City of Minnetonka, the LRT Trail parallels the Project Area for approximately ½ mile until the Project Area turns south along Highway 101. Bikeways intersect the Project Area at seven other locations within the municipality of Minnetonka. Within the City of Eden Prairie, bikeways intersect the Project Area at four locations.

Mitigative Measures

The Project will be visible from the Minnesota River, Strunk Lake, Harrison Lake, Galpin Lake, Lake Minnetonka, Duck Lake, and Round Lake; however direct impact to these resources is not expected. If impacts to these resources are encountered during construction of the Project, Xcel Energy will work with the appropriate representatives to minimize any impacts.

6.4.3 Public Services and Transportation

The seven municipalities provide water, sewer and electrical service to its residents. Based on comments provided by City staff, no public utility or road improvements projects are currently planned for the area near the existing Xcel Energy transmission line within the municipalities. Regional transportation studies have been undertaken by Carver and Hennepin Counties and the Minnesota Department of Transportation ("MnDOT"). The Carver County regional study was completed in partnership with Victoria, Waconia, Chanhassen and Norwood Young America (*Carver County Public Works Department,* 2009). This study did not identify any improvements or realignments within the Project Area. The Hennepin County Transportation System Plan has identified proposed improvements nearest the Project Area discuss upgrades to the intersection of Minnesota Highway 7 and 19.

6.5 Land-Based Economies

6.5.1 Agriculture

Carver County has a strong economic dependence on agricultural production. According to the 2007 United States Department of Agriculture ("USDA") Census of Agriculture, Carver County has 800 individual farms, marking a 2% decrease in total number of farms over the previous five years. Agricultural lands cover 169,367 acres, representing over 70% of all lands in Carver County with an average farm size of 212 acres. Carver County ranks among the top 20 counties in production of fruits, tree nuts, and berries (ranking 15th statewide); nursery, greenhouse, floriculture, and sod (ranking 10th statewide); and milk and other bovine dairy products (ranking 13th statewide). Nearly $93 million was generated from both crop and livestock sales in 2007.

Hennepin County has limited economic dependence on agricultural production. According to the 2007 USDA Census of Agriculture, Hennepin County has 582 individual farms, marking a 7% decrease in total number of farms over the previous five years. Agricultural lands cover 66,558 acres, representing over 18% of all land in Hennepin County with an average farm size of 114 acres. Hennepin County ranks among the top twenty Minnesota counties in the production of nursery, greenhouse, floriculture and sod products (ranking 3rd statewide); and horses, ponies, mules, burros, and donkeys (ranking 3rd statewide). Over $51 million was generated from both crop and livestock sales in 2007.

Construction of new transmission structures and removal of existing structures will require repeated access to structure locations to install foundations, structures and conductors. Equipment used in this process includes drill rigs, concrete trucks, backhoes, cranes, boom trucks and assorted small vehicles. Operation of these vehicles on adjoining farm fields can cause rutting and compaction, particularly during springtime and otherwise wet conditions.

Landowners will be compensated for the use of their land through easement payments. Additionally, to minimize loss of farmland and rural properties and to

ensure reasonable access to the land near the poles, Xcel Energy intends to place the poles approximately five feet from, and overhang, the roadway right-of-way. When possible, Xcel Energy will attempt to rebuild the transmission lines before crops are planted or following harvest.

Where possible, spring-time construction will be avoided. However, if construction during spring-time is necessary, disturbance to farm soil from access to each structure location will be minimized by using the shortest access route. This may require construction of temporary driveways between the roadway and the structure, but would limit traffic on fields between structures. Construction mats may also be used to minimize impacts on the access paths and in construction areas. Xcel Energy construction teams will work with the property owner, right of way agent, and transmission line engineers to minimize the impact on property through use of the owner's knowledge of the property. In addition to payments for easements acquired, Xcel Energy will compensate landowners for any crop damage and soil compaction that occurs as a result of the Project.

6.5.2 Forestry

There are no forested areas where species are harvested along the proposed transmission line rebuild route or the proposed new transmission line route. The primary tree cover in the area is associated with wetlands, waterways and homesteads. No economically significant forestry resources are located along the proposed transmission line rebuild route.

No impacts are anticipated and therefore no mitigative measures are proposed.

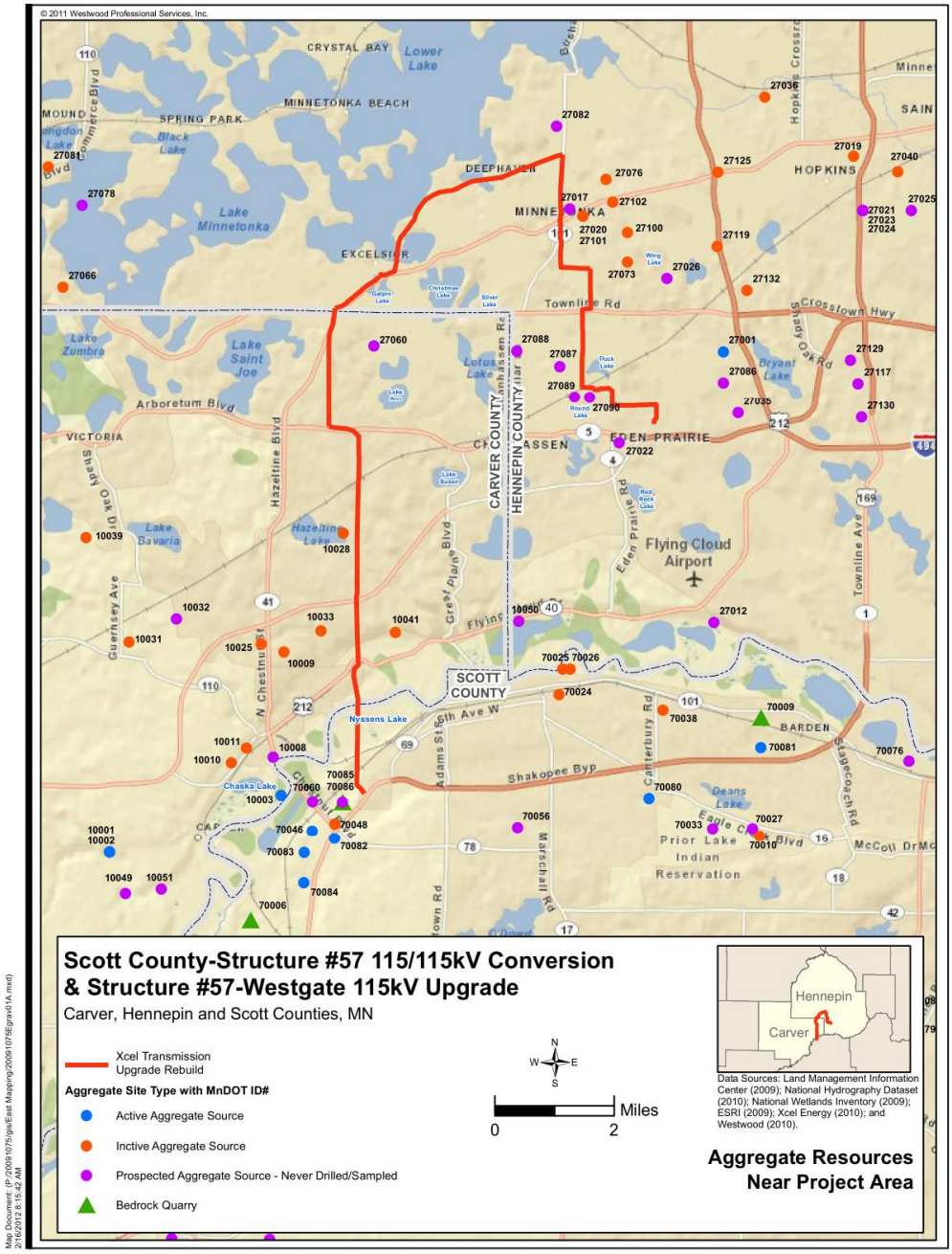
6.5.3 Tourism

Primary tourism activities in the region include camping, recreational use of the regions lakes for fishing and boating, bicycling, and cross country skiing. Lake Minnetonka is the largest lake in the Project Area and the dominant recreational feature.

6.5.4 Mining

There are multiple gravel pits, rock quarries and commercial aggregate sources in the vicinity of the Project Area (see Figure 6). According to the Minnesota Department of Transportation Aggregate Unit Office of Materials & Road Research (2002) there is active gravel pit located within three miles of Segments 2 through 10 of the Project Area. A number of inactive pits and registered prospected sources exist in Segments 2 through 10, but these are located in areas currently commercial or residential districts. These sources are not located in close proximity to the Project and will not be affected by the Project should development be pursued. Unknown resources that may exist in the near the Project would be situated in close proximity to existing utility and roadway ROW, making development unlikely. There are seven active pits within three mile of Segment 1 of the Project. Two are bedrock quarries and the other five are aggregate pits, one of which is owned by MnDOT. None of these active pits are in close proximity to the Project.

Figure 6
Aggregate Resources in the Project Vicinity



Mitigative Measures

No impacts to mining operations are anticipated and therefore no mitigative measures are proposed.

6.5.5 Archaeological and Historical Resources

A total of 679 previously recorded cultural resource properties (both archaeological and historic/architectural) were located within one mile of the proposed Project Area. In September 2010, a review of records at the Minnesota State Historic Preservation Office ("SHPO") and the Minnesota Office of the State Archaeologist ("OSA") identified 35 archaeological sites and 644 inventoried historic architectural properties are located within one mile of the Project Area.

Of the 35 archaeological sites, 16 consist of prehistoric artifacts scatters, six are single artifact finds, two are historical documentation records of abandoned townsites, seven are earthworks (which may or may not contain burials), two are cemeteries, one is a historic district containing ruins and artifacts, and one is a mill site. The historic district has a Considered Eligible Finding (CEF) by the SHPO. The eligibility of the remaining inventoried archaeological sites is unevaluated.

Of the 644 historic architectural resources identified in the records review, five are listed on the National Register of Historic Places (NRHP) and 21 have a CEF. The five NRHP properties are: 1) Heck, Albertine and Fred, House, located in the City of Chanhassen, Carver County; 2) the Excelsior School, located in the City of Excelsior, Hennepin County; 3) Wyer, Allemarinda and James, House, located in the City of Excelsior, Hennepin County; 4) Excelsior Fruit Growers Association Building, located in the City of Excelsior, Hennepin County; and 5) Peter Gideon Farmhouse, located in the City of Shorewood, Hennepin County.

Only 26 of the 679 cultural resource properties identified are located within the 200 foot Project Area. Nine of those properties are located within the boundaries of the City of Excelsior and distributed along project Segments 4 and 5. Five are located in the City of Minnetonka along portions of Project Segment 8. Two are located within the City of Eden Prairie; one each in Segment 9 and 10. Only one of the 26

properties located within the 200-foot-wide Project Area is considered eligible for listing on the National Register of Historic Places. This is the bridge on Minnetonka Boulevard that crosses the inlet of Lake Minnetonka (Bridge No. 90608). These properties will not experience direct impacts resulting from the construction of this Project. The existing transmission route in proximity to listed or eligible properties will consist of transmission line rebuild. The proposed construction will constitute the replacement of pre-existing features and not create new indirect visual impacts.

Mitigative Measures

The proposed Project will avoid impacts to identified archaeological and historic/ architectural resources to the extent possible. Should a specific resource impact be identified, Xcel Energy will consult with SHPO on whether the resource is eligible for listing in the NRHP. While avoidance would be a preferred action, mitigation for Project-related impacts on NRHP-eligible archaeological and historic resources may include resource investigations and/or additional documentation through data recovery.

6.6 Hydrological Features

6.6.1 Water Quality

Floodplains

The Project Area crosses the 100- and 500-year floodplains of the Minnesota River, Lower Lake Minnetonka, and two unnamed Public Water Wetlands (27-895W and 27-874W). In addition, the Project Area crosses the 100-year floodplain of Bluff Creek, Purgatory Creek, Carson's Bay of Lake Minnetonka, and Duck Lake (27-69P).

Wetlands, Waters, and Watercourses

Various large wetland complexes and small isolated wetlands are located throughout the Project Area, although a higher concentration of wetlands exists near the midsection of the proposed transmission route near the communities of Excelsior, Greenwood, and Deephaven. Many wetlands are adjacent to the various lakes and streams that are within or lie in close proximity to the Project Area. The National Wetlands Inventory ("NWI") was reviewed to assess wetland cover within the Project Area. Note that the NWI has not been field verified and sometimes contains inaccuracies; however, it is a good tool for initial wetland identification and assessment.

Based on NWI mapping approximately 26 percent of the area within three miles of the Project is mapped as wetland.

Of the wetlands present within the Project Area, most are classified as Lacustrine (associated with lakes) and Palustrine type wetlands. The other wetland type within the Project Area is Riverine, which is associated with rivers. Of the NWI-mapped wetlands within the Project Area, nearly half consist of Palustrine type wetlands and the other half of Lacustrine type wetlands. Riverine wetlands make up about one percent of the NWI-mapped wetlands.

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens (Cowardin et al. 1979). Of those wetlands the majority contain emergent vegetation with some displaying a mixture of shrubs and herbaceous vegetation. Some of the Palustrine wetlands have an open water components and contain unconsolidated bottoms. Lacustrine wetland systems are found in the shallow protected areas of lakes with water depth in the deepest part of the wetland basin greater than 6.6 feet. The Riverine System includes all wetlands and deepwater habitats contained within a channel. The Riverine System is bounded by the landward side by upland, by the channel bank (including natural and man-made levees), or by

wetland dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. In braided streams, the system is bounded by the banks forming the outer limits of the depression within which the braiding occurs.

The MnDNR Public Waters Inventory (PWI) identifies Public Wetlands, Waters and Watercourses. Notable Public Watercourses within the Project Area include the Minnesota River, Assumption Creek, Bluff Creek, Minnehaha Creek, and Purgatory Creek. Numerous Public Waters and Public Water Wetlands exist within three miles of the Project. Notable Public Waters include Lake Hazeltine, Lake Minnewashta, Lake Minnetonka, and Christmas Lake.

The proposed transmission line rebuild will have minor, mostly short term effects on surface water resources. Most potential effects on surface waters will be related to reconstruction of the transmission line across wetlands proximal to the existing transmission corridor. The Project could require wetland and water resource approvals from the U.S. Army Corps of Engineers (USACE), MnDNR, and several Local Government Units (LGU's). These agencies administer regulatory programs of the federal Clean Water Act and Rivers and Harbors Act, the Minnesota Public Water Resources Act and Utility Crossing Licenses, and the Minnesota Wetland Conservation Act (WCA).

Mitigative Measures

Xcel Energy will minimize impacts to public waters and wetlands to the greatest extent possible. Xcel Energy will apply erosion control measures identified in the MPCA Storm Water Best Management Practices Manual, such as using silt fence, to minimize impacts to adjacent water resources. During construction, Xcel Energy will control operations to minimize and prevent material discharge to surface waters. If materials do enter streams, they will be promptly removed and properly disposed of to the extent feasible.

Disturbed surface soils will be stabilized at the completion of the construction process to minimize the potential for subsequent effects on surface water quality. Permanent

impacts to public waters and wetlands will be avoided wherever feasible by maximizing the typical span length over these areas.

The transmission line rebuild may require waters and wetlands permits, letters of no jurisdiction, or exemptions from the USACE, MnDNR Division of Waters, and LGU's that administer WCA. After coordination and application submission, authorization from the USACE would likely fall under a Letter of Permission (LOP-05-MN) or the utility line discharge provision of a Regional General Permit (RGP-3-MN). The MnDNR Division of Waters requires a Public Waters Work Permit for any alteration of the course, current, or cross-section below the ordinary high water level of a Public Water or Watercourse. No such alterations are anticipated.

The cities of Chanhassen, Greenwood, Deephaven, Eden Prairie, Minnetonka, Chaska, and Minnehaha Creek Watershed District (MCWD), and Jackson Township (Scott County) are all LGU's that administer the WCA in the Project Area. It is possible that the BWSR representatives for Carver, Scott, and Hennepin Counties will coordinate with the LGU'S so that one entity administers the WCA over the entire Project Area. As a utilities project, it is likely that wetland impact minimization will allow the Project to be eligible for a WCA de minimis or utilities exemption. If that is not the case, WCA permits will be required.

Minnesota Statutes Section 84.415 requires Xcel Energy to obtain a license from the MnDNR Division of Lands and Minerals for the passage of any utility over, under, or across any state land or public waters. Therefore, Xcel Energy will either confirm the applicability of existing licenses for these crossings or obtain new utility crossing licenses prior to construction.

The MPCA regulates construction activities that may impact storm water under the Clean Water Act. In the event that a National Pollutant Discharge Elimination System ("NPDES") construction storm water permit and Stormwater Pollution Prevention Plan ("SWPPP") is required for the Project, Xcel Energy will obtain the permit and SWPPP. An NPDES permit is required for owners or operators for any construction activity disturbing: 1) one acre or more of soil; 2) less than one acre of soil if that

activity is part of a "larger common plan of development or sale" that is greater than one acre; or 3) less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources.

6.7 Vegetation and Wildlife

6.7.1 Vegetation

Land cover in the Project Area consists primarily of low to high intensity development including residential, commercial, light industrial, open space, and roadways. The Project consists of improvements to existing infrastructure which is in place largely along existing roadways. **Table 20** below summarizes land cover within the six-mile wide Project Area.

Table 20
Landcover Within the Project Area

Cover Type	Area (acres)	Percent Cover of Project Area
Forest/Shrubland	16,142	19%
Developed/High Intensity	2,565	3%
Developed/Low Intensity	16,002	19%
Developed/Medium Intensity	5,962	7%
Developed/Open Space	12,096	15%
Herbaceous & Woody Wetlands	3,500	4%
Open Water	12,360	15%
Pasture/Hay/Cropland	14,453	17%
Barren land	260	<1%

Source USDA, NASS Cropland Data Layer (2011)

Other significant land cover types within the Project Area are wetlands and open water forest, agricultural land. Reed canary grass, cattail, cottonwood, sandbar willow, and sedges are the primary species in wetlands. Common species in forested areas include sugar maple, American elm, box elder, green ash, bur and red oak, and eastern cottonwood. Transmission line construction impacts to trees and woodlands will be minimized because the transmission line rebuild will follow existing right-of-way. For a discussion on impacts to agriculture, please see **Section 6.5.1**.

Mitigative Measures

To minimize impacts to trees in the Project Area, Xcel Energy will limit tree clearing and removal to the transmission line right-of-way, areas that limit construction access

to the Project Area, and areas that impact the safe operation of the facilities.

6.7.2 Wildlife

The croplands, wetlands, and woodlands in the area provide habitat for a variety of wildlife. Wildlife and other organisms that inhabit the Project Area include small mammals such as mice, voles, and ground squirrels; large mammals such as white-tailed deer; waterfowl and other water birds like pelicans and egrets, songbirds, raptors, upland gamebirds; and reptiles/amphibians such as frogs, salamanders, snakes, and turtles.

Wildlife that resides within the construction zone will be temporarily displaced to adjacent habitats during the construction process. It is anticipated that fish and mollusks that inhabit the local watercourses will not be affected by transmission line rebuild.

The reconstructed transmission line may affect raptors, waterfowl and other bird species. Birds have the potential to collide with all elevated structures, including power lines. Avian collisions with transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands and water features, and along riparian corridors that may be used during migration.

The electrocution of large birds, such as raptors, is more commonly associated with small distribution lines than large transmission lines. Electrocution occurs when birds with large wingspans come in contact with two conductors or a conductor and a grounding device. Xcel Energy transmission and distribution line design standards provide adequate spacing to eliminate the risk of raptor electrocution and will minimize potential avian impacts of the proposed Project.

Mitigative Measures

It is anticipated that most wildlife displacement and habitat impacts will be temporary. Consequently, no wildlife population mitigation measures are proposed. Xcel Energy has been working with various state and federal agencies for over 20 years to address avian issues as quickly and efficiently as possible. In 2002, Xcel Energy Operating

Companies, including Xcel Energy, entered into a voluntary Memorandum of Understanding ("MOU") with the U.S. Fish and Wildlife Service ("USFWS") to work together to address avian issues throughout its service territories. The MOU sets forth standard reporting methods and the development of Avian Protection Plans ("APP") for each state that Xcel Energy serves. APPs include designs and other measures aimed at preventing avian electrocutions, as described in guidance provided by the Avian Power Line Interaction Committee ("APLIC" 2006) and the guidelines for developing APPs (APLIC and USFWS, 2005). The APP for the Minnesota Territory is complete and retrofit actions for areas with potential avian impacts are underway across the territory. Xcel Energy also addresses avian issues related to transmission projects by working with resource agencies such as the MnDNR and the USFWS to identify areas that may be appropriate for marking transmission line shield wires with bird diverters attempting to avoid areas known as primary migration corridors or migratory resting areas.

The Project has been assessed for areas with potential avian issues. Areas where bird diverters might be warranted have been identified. These areas include spans of transmission line that run adjacent to Carson's Bay and St. Alban's Bay of Lake Minnetonka and Galpin Lake. In most cases, the shield wire of an overhead transmission line is the most difficult part of the structure for birds to see. Xcel Energy has successfully reduced collisions on certain transmission lines by marking the shield wires with SFDs, which are pre-formed spiral shaped devices made of polyvinyl chloride that are wrapped around the shield wire.

6.8 Rare and Unique Natural Resources

A request for a Natural Heritage Database Search and comments regarding rare species and natural communities for the Project Area was submitted to the MnDNR on February 23, 2010. The results of the MnDNR Natural Heritage Database Search are included in **Appendix**. In February, 2012, the MnDNR confirmed there were no new records within the Project Area and that the letter dated April 2, 2010 is still valid.

The following assessment is based on MnDNR response, a review of the Natural Heritage Database that is licensed to Xcel Energy by the MnDNR, and other state and federal rare species and natural community information.

There are 65 known occurrences of rare species and sensitive natural communities within two miles of the Project Area as indicated in **Table 21** below. These include 26 occurrences of 14 vertebrate species, eight occurrences of five invertebrate species, 18 occurrences of 13 vascular plant species, one animal community, ten terrestrial communities, and two ecological features. Twenty-five of the 65 records are located within 0.5 mile of the Project Area and include the Bald eagle, Red-shouldered Hawk, Western Fox snake, Blandings's Turtle, Paddlefish, Shovelnose sturgeon, Rock pocketbook, Yellow sandshell, Marsh Arrow-grass, Sessile-flowered cress, Small White Lady's slipper, Sterile sedge, a bat concentration, a Seepage meadow/Carr, a Calcareous fen (Southern), one native plant community (undetermined class), and ice deposition (quaternary) (Minnesota DNR, 2010). It should be noted that 42 of the 65 records are within two miles of Segment 1, a portion of the Project where no structural changes or disturbance will occur as part of the Project.

Table 21
Rare and Unique Resources

Common Name	*Scientific Name*	Type	MN Status [1]	Last Obs.	Proximity (Miles)
American Brook Lamprey*	*Lampetra appendix*	Vertebrate	Not Applicable	2000	0.5-1.0
Bald Eagle	*Haliaeetus leucocephalus*	Vertebrate	SPC	2008	1.0-1.5
Bald Eagle*	*Haliaeetus leucocephalus*	Vertebrate	SPC	2008	0.0-0.5
Black buffalo*	*Ictiobus niger*	Vertebrate	SPC	2003	1.5-2.0
Blanding's Turtle	*Emydoidea blandingii*	Vertebrate	THR	1994	0.0-0.5
Blanding's Turtle	*Emydoidea blandingii*	Vertebrate	THR	1987	1.0-1.5
Blue sucker*	*Cycleptus elongatus*	Vertebrate	SPC	1989	1.5-2.0
Eastern Spotted Skunk	*Spilogale putorius*	Vertebrate	THR	1992	1.5-2.0
Gopher snake*	*Pituophis catenifer*	Vertebrate	SPC	1932	1.5-2.0
Least Darter	*Etheostoma microperca*	Vertebrate	SPC	1992	1.0-1.5
Least Darter	*Etheostoma microperca*	Vertebrate	SPC	2006	0.5-1.0
Least Darter	*Etheostoma micropea*	Vertebrate	SPC	2006	0.5-1.0
Least Darter	*Etheostoma micropea*	Vertebrate	SPC	2006	1.5-2.0
Milk snake*	*Lampropeltis triangulum*	Vertebrate	Not Applicable	1929	1.5-2.0
Paddlefish*	*Polyodon spathula*	Vertebrate	THR	2004	0.0-0.5
Pugnose Shiner	*Notropis anogenus*	Vertebrate	SPC	1941	0.5-1.0
Pugnose Shiner	*Notropis anogenus*	Vertebrate	SPC	1991	1.5-2.0
Red -shouldered Hawk	*Buteo lineatus*	Vertebrate	SPC	1989	0.0-0.5
Red -shouldered Hawk	*Buteo lineatus*	Vertebrate	SPC	1996	0.0-0.5
Red -shouldered Hawk	*Buteo lineatus*	Vertebrate	SPC	1993	0.0-0.5
Red -shouldered Hawk	*Buteo lineatus*	Vertebrate	SPC	1994	0.0-0.5
Shovelnose Sturgeon*	*Scaphirhynchus platorynchus*	Vertebrate	Not Applicable	1987	0.0-0.5
Shovelnose Sturgeon*	*Scaphirhynchus platorynchus*	Vertebrate	Not Applicable	1999	0.0-0.5
Shovelnose Sturgeon*	*Scaphirhynchus platorynchus*	Vertebrate	Not Applicable	1982	0.5-1.0
Shovelnose Sturgeon*	*Scaphirhynchus platorynchus*	Vertebrate	Not Applicable	1998	0.5-1.0
Western Fox Snake	*Elaphe vulpina*	Vertebrate	Not Applicable	1939	0.0-0.5
Mucket*	*Actinonaias ligamentina*	Invertebrate	THR	1989	1.0-1.5
Mucket*	*Actinonaias ligamentina*	Invertebrate	THR	1989	1.0-1.5
Regal fritillary*	*Speyeria idalia*	Invertebrate	SPC	1975	1.5-2.0
Rock Pocketbook*	*Arcidens confragosus*	Invertebrate	END	2006	0.0-0.5
Rock pocketbook*	*Arcidens confragosus*	Invertebrate	END	1989	1.0-1.5
Wartyback*	*Quadrula nodulata*	Invertebrate	END	2000	1.0-1.5
Yellow Sandshell*	*Lampsilis teres*	Invertebrate	END	1989	0.0-0.5
Yellow Sandshell*	*Lampsilis teres*	Invertebrate	END	1989	1.0-1.5
American Ginseng*	*Panax quinquefolius*	Vascular Plant	SPC	1995	0.5-1.0
American Ginseng	*Panax quinquefolius*	Vascular Plant	SPC	1995	1.0-1.5
Beaked Spike-rush*	*Eleocharis rostellata*	Vascular Plant	THR	1992	0.5-1.0
Dragon's Mouth	*Arethusa bulbosa*	Vascular Plant	Not Applicable	1931	1.5-2.0
Dwarf Trout Lily	*Erythronium propullans*	Vascular Plant	END	2007	1.5-2.0
Dwarf Trout Lily	*Erythronium propullans*	Vascular Plant	END	2007	1.5-2.0

Common Name	*Scientific Name*	Type	MN Status [1]	Last Obs.	Proximity (Miles)
Dwarf Trout Lily	*Erythronium propullans*	Vascular Plant	END	2007	1.5-2.0
Dwarf Trout Lily	*Erythronium propullans*	Vascular Plant	END	2007	1.5-2.0
Dwarf Trout Lily	*Erythronium propullans*	Vascular Plant	END	2007	1.5-2.0
Hair-like Beak-rush*	*Rhynchospora capillacea*	Vascular Plant	THR	1990	0.5-1.0
Kitten-tails*	*Besseya bullii*	Vascular Plant	THR	1979	1.5-2.0
Marsh Arrow-grass*	*Triglochin palustris*	Vascular Plant	Not Applicable	1995	0.0-0.5
Sessile-flowered Cress*	*Rorippa sessiliflora*	Vascular Plant	SPC	1891	0.0-0.5
Small White Lady's-slipper*	*Cypripedium candidum*	Vascular Plant	SPC	1995	0.0-0.5
Sterile Sedge*	*Carex sterilis*	Vascular Plant	THR	1995	0.0-0.5
Twig-rush*	*Cladium mariscoides*	Vascular Plant	SPC	1992	0.5-1.0
Valerian*	*Valeriana edulis var. ciliata*	Vascular Plant	THR	1992	0.5-1.0
Whorled nut-rush*	*Scleria verticillata*	Vascular Plant	THR	1990	0.5-1.0
Bat Concentration*	*Bat Colony*	Animal Community	Not Applicable	2000	0.5-1.0
Ice deposition (quaternary)	*Not Applicable*	Other	Not Applicable	1977	0.0-0.5
Kettle (quaternary)	*Not Applicable*	Other	Not Applicable	1980	1.5-2.0
Native Plant Community*	*Not Applicable*	Terrestrial Community	Not Applicable	1995	1.0-1.5
Dry Hill Prairie (Southern)*	*Dry Hill Prairie (Southern)Type*	Terrestrial Community	Not Applicable	1995	0.5-1.0
Native Plant *Community	*Native Plant Community, Undetermined Class*	Terrestrial Community	Not Applicable	1995	0.5-1.0
Native Plant Community*	*Native Plant Community, Undetermined Class*	Terrestrial Community	Not Applicable	1995	0.5-1.0
Native Plant Community*	*Native Plant Community, Undetermined Class*	Terrestrial Community	Not Applicable	1995	0.5-1.0
Native Plant Community	*Native Plant Community, Undetermined Class*	Terrestrial Community	Not Applicable	1995	1.0-1.5
Northern Poor Fen	*Northern Poor Fen Class*	Terrestrial Community	Not Applicable	1992	1.5-2.0
Calcareous Fen* (Southeastern)	*Calcareous Fen (Southeastern)Type*	Terrestrial Community	Not Applicable	1995	0.0-0.5
Native Plant* Community	*Native Plant Community, Undetermined Class*	Terrestrial Community	Not Applicable	1995	0.0-0.5
Seepage Meadow/Carr*	*Seepage Meadow/Carr*	Terrestrial Community	Not Applicable	1995	0.0-0.5

[1]SPC = State-listed Special Concern, THR = Threatened, END=Endangered (Minnesota DNR 2007)

***Denotes records within 2.0 miles of Segment 1.**

Fifty-two additional records of rare species were identified when reviewing the area between two and three miles from the Project. Many are additional records of species

already recorded within two miles of the Project such as American Ginseng, Kitten-tails, and the shovel nose sturgeon. Additional rare species recorded between two and three miles include, but are not limited to, the Common Moorhen, Hill's thistle, Smooth Rock-cress, Black sandshell, Butterfly, Pistolgrip, and Round pigtoe. Of the 52 records between two and three miles, 30 are invertebrate species of the freshwater mussel family Unionidae.

Mitigative Measures

The Project and construction process will be designed to avoid encroachment and effects on rare species and unique natural resources to the extent practicable. If rare species or unique natural resources will be affected, Xcel Energy will coordinate with the MnDNR and consider modifying either the construction footprint or the construction practices to minimize impacts. A field survey was completed in November of 2010 to search for previously unrecorded Bald Eagle nests in proximity to the Project Area. This survey revealed that no new nests were identified. In the event that an eagle nest is later located and determined to be occupied, efforts will be made to minimize potential impacts from construction activities which may include alteration of pole locations or scheduling construction to avoid nesting season.

4398559v8

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Ellen Anderson	Chair
J. Dennis O'Brien	Commissioner
Phyllis Reha	Commissioner
David Boyd	Commissioner
Betsy Wergin	Commissioner

Mark Suel
Government & Regulatory Affairs
Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401

SERVICE DATE: November 16, 2011

DOCKET NO. E-002/CN-11-332

In the Matter of the Application of Northern States Power Company d/b/a Xcel Energy for a Certificate of Need for the Upgrade of the Southwest Twin Cities Bluff Creek – Westgate Area 69 kV Transmission Line to 115 kV Capacity

The above entitled matter has been considered by the Commission and the following disposition made:

Granted the Applicant's Exemption Request.

The Commission agrees with and adopts the recommendations of the Department of Commerce which are attached and hereby incorporated in the Order.

BY ORDER OF THE COMMISSION

Burl W. Haar
Executive Secretary

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MINNESOTA DEPARTMENT OF COMMERCE

85 7th Place East, Suite 500
St. Paul, Minnesota 55101-2198
www.commerce.state.mn.us
651.296.4026 FAX 651.296.1959
An equal opportunity employer

August 3, 2011

Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

RE: **Request for Certificate of Need Exemption Request Approval**
Docket No. E002/CN-11-332

Dear Dr. Haar:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

Exemption Request: Southwest Twin Cities Bluff Creek-Westgate Transmission Line Upgrade from 69 KV to 115 KV Capacity.

The petitioner is:

Mark Suel
Government & Regulatory Affairs
Xcel Energy
414 Nicollet Mall
Minneapolis, Minnesota 55401

The Department recommends **approval with modifications** and is available to answer any questions the Minnesota Public Utilities Commission may have.

Sincerely,

/s/ STEVE RAKOW
Rates Analyst

SR/ja
Attachment

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

COMMENTS OF THE MINNESOTA DEPARTMENT OF COMMERCE, DIVISION OF ENERGY RESOURCES

DOCKET NO. E002/CN-11-332

I. BACKGROUND

On April 19, 2011 Northern States Power Company, a Minnesota corporation (Xcel or the Company) submitted the Company's *Notice Plan: Southwest Twin Cities Bluff Creek—Westgate Transmission Line Upgrade from 69 kV to 115 kV Capacity* (Notice Petition). The Notice Petition provided a plan to notify potentially affected members of the public about the proposal, under Minnesota Rules part 7849.2550. In response to the Notice Petition, comments were filed by the Minnesota Department of Commerce-Division of Energy Resources (Department) and reply comments were filed by Xcel. The Notice Petition is currently pending before the Minnesota Public Utilities Commission (Commission).

On June 17, 2011 Xcel submitted the Company's *Request for Exemption Request: Southwest Twin Cities Bluff Creek—Westgate Transmission Line Upgrade from 69 kV to 115 kV Capacity* (Exemption Petition) to obtain exemption from certain data requirements of Minnesota Rules part 7849. In response to the Exemption Petition, on June 24, 2011 the Commission issued a notice specifying that comments are due July 18, 2011 and reply comments are due August 1, 2011.

On July 1, 2011, the Minnesota state government shut down. As a result, the due dates were modified to extend the due dates by 30 days, to August 17 and August 31, respectively. Below are the comments of the Department regarding the Exemption Petition.

II. DEPARTMENT ANALYSIS

A. BACKGROUND

Xcel proposes to construct a 115 kV transmission line in the Southwest Twin Cities area. According to the Company, the proposed project would upgrade approximately 14 miles of 69 kV transmission line to 115 kV capacity as follows:

- converting approximately 3.6 miles of 69 kV transmission line to 115 kV transmission line between the Bluff Creek and Excelsior Substations;
- converting approximately 3 miles of 69 kV transmission line to 115 kV capacity between the Excelsior and Deephaven Substations;
- converting approximately 7.5 miles of 69 kV transmission line to 115 kV capacity between the Deephaven and Westgate Substations; and
- upgrading the Excelsior and Deephaven Substations to 115 kV capacity.

The proposed facilities would qualify as large energy facilities (LEF) under Minnesota Statutes §216B.2421, subd. 2 (3). Minnesota Statute §216B.243, subd. 2 requires that LEFs obtain a Certificate of Need (CN). Minnesota Rules part 7849 includes the filing requirements for a CN for an electric transmission facility.

The Exemption Petition states that the proposed 115 kV lines will:

- maintain reliable service in the southwestern part of the metropolitan area; and
- allow future growth and development in the area.

B. XCEL'S REQUEST

In the Exemption Petition, Xcel requests exemption from providing data relevant to the following portions of Minnesota Rules:

- 7849.0260, subp. A(3) and C(6);
- 7849.0270, subp. 2 (A-D and F) and Subp. 3-5;
- 7849.0280, (B) through (I);
- 7849.0290;
- 7849.0300; and
- 7849.0340.

Minnesota Rules 7849.0200, subp. 6 states:

> Before submitting an application, a person is exempted from any data requirement of this chapter if the person (1) requests an exemption from specified rules, in writing to the commission, and

> (2) shows that the data requirement is unnecessary to determine the need for the proposed facility or may be satisfied by submitting another document.

The Department examines each specific exemption request separately. The required criterion is whether Xcel has shown that "the data requirement is unnecessary to determine the need for the proposed facility or may be satisfied by submitting another document" as discussed above.

C. ANALYSIS OF EXEMPTION REQUESTS

1. Minnesota Rules 7849.0260, subp. A(3) and C(6)

These rules require an applicant to provide estimated "losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations." Xcel proposes to supply system loss information in lieu of line-specific losses.

The Department agrees that line losses for the system are more relevant to the analysis than line losses for individual lines. The Department notes that, to make the proper decisions in a societal framework, it is necessary to know what happens to system losses when a line is added. To count only the losses on the line in question might lead to the selection of one alternative because it has lower losses on that line but has higher system line losses; therefore selection of such an alternative would force the system to produce more energy than some other alternative. Thus, the proposal to use data for the system as a whole in this proceeding is appropriate.

In summary, the Department recommends that the Commission approve Xcel's proposed exemption to Minnesota Rules 7849.0260 A(3) and C(6) with the provision of the proposed alternative data.

2. Minnesota Rules 7849.0270, subp. 2 (A-D and F) and Subps. 3-5

These rules require an applicant to provide information regarding its system peak demand, annual energy consumption, and load factors for the applicant's service area and system. Xcel requests this exemption since the proposed facility is designed to serve customers in the local area rather than Xcel's system. Instead, Xcel proposes to provide data supporting the load serving needs claimed by the Company.

The Department agrees that the data Xcel proposes to provide, "detailed substation-specific demand projections," is the appropriate data regarding the need to address reliability in the southwest twin cities area. The Department also agrees that provision of information regarding substation forecast methodology, databases, and assumptions is appropriate. Information specific to the local area is more relevant to the claimed need than system-wide information.

In summary, the Department recommends that the Commission approve Xcel's proposed exemption to Minnesota Rules 7849.0270, subp. 2 (A-D and F) and Subps. 3-5 with the provision of the proposed alternative data.

3. Minnesota Rules 7849.0280, (B) through (I)

This rule requires the applicant to provide information that describes the ability of its existing system to meet forecasted demand; in essence, load and capability (L&C) information. Instead of L&C data Xcel proposes to discuss the reliability concerns resulting from forecasted peak demand in the local area. The Department agrees with Xcel that the Company's proposed discussion, focusing on transmission adequacy, is more relevant than the required data, which focuses on generation adequacy. Therefore, the Department recommends that the Commission grant the exemption with the provision of the proposed alternative data.

4. Minnesota Rules 7849.0290

This rule requires the applicant to provide conservation program information and quantification of the impact of conservation programs on forecast data. Instead Xcel proposes to submit:

> … a discussion of demand management programs used by Xcel Energy to manage peak loads and how these programs affect the substation loads in the specific project area … would be more useful to the need analysis. In addition, we propose to provide a summary of the 2009 filing made by Xcel Energy pursuant to the Energy Conservation Improvement Statute.

As with section II C 2 above (forecast data), the Department agrees that the data Xcel proposes to provide is the appropriate data regarding the need to address reliability in the southwest twin cities area. Therefore, the Department recommends that the Commission grant the exemption with the provision of the proposed alternative data.

5. Minnesota Rules 7849.0300 and 7849.0340

Minnesota Rules 7849.0300 requires detailed information regarding the consequences of delay on three specific statistically based levels of demand and energy consumption. Minnesota Rules 7849.0340 requires a discussion of what the impact would be on existing generation and transmission facilities at three levels of demand specified in part 7849.0300 for the no-build alternative. Instead, Xcel proposes to provide information on the consequences of delay in the context of the potential impacts of delay on the local community service reliability. Specifically, Xcel proposes "to identify the threshold level of demand that places service at risk and the effect of incremental change in growth rather than evaluate system performance at three discrete demand levels."

The Department agrees with Xcel that the Company's proposed data, focusing on demand in the local area, is relevant to the claimed need and provides better information than the required data. Therefore, the Department recommends that the Commission grant the exemption with the provision of the proposed alternative data.

III. DEPARTMENT RECOMMENDATION

The Department recommends that the Commission approve the Company's request for exemption from the required data with the provision of the proposed alternative data.

/ja

Appendix B

Southwest Twin Cities Phase 2 Study Update

Southwest Twin Cities Phase 2 Study Update

(Chaska – Chanhassen – Excelsior – Deephaven - Minnetonka corridor)

Xcel Energy Services Inc
07/08/11

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Appendix B 40

Executive Summary

This study is an update to the Southwest Twin Cities Load serving study for the areas between Minnetonka and Chaska. The current study was performed using the latest models and load forecast. The study also incorporates proposed changes to the transmission system at Glen Lake substation, Highway 212 Corridor project along with West Creek data center load.

Certification

I hereby certify that this report was prepared by me or under my direct supervision and that I am duly Licensed Professional Engineer under the laws of the State of Minnesota

Srinivas Vemuri
Date: 7/08/11
License # 48351

1. Background

This study is an update to the load serving study performed for the Chaska – Chanhassen – Excelsior – Deephaven – Minnetonka – Eden Prairie corridor in 2009. This study is performed to re-evaluate the deficiencies in the study area using the most recent load forecast provided by the stakeholders. This study includes evaluation of additional transmission alternatives to meet the load serving needs in the area.

Throughout this study it is assumed that the Glencoe – West Waconia – Chaska - Scott County 115 kV conversion project is in-service. This assumption helps eliminate any deficiencies that would be addressed by the projects that are currently being pursued.

2. Model updates

The study update was performed using the 2010 series MRO 2016 summer peak model. The following changes were made to the system topology to reflect recent plans and corrections.

Glen Lake load is currently served from Westgate and Gleason Lake substations, with each substation serving approximately 50% of the load. Recent studies have indicated that the loss of Gleason Lake 115/69 kV transformer would lead to severe low voltages at Glen Lake substation. To mitigate this low voltage, NSP has proposed to move the load, served by Gleason Lake substation, to Westgate. To reflect this change, the normally open switch between the distribution transformers at Glen Lake load is moved to the north side of the load. In order to implement this change in topology, the Westgate transformer serving Glen Lake, has been upgraded to 70MVA.

In the 2009 study for this area, the rating of Westgate – Deephaven 69kV line was assumed to be 62 MVA, but the actual rating of this line is limited to 53.2MVA, due to substation equipment. Since the line substation equipment can be easily upgraded, the next limiting element of (0.3 miles of 4/0 CU) transmission conductor was used to rate the line. Therefore the rating of the line was dropped from 62 MVA to 59 MVA.

The Southwest Twin Cities Phase 1 and Highway 212 Corridor 115kV conversion projects are included in the base models. These projects include new 115 kV lines from Glencoe to West Waconia, and a new 115 kV line from West Waconia to Chaska to Scott County substation. The Highway 212 Corridor project model included retirement of Chaska downtown substation and addition of West Creek substation along with the proposed data center load. These projects are included in the models to ensure that only the deficiencies between Scott County and Westgate alone are identified and addressed through this study.

The models also assume that the Minnesota River generator is offline, this is a valid assumption as this generator is not considered a base load generating unit, and would be expensive to dispatch out of merit order. Table 2.1 below shows the updated load forecast based on non-coincident peak loads in the area.

Table 2.1

Substation	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Westgate	171.28	173.86	176.49	179.17	181.89	184.65	187.47	190.33	193.24	196.20
Excelsior	12.88	13.01	13.14	13.27	13.40	13.54	13.67	13.81	13.95	14.09
Deephaven	43.78	44.22	44.66	45.11	45.56	46.01	46.47	46.94	47.41	47.88
Minn River	31.00	36.00	32.00	35.00	36.00	36.00	37.00	38.00	38.00	39.00
Chanhassen	8.40	8.49	8.57	8.66	8.74	8.83	8.92	9.01	9.10	9.19
Glen Lake	43.39	43.82	44.26	44.70	45.15	45.60	46.05	46.51	46.98	47.45
Bluff Creek (NSP)	40.02	40.42	40.82	41.23	41.64	42.06	42.48	42.91	43.33	43.77
Bluff Creek (GRE)	6.48	6.55	6.61	6.68	6.75	6.81	6.88	6.95	7.02	7.09
Bluff Creek (Chaska)	31.00	32.00	32.00	33.00	34.00	34.00	35.00	35.00	36.00	36.00

The forecast for NSP's substations was provided by NSP's distribution capacity planning. The forecast is based on load on key elements of the system, such as feeders and transformers on an annual basis, and load readings from multiple sources. Adjustments were made to eliminate artificially high results due to load switching between substations. This provided the yearly peak load served at each substation. Distribution capacity planning then created load forecast based on load growth trends, predicted load growth from information provided by area engineers, new load additions and economic factors.

The load at Minnesota River, Bluff Creek (GRE and Chaska) and Chanhassen were provided by the respective entities.

3. Analysis

3.1 Criteria

Table 3.1 below provides NSP's criteria for system performance. For study purposes, to identify deficiencies in the study area, any facility loaded above 100% or close to 100% is documented. Similarly any low voltage condition with voltage less than 92% or close to 92% are documented. This is done to ensure that any future problems in the study area are also identified.

Table 3.1

	% Line loading	% Transformer loading	Minimum %Voltage	Maximum %Voltage
System intact	100	100	95	105
Contingency	110	115	92% (Twin Cities) 90% (outside Twin cities)	105

3.2 System deficiencies

The deficiencies identified in the study region are listed in Table 3.2. The deficiencies marked in red indicate violation of criteria listed in Table 3.1. The remaining deficiencies indentified do not violate the criteria, identified in Table 3.1, however these deficiencies could be potential violations in the future.

Table 3.2

Contingency	Facility	Rating	MVA flow	Overload/ Voltage
Loss of Scott County – Excelsior	Westgate 115/69 kV transformer	47	70	130%
Loss of Scott County – Excelsior	Westgate – Deephaven 69 kV line	59	60.3	102%
Loss of Scott County TR 1	Scott County TR 2	70	76.9	110%
Loss of Scott County TR 2	Scott County TR 1	70	77.3	110%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Scott County – Minnesota River 115 kV line	316.3	388.7	123%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Minnesota River – Chanhassen	316.3	349	110%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Chanhassen – Bluff Creek	316.3	339.4	107%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Scott County–Excelsior 69 kV line	68	70	103%
Loss of Eden Prairie – Westgate double ckt 115 kV line	Westgate			91.4%
	Deephaven			91.6%
	Bluff Creek			92.4%
	Excelsior			92.9%
	Chanhassen			93.7%

Although the Scott County – Bluff Creek 115 kV line can be re-rated to 361MVA with minimal upgrades, Table 3.2 indicates that the flows on the Scott County – Minnesota River exceed 388 MVA during contingency conditions, therefore upgrading the line to 361 MVA would not mitigate this overload. In addition, increasing the rating of this line does not address the voltage deficiencies identified in Table 3.2. Therefore upgrades required to rerate the line to 361 MVA were not explored.

3.2 Mitigation Plans

The following sections provide mitigation options for deficiencies identified in Table 3.2. These sections also provide results of PV analysis using PSSE 30.3.2, and AC-FCITC results using PSS MUST 9.2. The PV and FCITC analyses were performed to determine the approximate incremental load serving capability of each of the options, and possible future upgrades that may be needed to continue supporting the load growth in the study area.

<u>Option 1</u>

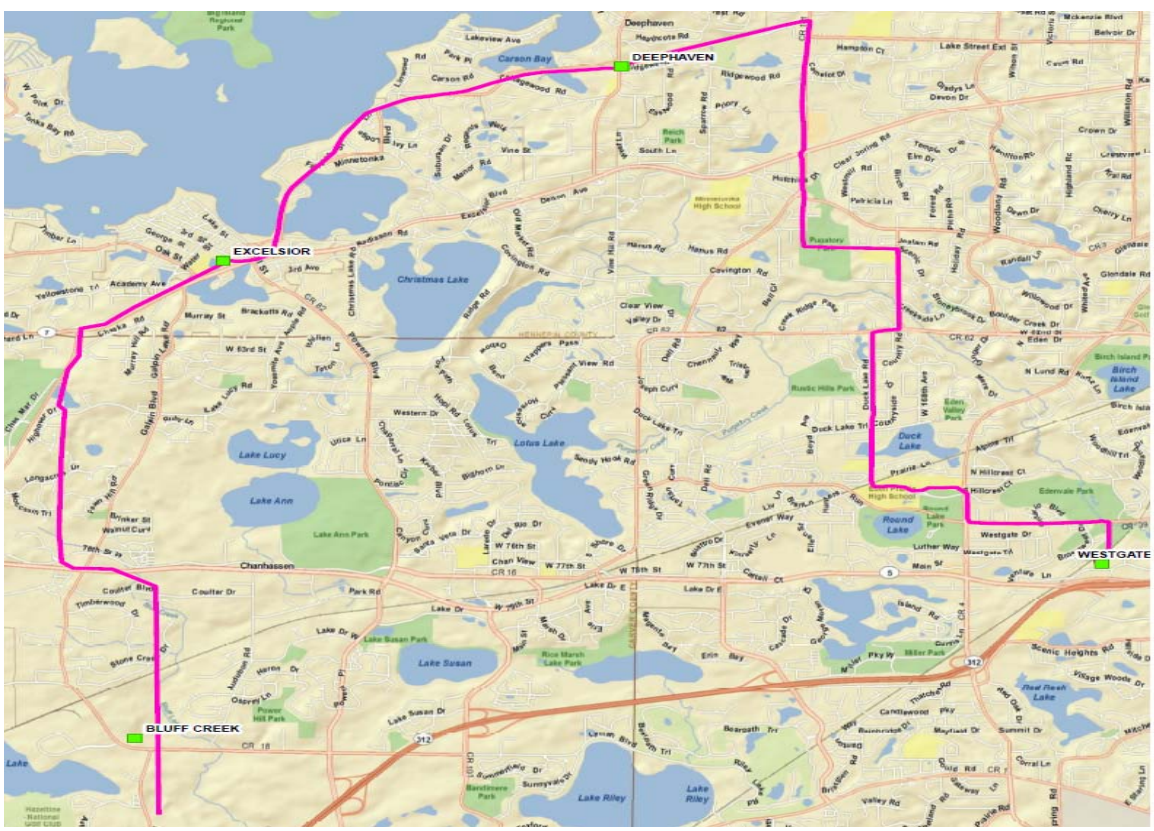


Figure 3.1

This option is to convert the 69 kV line between Westgate, Deephaven, Excelsior and Scott County to 115 kV. This would eliminate the overload on Westgate 115/69 kV transformer, currently serving Deephaven and Excelsior substations, as it will no longer be needed. This option also eliminates the overload on Scott County – Minnesota River – Chanhassen 115 kV line, as a new parallel 115 kV circuit is created by this option. In addition, load would be reduced on the Scott County 115/69 kV transformers, as the load at Excelsior and Deephaven would be converted from 69 kV to 115 kV. Similarly the future overload on Excelsior – Scott County, Chanhassen – Bluff Creek and low voltages at Westgate would be mitigated by the new 115 kV circuit.

The loss of Eden Prairie – Westgate is considered the most critical contingency for this area due to the loss of 345 kV source. This outage would result in high flows on the 115 kV lines between Black Dog – Scott County – Bluff Creek and low voltages at Westgate, as the entire load is served from Scott County which is fed from Blue Lake and Black Dog substations.

After the conversion of Excelsior and Deephaven substations to 115kV, the Eden Prairie – Westgate 115 kV double circuit outage would determine the incremental load serving capability of the system in this area.

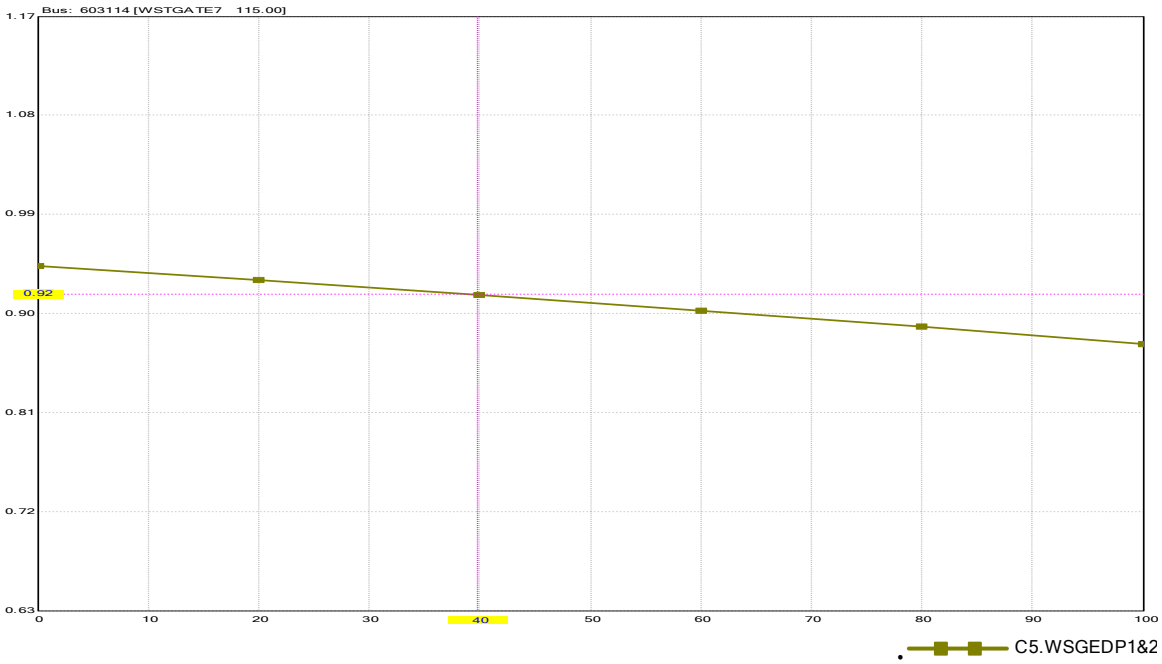


Figure 3.2

Figure 3.2 above provides the results of PV analysis. The loads listed in Table 3.3 below were scaled up with the Eden Prairie – Westgate double circuit line out of service and the voltages at Westgate were plotted against the load increment. Figure 3.2 indicates that the load in the region can be increased by 40 MW before the voltages at Westgate drop to 92%.

Table 3.3

Loads
Westgate
Excelsior
Deephaven
Glen Lake
Minnesota River
Chanhassen
Bluff Creek

Based on the results of PV analysis, transfer limit analysis was performed on the area by monitoring the transmission line flows while increasing the loads listed in Table 3.3. Table 3.4 below provides the transfer limit analysis results for load increment of up to 60 MW.

Table 3.4

Contingency	Facility	DF	Emergency rating	Incremental Load
Loss of Eden Prairie – Westgate 115 kV Ckt 1 or 2	Loss of Eden Prairie – Westgate 115 kV Ckt 2 or 1	62.5%	349.5	-0.3
Loss of Eden Prairie – Westgate 115 kV double circuit	Black Dog – Savage 115 kV line	28%	185.4	-5.4
Loss of Eden Prairie – Westgate 115 kV double circuit	Scott County – Scott county tap 115 kV line	44.1%	185.4	29.4
Loss of Eden Prairie – Westgate 115 kV double circuit	Black Dog – Glendale 115 kV line	30.8%	185.4	57.2
Loss of Eden Prairie – Westgate 115 kV double circuit	Scott County – Minnesota River	95.3%	348	63.5

The Eden Prairie – Westgate double circuit outage would result in overloading the 115 kV line between Black Dog and Scott County and high flows on the 115 kV line from Scott County to Minnesota River.

The overload on Black Dog – Savage 115 kV line is currently being mitigated by upgrading the conductor of the line, and it not considered an overload. Scott County – Scott County tap 115 kV line would exceed its emergency rating after reaching 29 MW. From PV and transfer limit

analyses, it can be concluded that this option would provide an incremental load serving capability of approximately 29 MW.

The overload on Eden Prairie – Westgate 115 kV line could be mitigated by re-rating the line to 361 MVA in the near term, by performing minimal upgrades. The long term plan to relieve the overload on this line is to introduce a new 345 kV source at Scott County substation that is discussed below in Option 1A below.

Option 1A

In addition to the low voltages and overloads caused by the double circuit 115 kV line, shown in Table 3.4 and Figure 3.2. Several studies have indicated that the Eden Prairie transformers are reaching their capacity limit under certain contingencies. To mitigate these problems, a new 345/115 kV source would be needed at Scott County substation in the future. The Helena – Blue Lake 345 kV line could be tapped at Scott County substation, thereby providing a new 345/115 kV source to the area.

This would eliminate the low voltages shown in Figure 3.2 beyond 40MW load growth, and overloads identified in Table 3.4 beyond 29 MW. Figure 3.3 below provides the PV curve with option 1 along with the new 345/115kV source at Scott County substation. It can be noted from the figure that the incremental load serving capability of this option would increase from 40MW to 178MW before the voltage at Westgate drop to 92%.

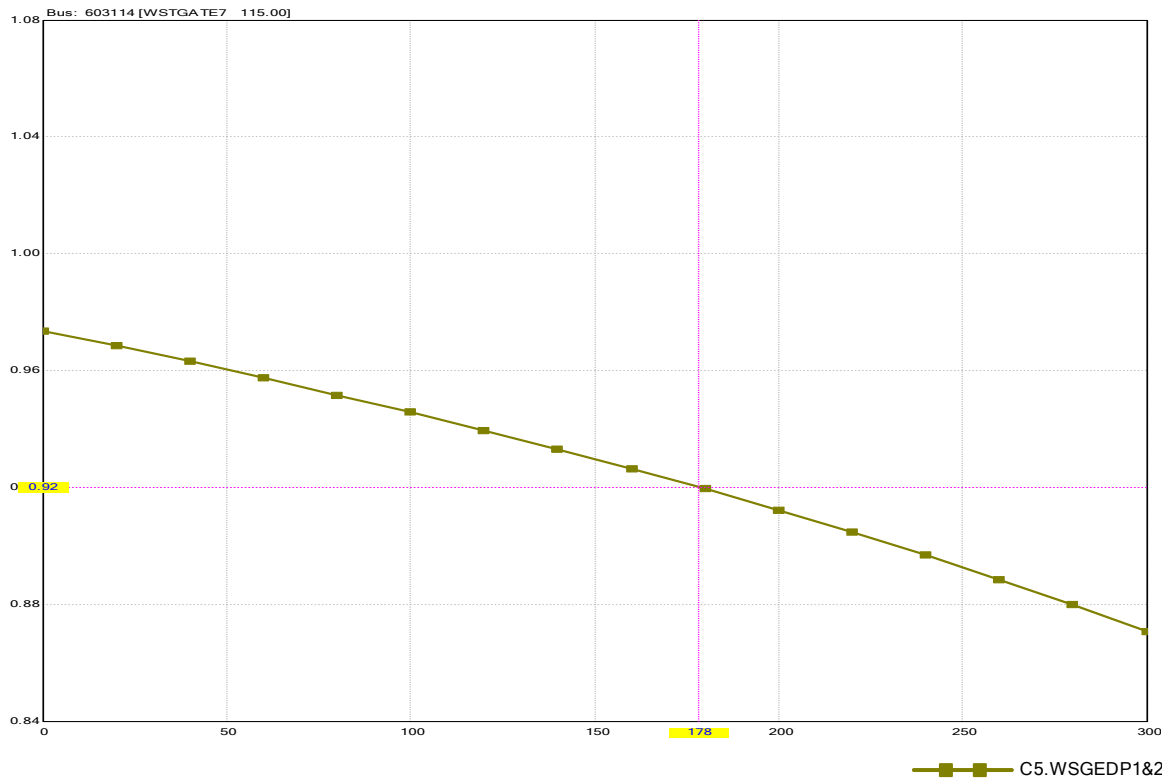


Figure 3.3

Table 3.5 below shows the transfer limit analysis with option 1 along with new 345/115 kV source at Scott County substation. It can be seen from the table that the Westgate transformer and the 69 kV line serving Glen Lake substation would overload without any contingency. These violations could be ignored as the load is uniformly scaled among all the substations listed in Table 3.3. As the load at Glen Lake is radially served from Westgate substation, the facilities serving this substation would overload when the load at the substation exceeds the rating of the transformer and line serving it. Therefore these overloads are not relevant to the current study and would have to be studied separately.

Table 3.5

Contingency	Facility	Normal Rating	Incremental load	DF	Emergency rating	Incremental Load
Base Case	Westgate 115/69 kV transformer	70	78.9 MW	28.82%		
Loss of Eden Prairie – Westgate 115 kV double circuit	Scott County – Minnesota River 115kV line	316	65.5 MW	77.20%	348	89.6 MW
Base Case	Glen Lake – Westgate 69 kV	66	102.4 MW	19.55%		
Loss of Eden Prairie – Westgate 115 kV double circuit	Minnesota River – Chanhassen 115 kV line	316	160.16	59.81%	348	179.3 MW

Ignoring the overload on the facilities serving Glen Lake substation, it can be noticed that the Scott County – Minnesota River – Chanhassen 115 kV line would be the next limiting element after 89.5 MW of load growth in the study area.

Option 1AB

The 115 kV line overloads listed in Table 3.5 are caused by unequal loading on the two 115 kV lines between Scott County and Westgate. The difference in flows on the two lines can be reduced by connecting the Scott County – Excelsior 115 kV line (part of option 1) into Bluff Creek substation and converting Bluff Creek 115 kV bus into ring configuration. This would significantly reduce the flows on Scott County – Minnesota River – Chanhassen – Bluff Creek 115 kV circuit.

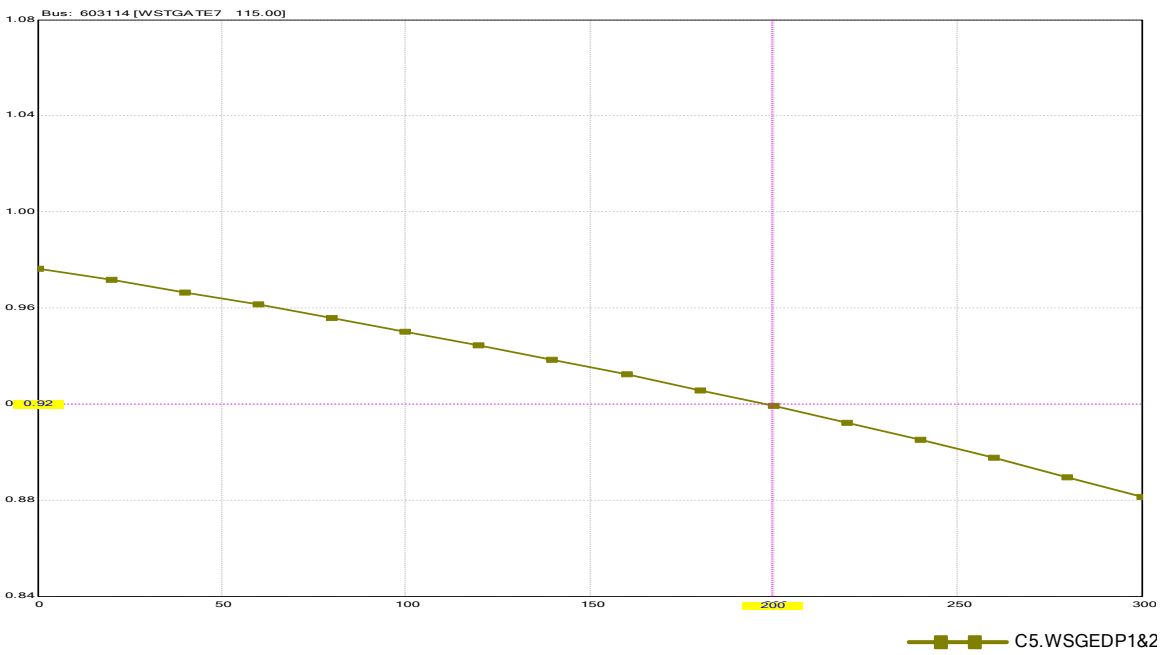


Figure 3.4

Figure 3.4 above provides the PV curve, for the loss of Eden Prairie – Westgate double circuit 115 kV line, with option 1A and the 'in-out' on Scott County – Excelsior 115 kV line into Bluff Creek substation. It can be seen that the incremental load serving capability of the system increases from 178 MW to 200 MW with the expansion of Bluff Creek substation into a ring bus. Table 3.6 below provides the transfer limit analysis to identify all the overloads with this upgrade.

Table 3.6

Contingency	Facility	Normal Rating	Incremental load	DF	Emergency rating	Incremental Load
Base Case	Westgate 115/69 kV transformer	70	78.9	28.8%		
Base Case	Westgate – Glen Lake 69 kV line	66	102.5	19.5%		

Similar to option 1A the overloads on Westgate transformer and the 69 kV line serving Gleason Lake can be ignored as the overloads are on the facilities serving Glen Lake load alone and do not impact the regional 115kV system, these overloads have to be mitigated through a separate study in the future. There were no new overloads identified with 200 MW of load increment, therefore the low voltage at Westgate is considered the limiting deficiency for this option.

Highway7 route for option 1

Based on the information gathered from public meetings, alternatives to existing 69kV line route between Deephaven and Excelsior substations were explored. Due to the existing development in this area, it would be extremely difficult to find new routes for option 1. This section describes the possible alternative routes for proposed option 1.

Option 1C:

One of the suggested alternative routes for option 1 is to continue to follow Highway 7 from Excelsior substation towards East, up to Highway 7 and CR101 intersection. With this route, in order to serve Deephaven substation, approximately 1 mile of double circuit 115 kV line (in-out) from the intersection of Highway 7 and Vine Hill Road to Deephaven substation has to be built. The map for option 1C is shown below in Figure 3.5

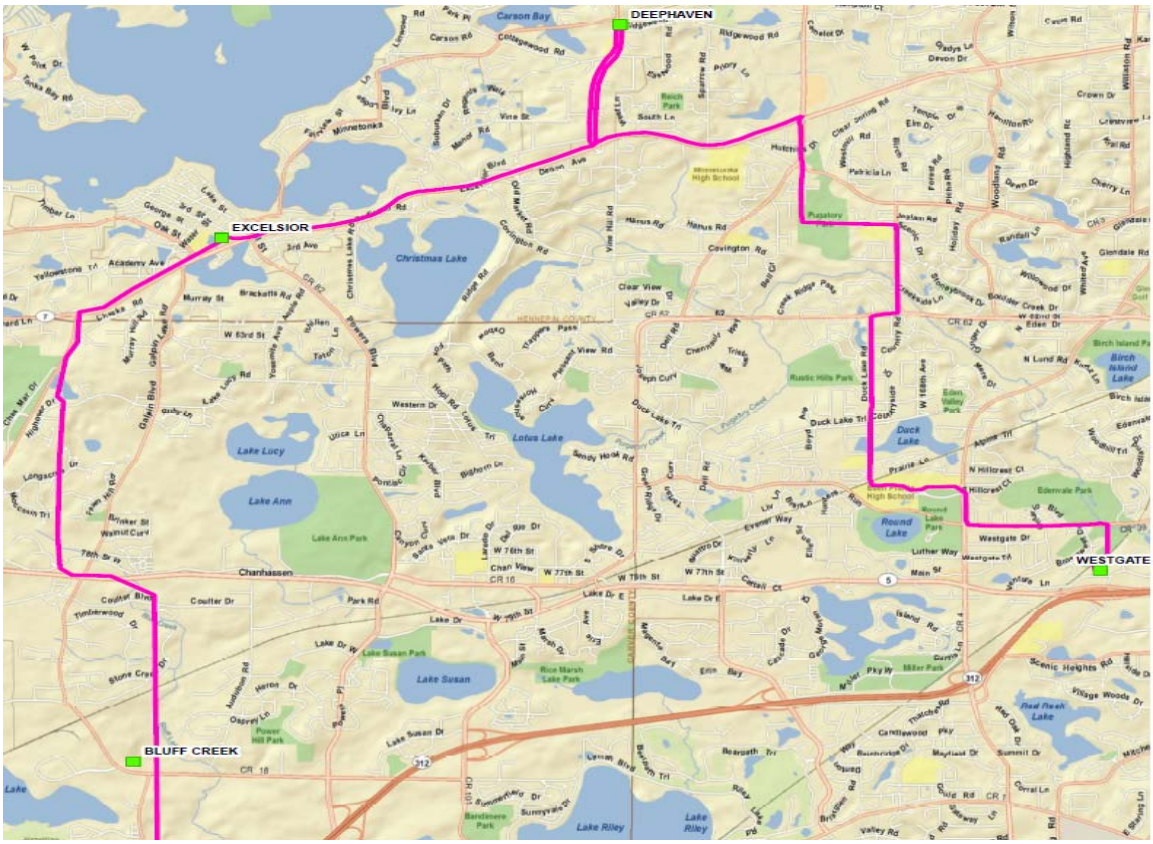


Figure 3.5

Option 1D:

This alternative route to option 1 would involve following HWY7, towards east of Excelsior substation, up to the intersection of HWY7 and Vine Hill Road. From this intersection, a single circuit 115 kV line would have to be built up to Deephaven substation. From Deephaven substation towards East, the existing 69 kV line towards Westgate could be followed. The map for option 1D is shown below in Figure 3.6.

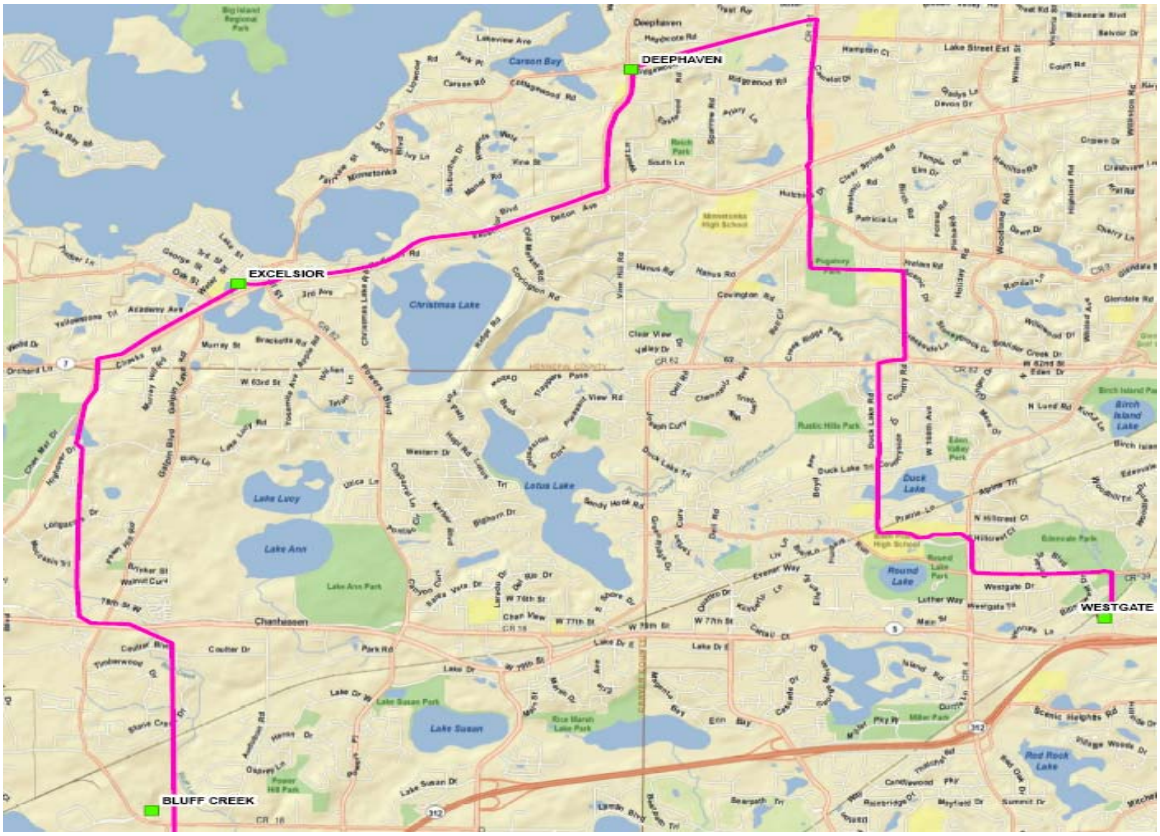


Figure 3.6

For transmission planning purposes, the performance of options 1C and 1D would be similar to option 1 and does not significantly impact the results shown in Tables 3.4 through 3.6 and Figures 3.2 through 3.4.

Option 2

The alternative to converting the existing Scott County – Excelsior – Deephaven – Westgate 69 kV line to 115 kV is to upgrade all the facilities that overload, to a higher capacity. Based on Table 3.2, this option would involve the following initial upgrades:

- Upgrade Westgate 115/69 kV transformer to higher capacity (70 or 112 MVA)
- Upgrade the double circuit 115 kV line from Scott County – Minnesota River to 2-795 ACSS conductor.

Table 3.7 and Figure 3.7 below show the thermal and voltage performance of the system after the initial upgrades listed above.

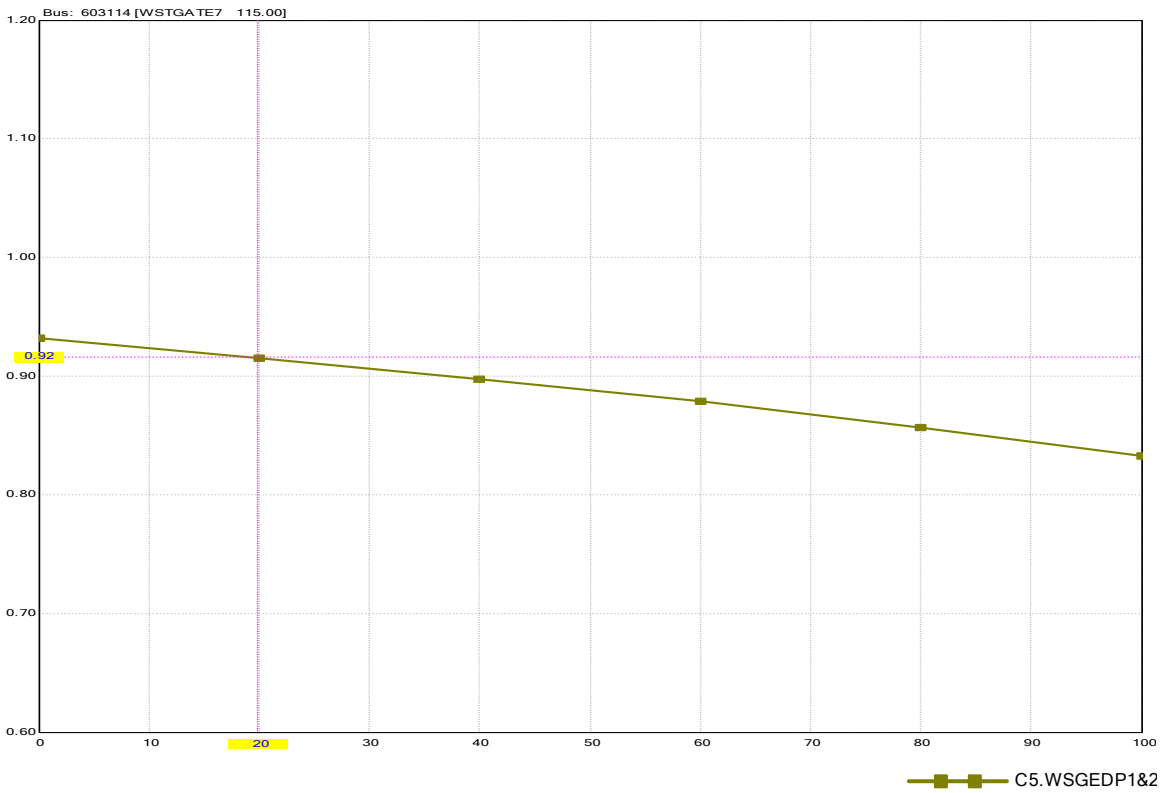


Figure 3.7

Table 3.7

Contingency	Facility	Normal Rating	Incremental load	DF	Emergency rating	Incremental Load
Loss of Eden Prairie – Westgate 1 or 2	Eden Prairie – Westgate 2 or 1	318		60.2	349.5	13.3
Westgate – Eden Prairie 115 kV double ckt outage	Minnesota River – Chanhassen 115kV line	316		94.9	348	0.8
Westgate – Eden Prairie 115 kV double ckt outage	Bluff Creek – Chanhassen 115kV line	316		86.72	348	11.5
Loss of Excelsior – Scott County 69 kV	Westgate – Deephaven 69 kV line			19.8	65	29.5
Westgate – Eden Prairie 115 kV double ckt outage	Scott tap – Scott County 115 kV line	168.5		45.67	184.4	30.9

It can be seen from the Table 3.7 and Figure 3.7 that the incremental load growth attained by rebuilding the existing 115 kV line from Scott County to Minnesota River and upgrading the Westgate transformer is less than 1 MW due to the overload on Minnesota River – Chanhassen – Bluff Creek 115 kV line. Mitigating Westgate – Eden Prairie line overload in

Table 3.7 by upgrading the line to higher capacity is not considered viable solution as the outage of this double circuit is still a critical contingency. The mitigation plan for this overload is to provide a new 345 kV source at Scott County substation, which is discussed in option 2AB.

Option 2A

In order to mitigate the overloads shown in Table 3.7, the Minnesota River to Bluff Creek 115 kV line has to be upgraded to 2-795 ACSS conductor. It should be noted that this line is double circuited with the Scott County – Excelsior 69 kV line, therefore the entire double circuit may need to be re-built in order to attain higher capacity on Scott County – Bluff Creek 115 kV line. Table 3.8 and Figure 3.8 below provide the incremental load serving capability with the upgrade of 115 kV line from Minnesota River to Bluff Creek to 2-795 ACSS.

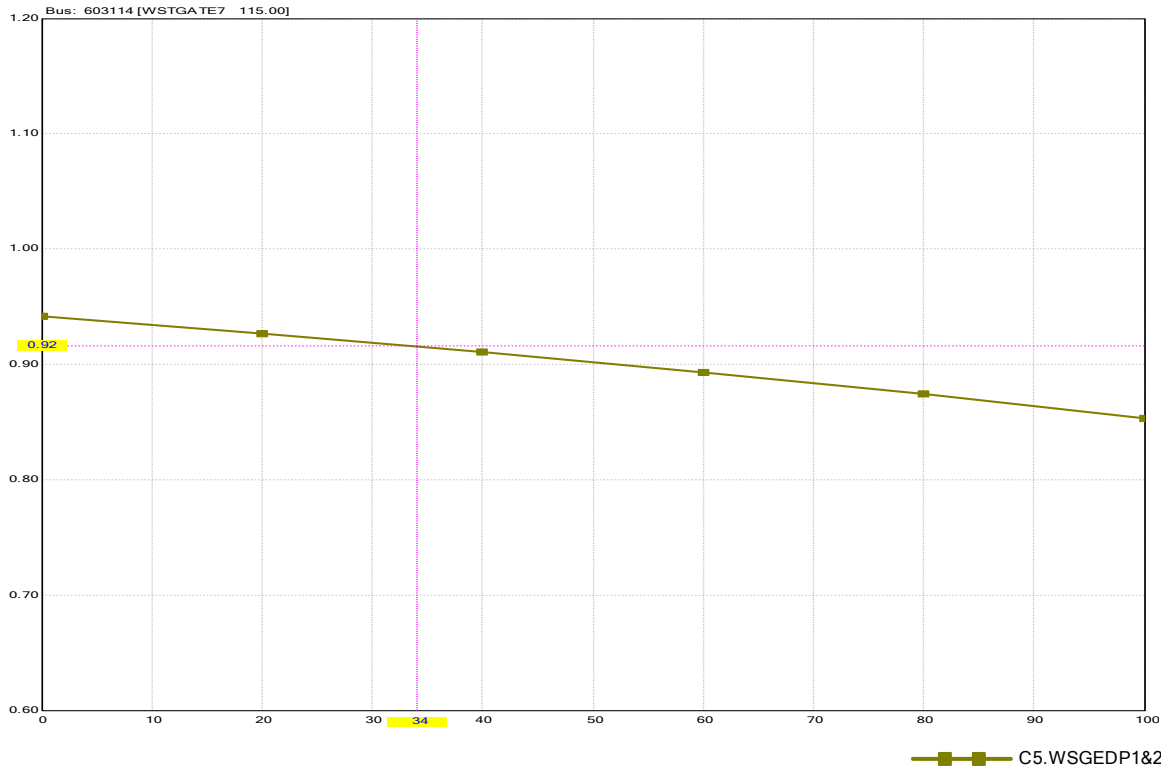


Figure 3.8

Table 3.8

Contingency	Facility	DF	Emergency rating	Incremental Load
Loss of Eden Prairie – Westgate 1 or 2	Eden Prairie – Westgate 2 or 1	60.0	349.5	13.7
Scott County – Excelsior 69 kV line	Westgate – Deephaven 69 kV line	19.8	65	29.4
Westgate – Eden Prairie 115kV double ckt outage	Scott County – Scott County tap	44.24	185.4	33.7
Westgate – Eden Prairie 115kV double ckt outage	Excelsior – Scott County 69kV line	24.14	74.3	52.3

Option 2AB

Based on Table 3.8 and Figure 3.8, the incremental load growth of option 2A is approximately 30 to 34 MW due to overload on Westgate – Deephaven, Scott County – Excelsior 69 kV line and low voltages at Westgate. To mitigate the limitations listed for option 2A, similar to option 1A, a new 345/115 kV source has to be built at Scott County substation. In addition, Westgate – Deephaven 69 kV line has to be upgraded to higher capacity. This would eliminate the low voltages at Westgate, the overload on Scott County – Scott County tap 115 kV line and the overload on Westgate – Eden Prairie 115 kV circuits. Table 3.9 and Figure 3.9 provide the incremental load growth provided by the addition of 345 kV source along with upgrading the 69 kV line between Westgate and Deephaven substation.

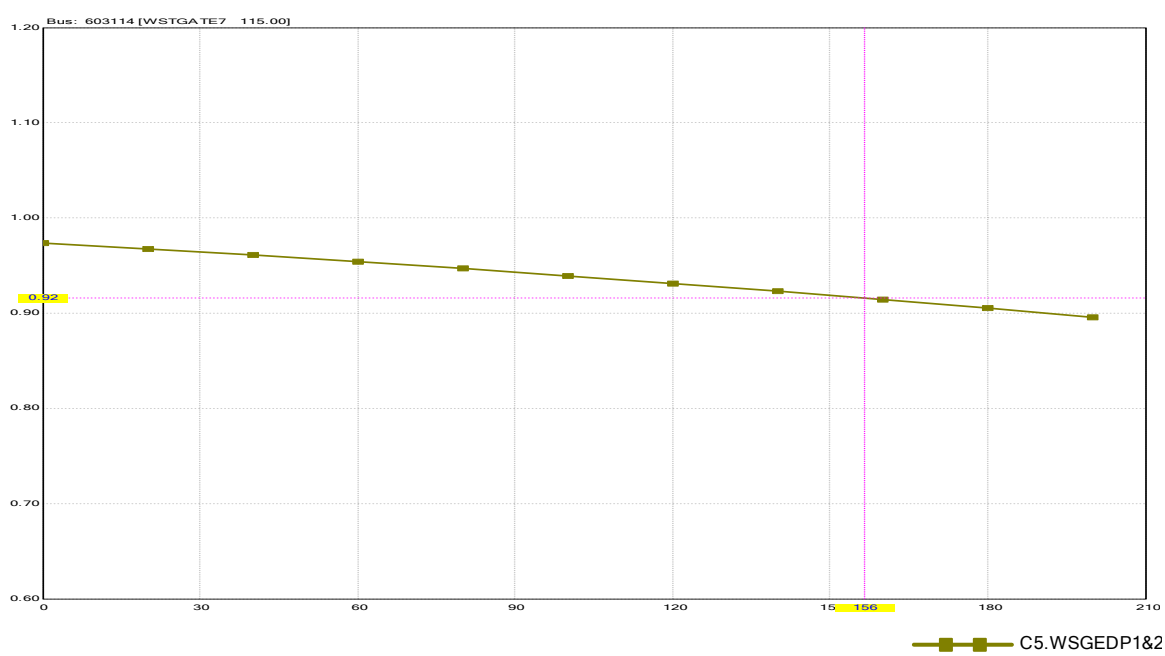


Figure 3.9

Table 3.9

Contingency	Facility	Normal Rating	Incremental load	DF	Emergency rating	Incremental Load
Scott County 115/69 kV transformer 2	Scott County 115/69 kV transformer 1	70		7.89	80.5	-98.1
Scott County 115/69 kV transformer 1	Scott County 115/69 kV transformer 2	70		7.83	80.5	-90.0
Loss of Westgate – Deephaven 69 kV line or Westgate 115/69 kV transformer	Excelsior – Scott County 69 kV line			20.68	74.8	64.5
Base Case	Westgate 115/69 kV transformer	70	78.9	28.8		
Base Case	Westgate – Glen Lake 69 kV line	66	103.2	19.5		

From Tables 3.9 and Figure 3.9 it can be seen that the incremental load serving capability of this plan is approximately 64.5 MW due to overload on Excelsior – Scott county 69 kV line. It should also be noted that the Scott County 115/69 kV transformers have to be upgraded to higher capacity (112 MVA) in order to install 345/115 kV source at Scott County. The overload on Westgate transformer, serving Glen Lake substation, and the Westgate – Glen Lake 69kV line are ignored as this is due to the load at Glen Lake alone and has to be addressed separately.

Option 2ABC

This option includes option 1AB and upgrade of Scott County – Excelsior 69kV line and Scott County 115/69 kV transformers. This would eliminate all the overloads listed in Table 3.9. The PV curve and transfer limit analysis for this option are provided below in Figure 3.10 and Table 3.10.

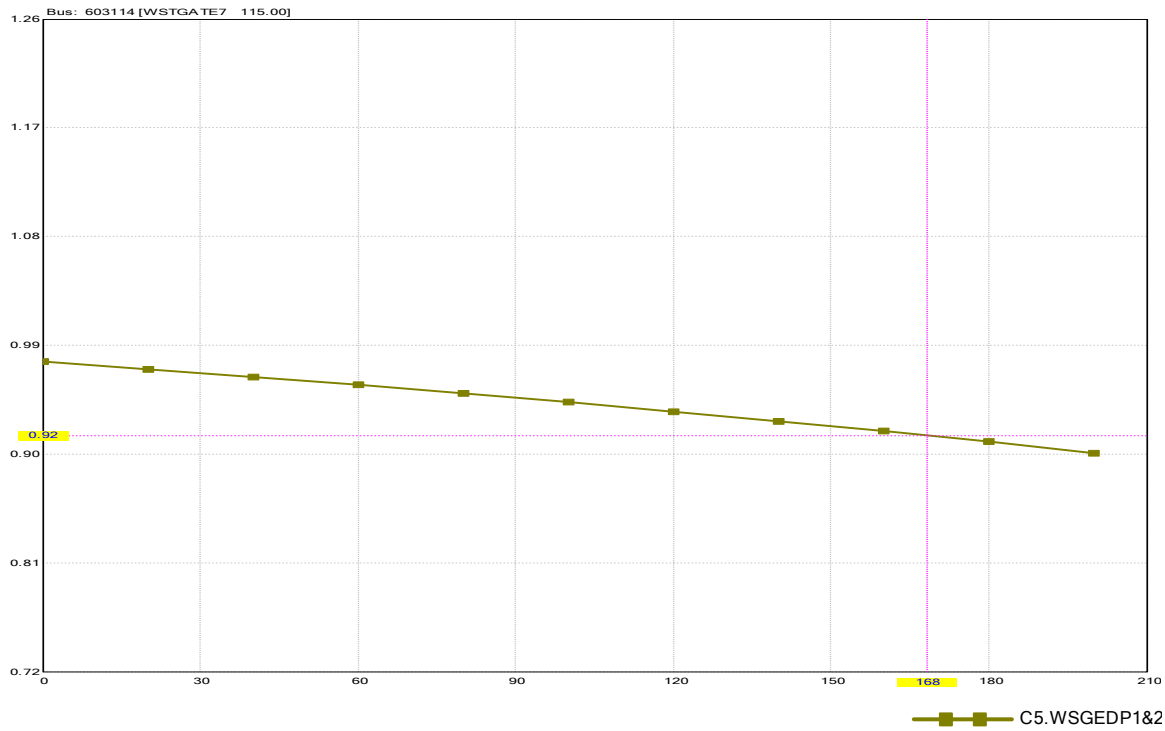


Figure 3.10

Table 3.10

Contingency	Facility	Normal Rating	Incremental load	DF
Base Case	Westgate 115/69 kV transformer	70	78.9	28.8
Base Case	Westgate – Glen Lake 69 kV line	66	103.2	19.5

From figure 3.10 and Table 3.10 it can be noted that the maximum incremental load serving capability of this option is 168 MW.

3.3 Summary of performance of 115 and 69 kV options

Table 3.11 below provides the summary of results comparing the 115kV and 69kV options to mitigate the deficiencies identified in the study area. It can be seen that the 115kV options has significantly more load serving capability compared to the 69 kV alternatives.

Table 3.11

Option	Limiting contingency	Incremental Load serving capability
Option 1: Convert Westgate – Deephaven – Excelsior – Scott County to 115 kV along with Excelsior and Deephaven substations	Loss of Eden Prairie – Westgate double circuit line resulting in overload on Scott County – Scott County tap line	~29 MW
Option 1A: Option 1 + new 345 kV source at Scott County substation	Loss of Eden Prairie – Westgate double circuit line resulting in overload on Scott County – Minnesota River 115 kV line	~90 MW
Option 1AB: Option 1A + Scott County – Excelsior 115kV line 'in-out' into Bluff Creek	Loss of Eden Prairie – Westgate 115 kV double circuit resulting in overload on Scott County – Minnesota River 115 kV line.	200 MW
Option 2: Upgrade Westgate 115/69 kV transformer and Scott County – Minnesota River 115 kV line to 2-795 ACSS	Overload on Minnesota River – Chanhassen – Bluff Creek 115 kV line	<1 MW
Option 2A: Option 2 + Upgrade Minnesota River – Chanhassen – Bluff Creek 115 kV line to 2-795 ACSS conductor.	Low voltages at Westgate and overload on Scott County – Scott tap for the loss of Eden Prairie – Westgate double circuit outage. Overload on Westgate – Deephaven 69 kV line for the loss of Scott County – Excelsior 69 kV line.	~30 MW
Option 2AB: Option 2A + Introduce new 345/115 kV source into Scott County substation, upgrade Scott County 115/69 kV transformers to 112 MVA and rebuild Westgate – Deephaven 69 kV line to higher capacity.	Overload on Scott County – Excelsior 69 kV line for the loss of Westgate transformer or Westgate – Deephaven 69 kV line.	64.5 MW
Option 2ABC: Option 2AB + upgrade Scott County – Excelsior 69 kV line to higher capacity.	Limited by voltages at Westgate substation for the loss of Eden Prairie – Westgate double circuit 115 kV line.	168 MW

3.3 Other consideration

Since the low voltages at Westgate caused by the loss of Westgate – Eden Prairie double circuit is the limiting contingency, further load growth beyond option 1AB or 2ABC can be achieved by converting the Bluff Creek – Westgate 115 kV circuit to a bifurcated line. Currently this is a double circuit line with one of the two circuits energized. Converting this double circuit 115 kV circuit to a bifurcated line significantly reduces the impedance of the line, there by improving the voltage at Westgate. Since this could be done in conjunction with Option 1AB or 2ABC, it would impact both the options equally. Therefore no further analysis was performed to determine the additional incremental load growth.

3.4 Economic analysis

The total load at Glen Lake, Westgate, Excelsior, Deephaven, Bluff Creek, Minnesota River and Chanhassen substations is approximately 418MW in the 2016 models. Assuming a 1% load growth there after, the following table provides the required upgrades by year, along with a high level indicative cost, net present value, and the $/MW of incremental load growth for each of the options.

Table 3.12

Facility	Cost in Million $	year
Option 1AB		
Scott County Line termination	1.47	2014
Westgate line termination	1.26	2014
Deephaven substation conversion	6.34	2014
Excelsior substation conversion	4.39	2014
Westgate – Deephaven conversion	5.70	2014
Deephaven – Excelsior conversion	2.77	2014
Excelsior – Bluff Creek Conversion	4.12	2014
Scott County 345/115 kV addition	21.7	2023
Bluff Creek in-out (ring bus)[1]	-	2054
Total	**47.75**	
NPV in 2010 dollars	**37**	
NPV Cost in million $/MW of incremental growth, assuming 200 MW of capability (total incremental load growth/NPV)	**0.185**	
Option 2ABC		
Westgate transformer upgrade	2.03	2014
Scott County – Bluff Creek line upgrade	13.0	2014
Scott County transformer upgrade	4.16	2023
Westgate – Deephaven line upgrade	2.7	2023
Scott County 345/115 kV addition	21.7	2023
Scott County – Excelsior line upgrade	1.5	2030
Total	**45.1**	
NPV in 2010 dollars	**30**	
NPV Cost in million $/MW of incremental growth, assuming 150 MW of capability (total incremental load growth/NPV)	**0.18**	

Based on Tables 3.12 and 3.11, it can be concluded that option 1AB can provide 200 MW of load serving capability in the long term at approximately 0.185 million $/MW of incremental load growth as opposed to 168 MW of serving capability in the long term at the same cost per MW of incremental load growth for the 69 kV alternative. Since the difference in cost per MW of incremental load is less than 3%, the two alternatives are considered comparable.

[1] The cost of Bluff Creek Ring bus was not included as it is projected to be needed beyond 40 years.

In the current study the utility of the Scott County 345/115 kV transformers is limited to improving the voltage at Westgate, however there are additional benefits of installing the new bulk source. For instance, several studies have indicated that Eden Prairie 345/115 kV transformers are reaching their capacity and need to be upgraded. The addition of Scott County transformers significantly reduces the load on the Eden Prairie transformers, similarly the overload on Eden Prairie – Westgate 115 kV double circuit would be significantly reduced with the addition of this bulk electric source at Scott County. Due to these reasons, the years indicated in Table 3.12 are not indicative of the actual need of Scott County 345/115 kV transformers, depending on the generation and load growth, these transformers may be needed sooner than 2023.

3.5 Loss analysis

Tables 3.13 and 3.14 below provide the losses for Base case, Option1 and Option 2A. The losses in Table 3.13 are based on total losses in NSP and GRE control areas. The losses in Table 3.14 are based on individual branch loading between Scott County and Westgate substations.

Table 3.13

	Base Case	**Option 1**	**Option 2A**
NSP	295.5	294.2	295.5
GRE	85.7	85.7	85.7
Total	381.2	379.9	381.1

Table 3.14

	Base Case	**Option 1**	**Option 2A**
Westgate – Deephaven	0.65	0.25	0.91
Deephaven – Excelsior	0.03	0.01	0.02
Excelsior – Scott Co	0.21	0.00	0.11
Scott Co – MN River	0.04	0.06	0.02
MN River – Chanhassen	0.00	0.00	0.00
Chanhassen – Bluff Creek	0.00	0.00	0.00
Bluff Creek –Westgate	0.52	0.43	0.46
Westgate 115/69 kV TR	0.11	-	0.08
Total	**1.56**	**0.75**	**1.6**

From Table 3.13 and 3.14 it can be noticed that the losses do not change significantly due to either options, therefore no further analysis was performed to identify the economic benefit of loss reduction.

4. Conclusion

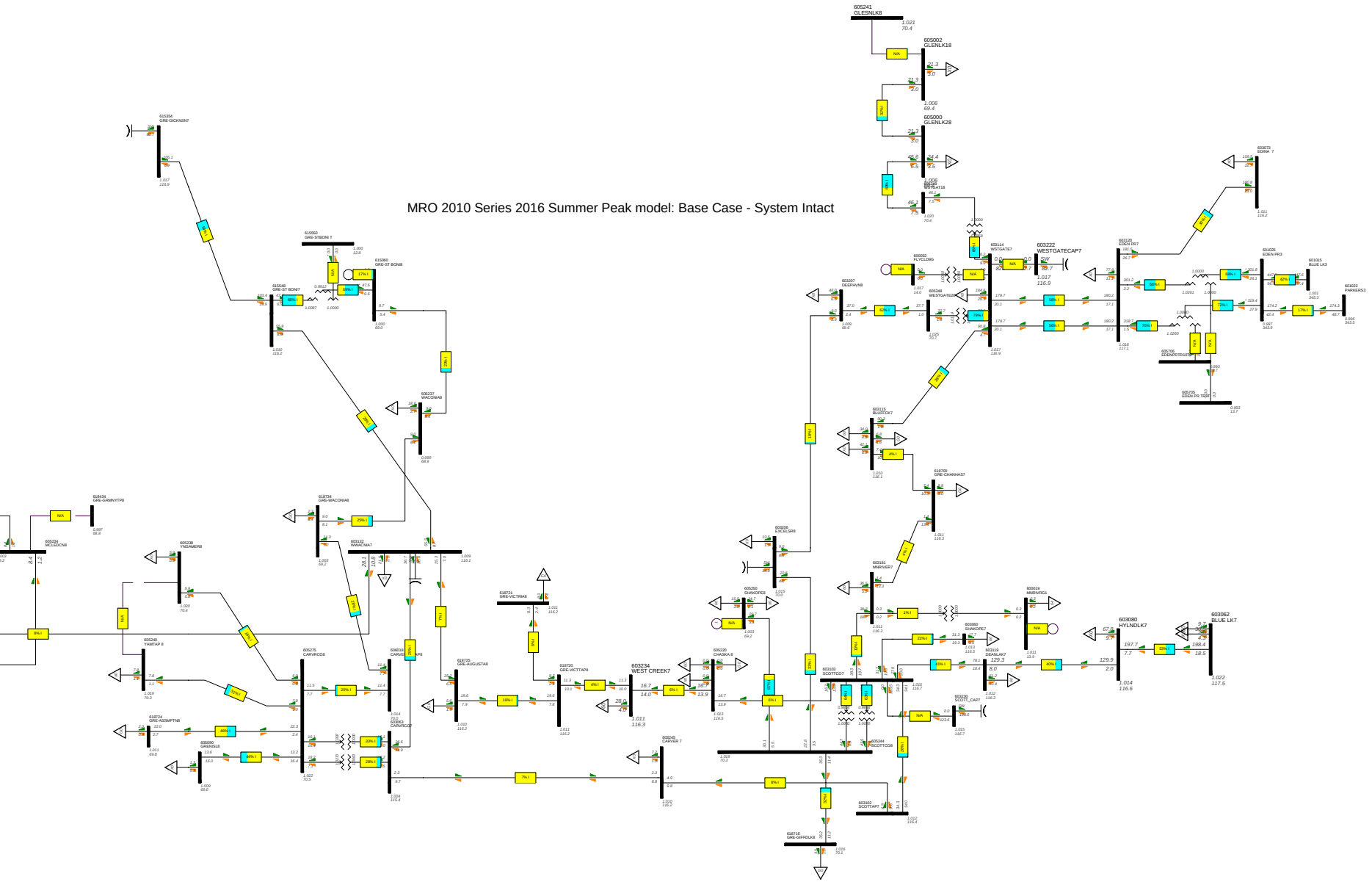
The recommended near term plan to mitigate the load serving problems in the study region is option 1, that is to convert the existing 69 kV line between Scott County – Excelsior – Deephaven – Westgate substation to 115 kV along with Excelsior and Deephaven substations.

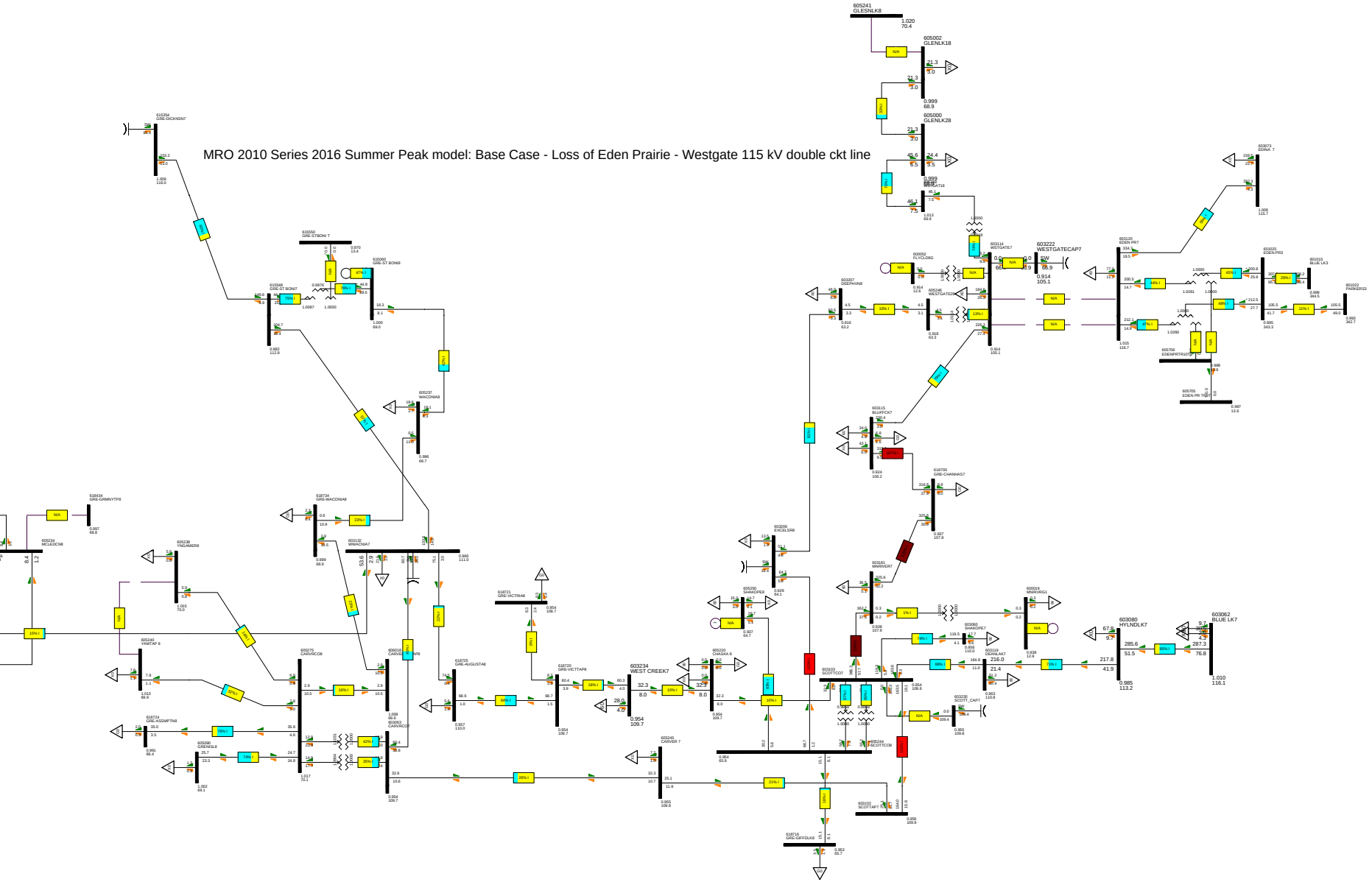
As the load grows in the study area, this option would provide better load serving benefit to the area, compared to the 69 kV alternative, by offering better voltage support during the loss of Eden Prairie – Westgate double circuit outage.

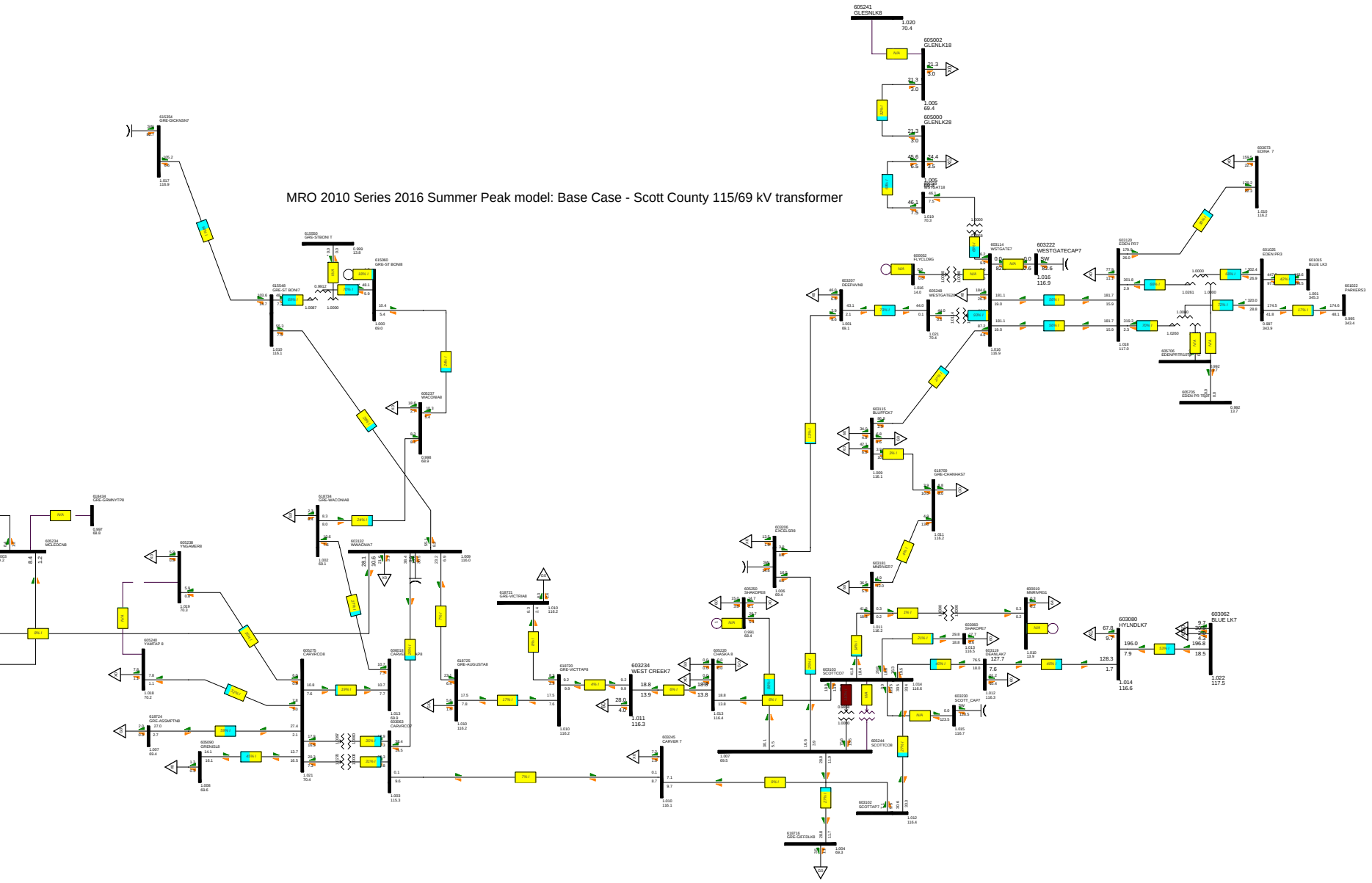
The 115 kV options provide an inherent advantage for future expansion of transmission system in the area, as the major sources to the study area are primarily 345/115 kV substations. The 69 kV option creates an isolated 69 kV transmission system between Scott County and Westgate, this would create future challenges for transmission expansion, if the area experiences high load growth.

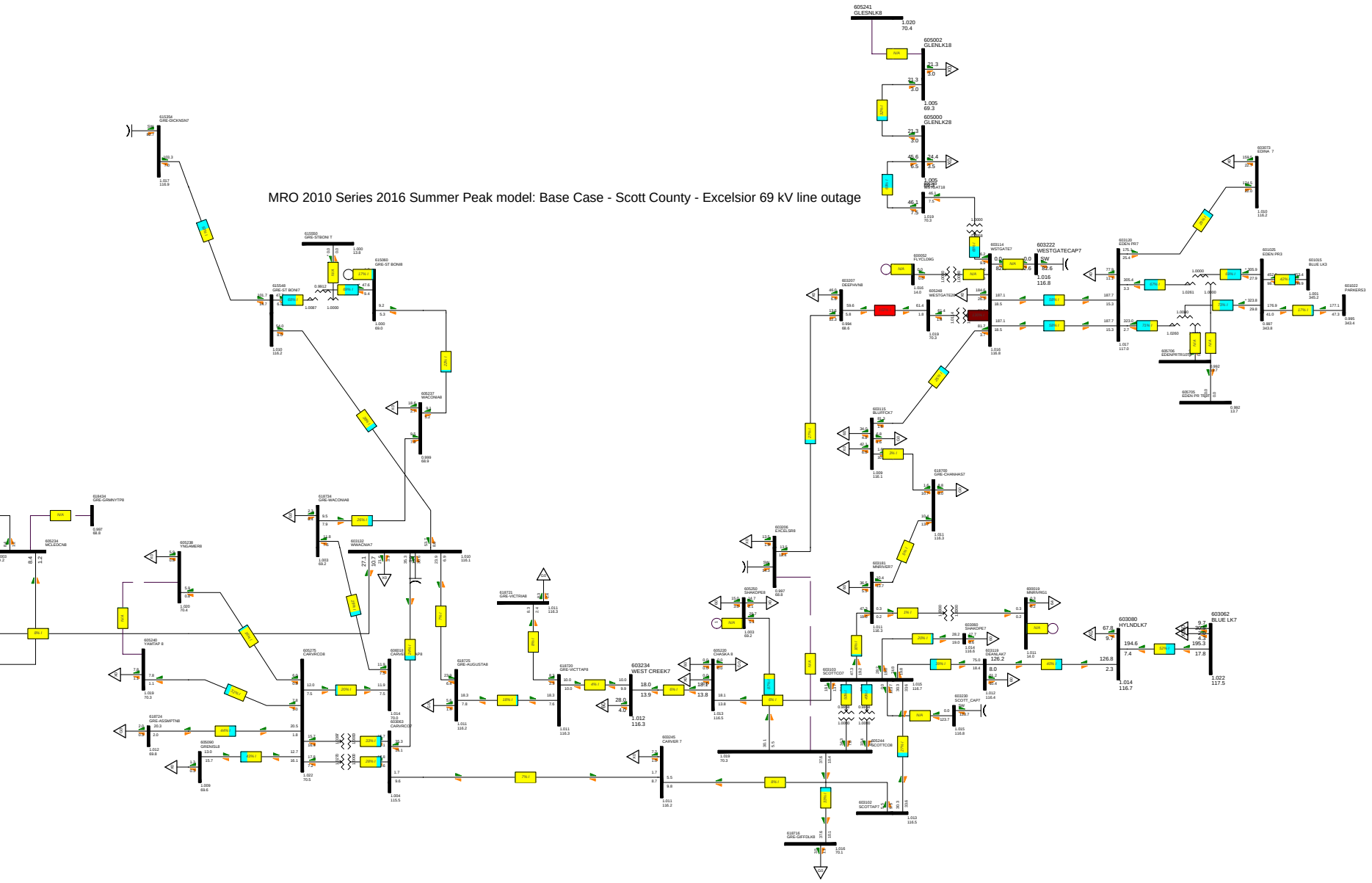
Appendix A

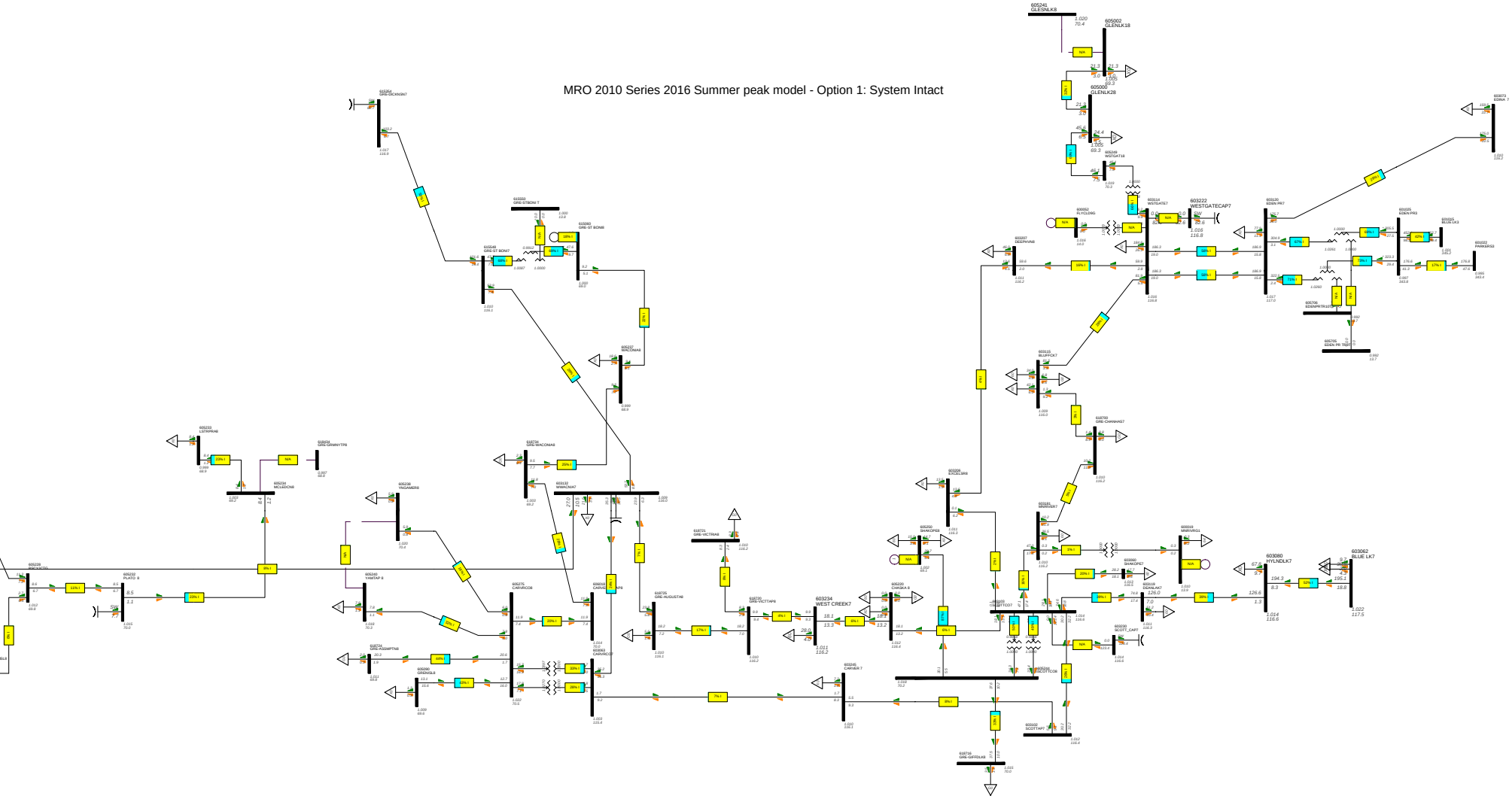
Powerflow Maps

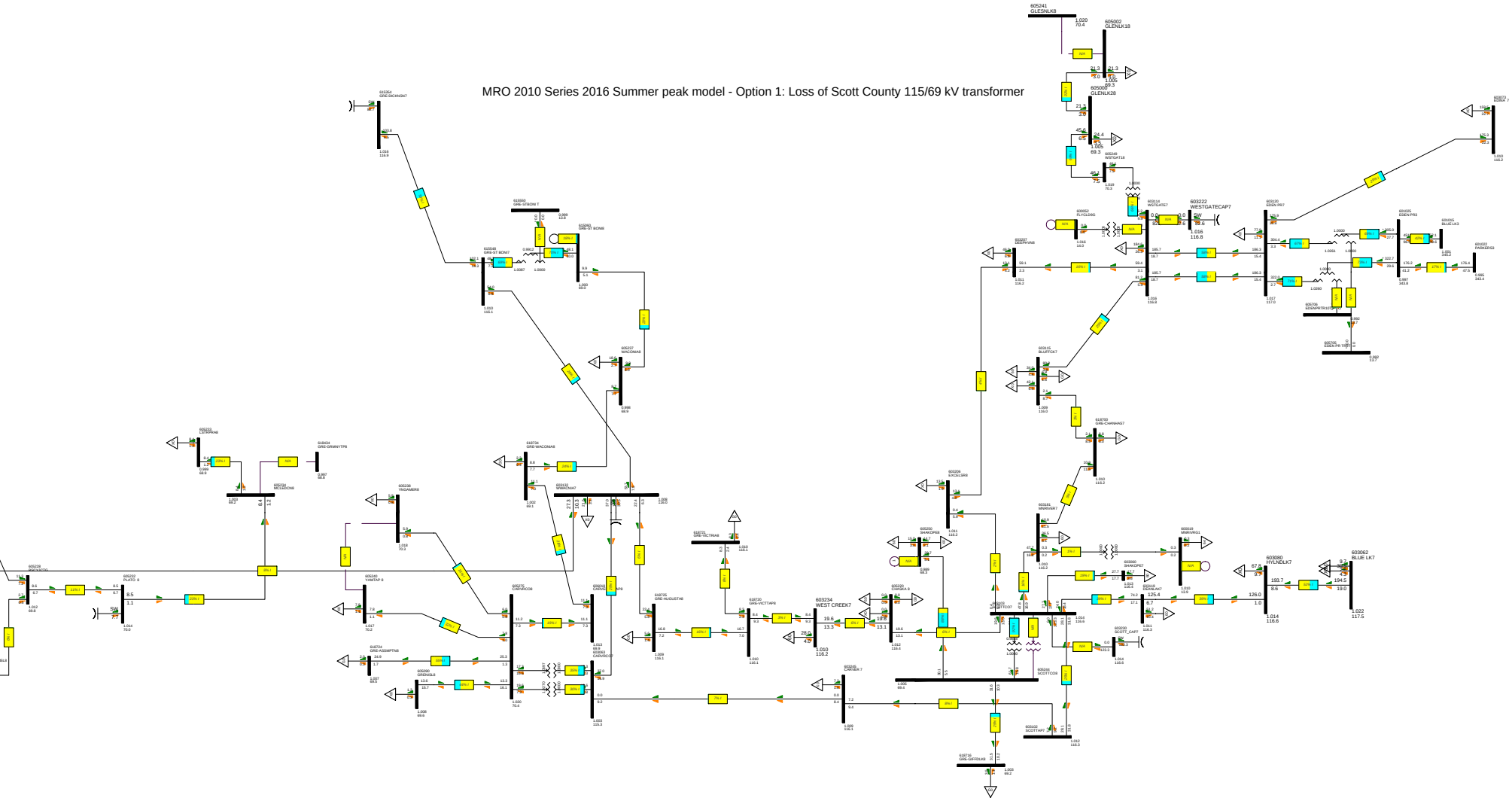

MRO 2010 Series 2016 Summer Peak model: Base Case - System Intact
605241 GLESNLK8
605002 GLENLK18
605000 GLENLK28
603222 WESTGATECAP7
603234 WEST CREEK7
603080 HYLNDLK7
603062 BLUE LK7

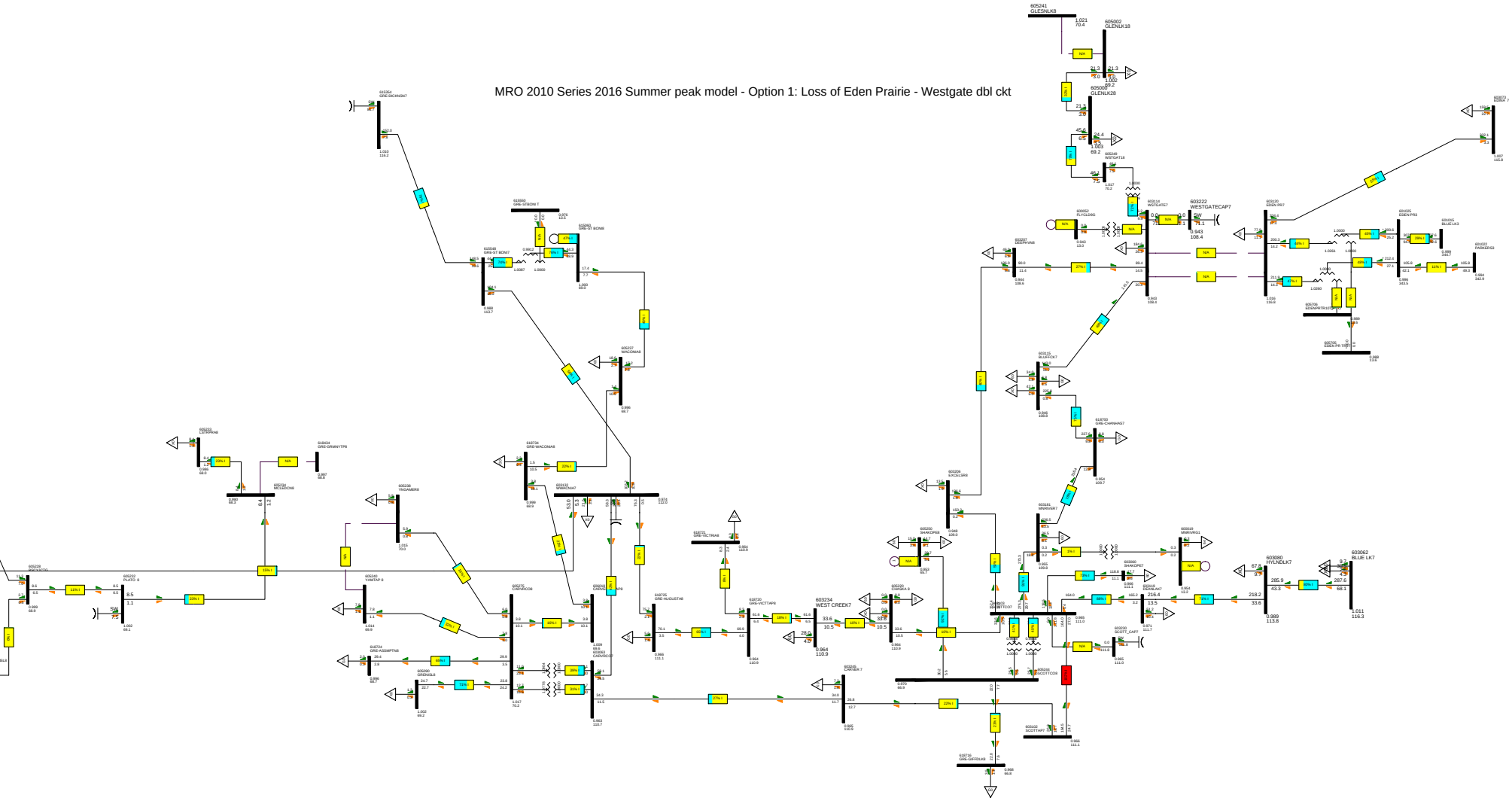

MRO 2010 Series 2016 Summer Peak model: Base Case - Loss of Eden Prairie - Westgate 115 kV double ckt line

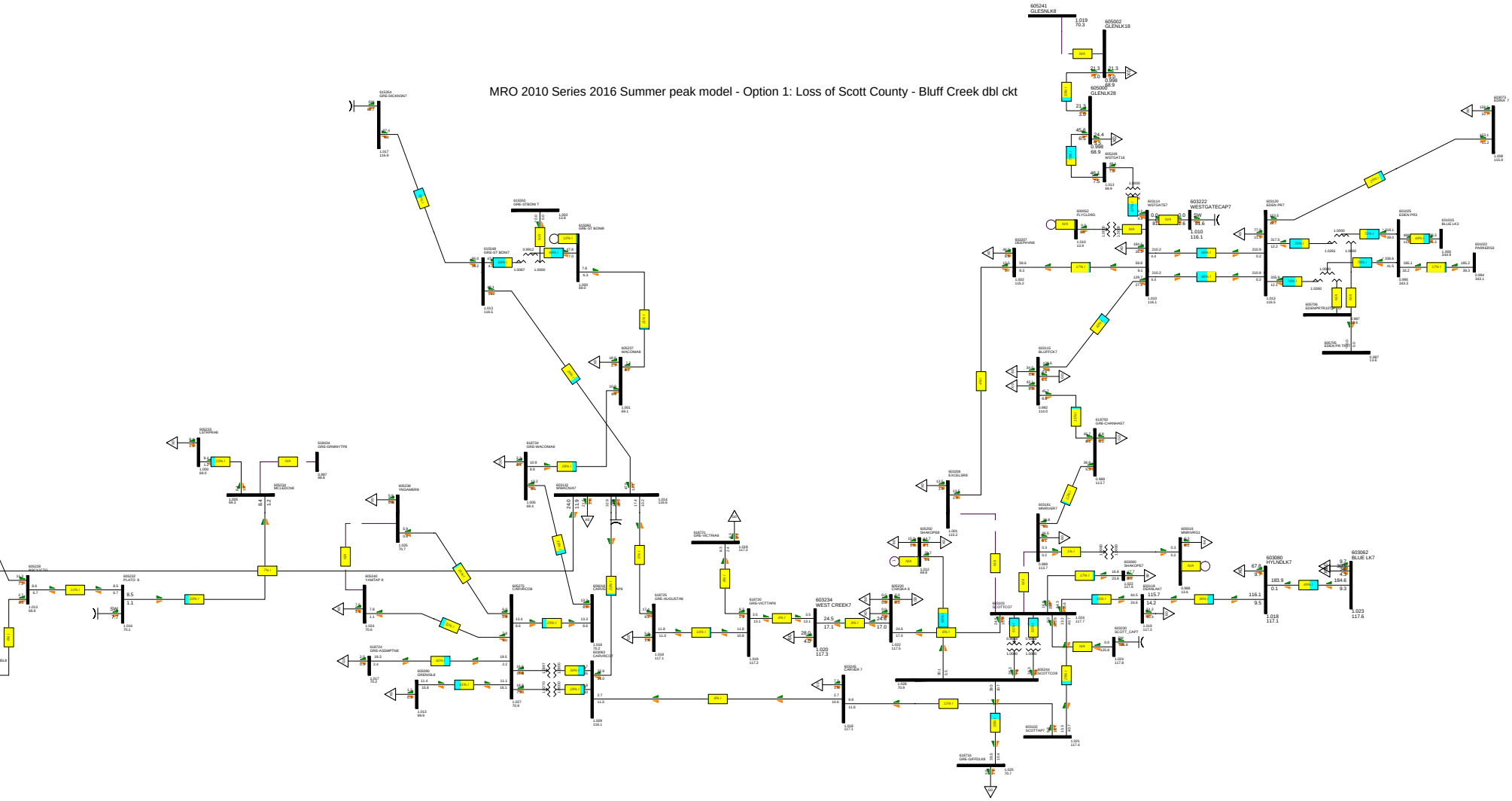

MRO 2010 Series 2016 Summer Peak model: Base Case - Scott County 115/69 kV transformer

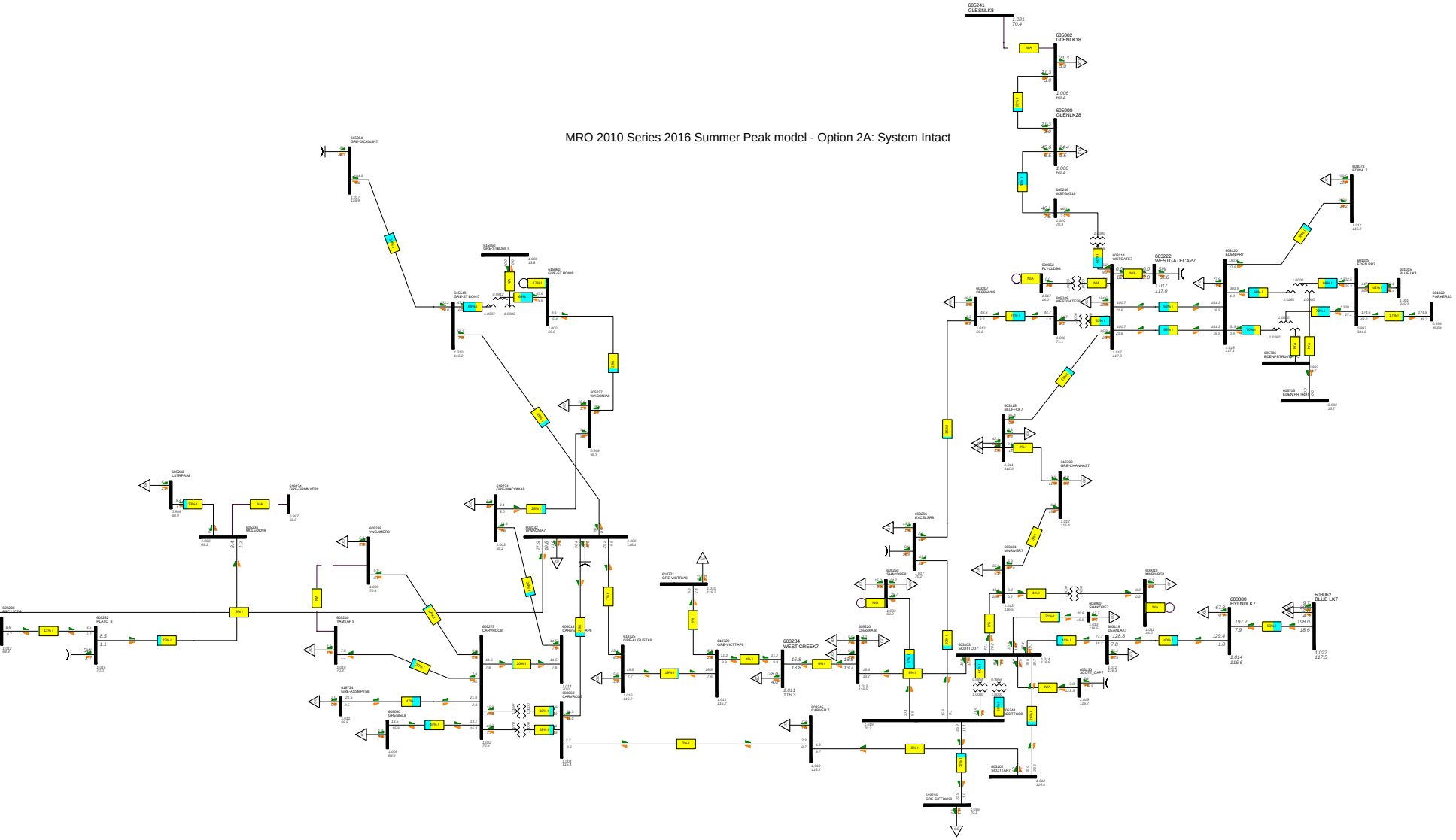

MRO 2010 Series 2016 Summer Peak model: Base Case - Scott County - Excelsior 69 kV line outage

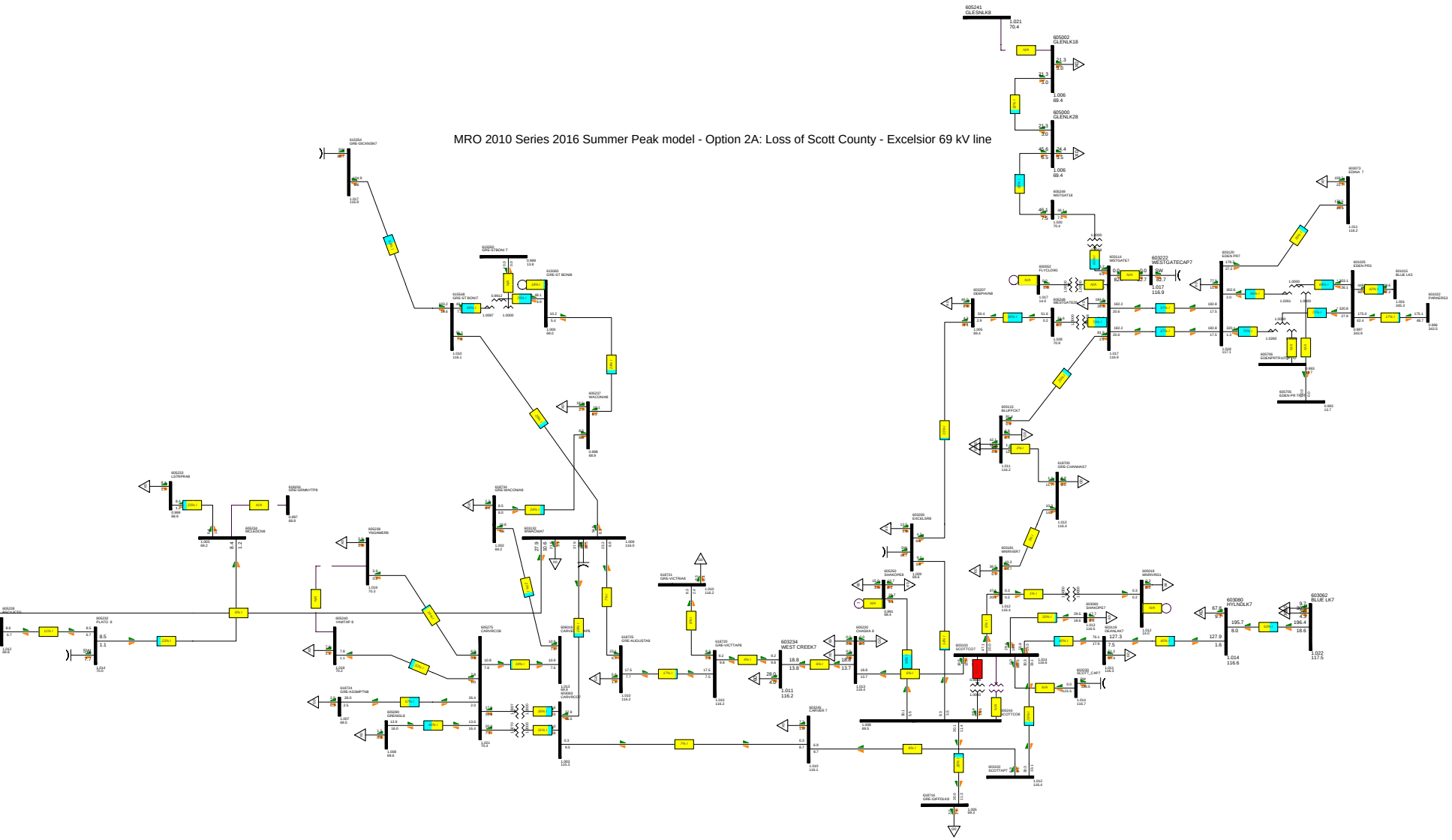

MRO 2010 Series 2016 Summer peak model - Option 1: System Intact

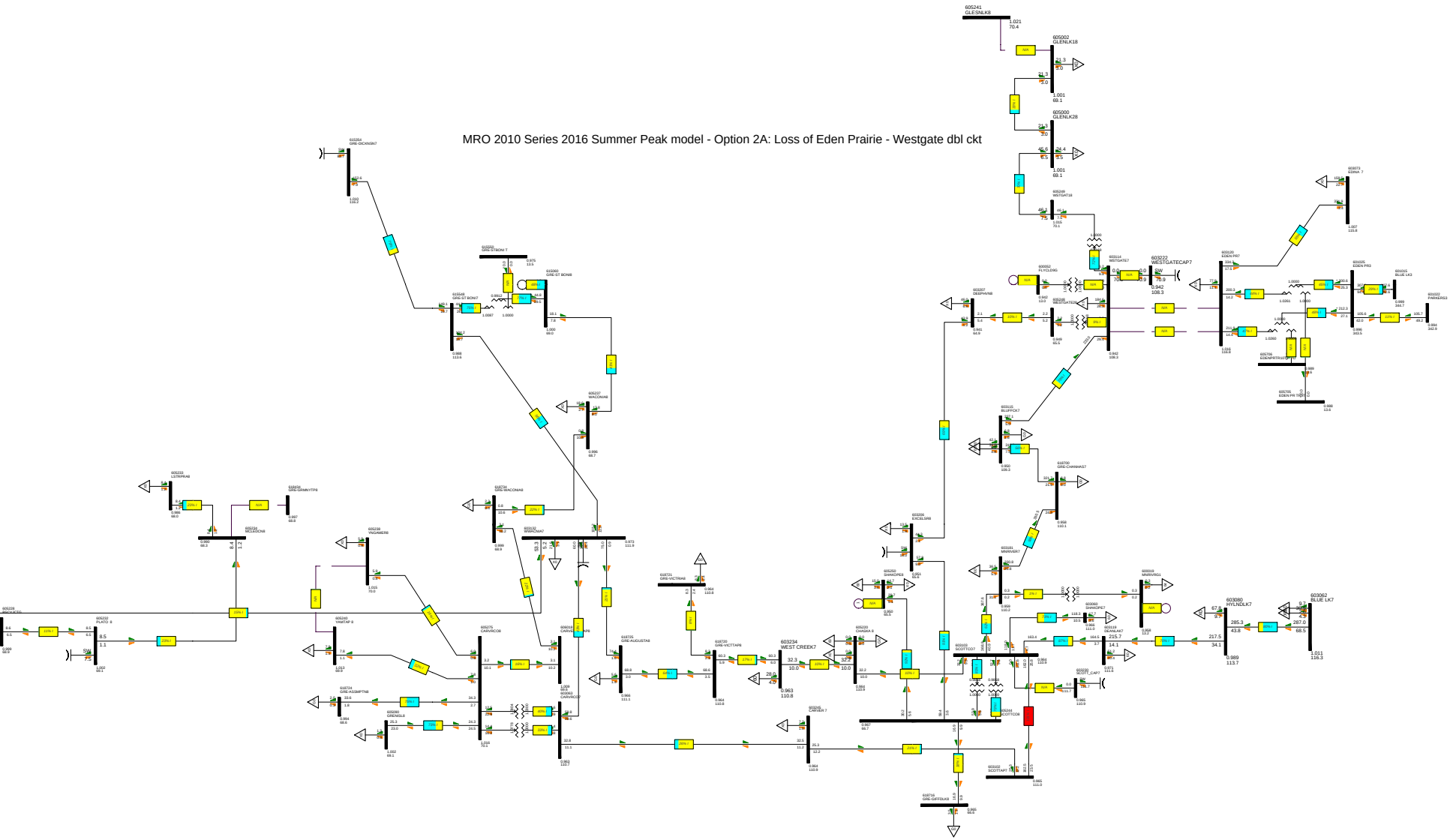

MRO 2010 Series 2016 Summer peak model - Option 1: Loss of Scott County 115/69 kV transformer
605241
GLESNLK8
605002
GLENLK18
605006
GLENLK28
603222
WESTGATECAP7
603234
WEST CREEK7
603080
HYLNDLK7
603062
BLUE LK7

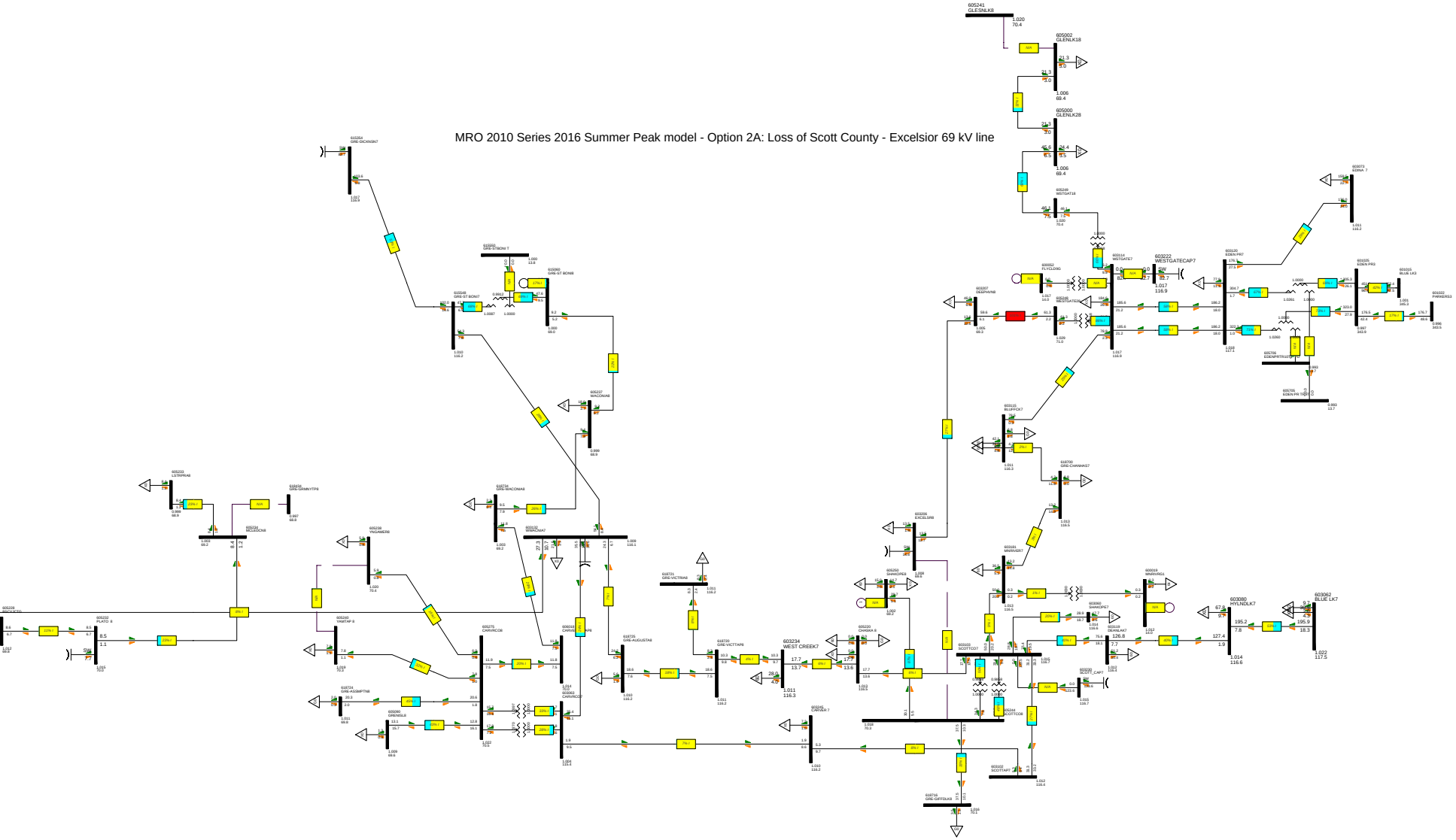

MRO 2010 Series 2016 Summer peak model - Option 1: Loss of Eden Prairie - Westgate dbl ckt
605241 GLESNLK8
605002 GLENLK18
605006 GLENLK28
605268 WSTGAT18
603314 WSTGATE7
603222 WESTGATECAP7
603234 WEST CREEK7
603080 HYLNDLK7
603062 BLUE LK7


MRO 2010 Series 2016 Summer peak model - Option 1: Loss of Scott County - Bluff Creek dbl ckt
605241 GLESNLK8
605002 GLENLK18
605008 GLENLK28
603222 WESTGATECAP7
603080 HYLNDLK7
603062 BLUE LK7
603234 WEST CREEK7


MRO 2010 Series 2016 Summer Peak model - Option 2A: System Intact


MRO 2010 Series 2016 Summer Peak model - Option 2A: Loss of Scott County - Excelsior 69 kV line


MRO 2010 Series 2016 Summer Peak model - Option 2A: Loss of Eden Prairie - Westgate dbl ckt


MRO 2010 Series 2016 Summer Peak model - Option 2A: Loss of Scott County - Excelsior 69 kV line

Appendix B

NPV analysis sheets

Title: Option 1AB

Cost of Capital	8.81%	Starting year for study	2010	
Revenue Require Rate	12.66%	Investments/Expenses	2010	
Investment Escalation	1.50%	Ending Year	2045	35
Expense Escalation	1.50%	*The 35 year totals below were calculated using the rates above.		

Year	Cumulative Present Worth	Total Investment		Levelized Annual Cost
2045	37	54		3

Year	New Investments 2010 dollars	Expenses 2010 dollars	Escalated New Investments	Escalated Expenses	Investment Revenue Requirement	Revenue Requirements	Present Worth of Revenue Requirements	Cumulative Present Worth 2010 dollars	Cumulative Investment	
2010	0	0	0	0	0	0	0	0	0	1
2011	0	0	0	0	0	0	0	0	0	2
2012	0	0	0	0	0	0	0	0	0	3
2013	0	0	0	0	0	0	0	0	0	4
2014	26	0	28	0	4	4	2	2	28	5
2015	0	0	0	0	4	4	2	4	28	6
2016	0	0	0	0	4	4	2	6	28	7
2017	0	0	0	0	4	4	2	8	28	8
2018	0	0	0	0	4	4	2	10	28	9
2019	0	0	0	0	4	4	2	11	28	10
2020	0	0	0	0	4	4	1	13	28	11
2021	0	0	0	0	4	4	1	14	28	12
2022	0	0	0	0	4	4	1	15	28	13
2023	22	0	26	0	7	7	2	17	54	14
2024	0	0	0	0	7	7	2	19	54	15
2025	0	0	0	0	7	7	2	21	54	16
2026	0	0	0	0	7	7	2	23	54	17
2027	0	0	0	0	7	7	1	24	54	18
2028	0	0	0	0	7	7	1	25	54	19
2029	0	0	0	0	7	7	1	27	54	20
2030	0	0	0	0	7	7	1	28	54	21
2031	0	0	0	0	7	7	1	29	54	22
2032	0	0	0	0	7	7	1	30	54	23
2033	0	0	0	0	7	7	1	31	54	24
2034	0	0	0	0	7	7	1	32	54	25
2035	0	0	0	0	7	7	1	32	54	26
2036	0	0	0	0	7	7	1	33	54	27
2037	0	0	0	0	7	7	1	34	54	28
2038	0	0	0	0	7	7	1	34	54	29
2039	0	0	0	0	7	7	1	35	54	30
2040	0	0	0	0	7	7	0	35	54	31
2041	0	0	0	0	7	7	0	36	54	32
2042	0	0	0	0	7	7	0	36	54	33
2043	0	0	0	0	7	7	0	37	54	34
2044	0	0	0	0	7	7	0	37	54	35
2045	0	0	0	0	7	7	0	37	54	36

Title: Option 1ABC

Cost of Capital	8.81%	Starting year for study	2010	
Revenue Require Rate	12.66%	Investments/Expenses	2010	
Investment Escalation	1.50%	Ending Year	2045	35
Expense Escalation	1.50%	*The 35 year totals below were calculated using the rates above.		

Year	Cumulative Present Worth	Total Investment		Levelized Annual Cost
2045	30	53		3

Year	New Investments 2010 dollars	Expenses 2010 dollars	Escalated New Investments	Escalated Expenses	Investment Revenue Requirement	Revenue Requirements	Present Worth of Revenue Requirements	Cumulative Present Worth 2010 dollars	Cumulative Investment	
2010	0	0	0	0	0	0	0	0	0	1
2011	0	0	0	0	0	0	0	0	0	2
2012	0	0	0	0	0	0	0	0	0	3
2013	0	0	0	0	0	0	0	0	0	4
2014	15	0	16	0	2	2	1	1	16	5
2015	0	0	0	0	2	2	1	3	16	6
2016	0	0	0	0	2	2	1	4	16	7
2017	0	0	0	0	2	2	1	5	16	8
2018	0	0	0	0	2	2	1	6	16	9
2019	0	0	0	0	2	2	1	6	16	10
2020	0	0	0	0	2	2	1	7	16	11
2021	0	0	0	0	2	2	1	8	16	12
2022	0	0	0	0	2	2	1	9	16	13
2023	29	0	35	0	6	6	2	11	51	14
2024	0	0	0	0	6	6	2	12	51	15
2025	0	0	0	0	6	6	2	14	51	16
2026	0	0	0	0	6	6	2	16	51	17
2027	0	0	0	0	6	6	1	17	51	18
2028	0	0	0	0	6	6	1	18	51	19
2029	0	0	0	0	6	6	1	20	51	20
2030	2	0	2	0	7	7	1	21	53	21
2031	0	0	0	0	7	7	1	22	53	22
2032	0	0	0	0	7	7	1	23	53	23
2033	0	0	0	0	7	7	1	24	53	24
2034	0	0	0	0	7	7	1	24	53	25
2035	0	0	0	0	7	7	1	25	53	26
2036	0	0	0	0	7	7	1	26	53	27
2037	0	0	0	0	7	7	1	26	53	28
2038	0	0	0	0	7	7	1	27	53	29
2039	0	0	0	0	7	7	1	28	53	30
2040	0	0	0	0	7	7	0	28	53	31
2041	0	0	0	0	7	7	0	28	53	32
2042	0	0	0	0	7	7	0	29	53	33
2043	0	0	0	0	7	7	0	29	53	34
2044	0	0	0	0	7	7	0	30	53	35
2045	0	0	0	0	7	7	0	30	53	36

Appendix C

Rate Impact Information

Bluff Creek-Westgate Upgrade
Preferred Plan
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Cost Assumptions			
Capital Structure	Rate	Ratio	Weighted Cost
Long Term Debt	6.6100%	46.2500%	3.0600%
Short Term Debt	4.4100%	1.2800%	0.0600%
Preferred Stock	0.0000%	0.0000%	0.0000%
Common Equity	10.8800%	52.4700%	5.7100%
Required Rate of Return			8.8300%
Tax Rate (MN)	41.3700%		

Easement = -

Rate Analysis	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Plant Investment	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000
Depreciation Reserve	(590,909)	(1,181,818)	(1,772,727)	(2,363,636)	(2,954,545)	(3,545,455)	(4,136,364)	(4,727,273)	(5,318,182)	(5,909,091)	(6,500,000)	(7,090,909)
CWIP	-	-	-	-	-	-	-	-	-	-	-	-
Accumulated Deferred Taxes	(158,898)	(690,929)	(1,164,662)	(1,584,613)	(1,954,656)	(2,278,662)	(2,559,966)	(2,801,902)	(3,037,385)	(3,272,760)	(3,508,242)	(3,743,617)
	25,250,193	24,127,252	23,062,611	22,051,750	21,090,799	20,175,884	19,303,671	18,470,825	17,644,434	16,818,149	15,991,758	15,165,474
Average Rate Base	25,625,096	24,688,722	23,594,932	22,557,181	21,571,275	20,633,341	19,739,777	18,887,248	18,057,629	17,231,291	16,404,954	15,578,616
Debt Return	799,503	770,288	736,162	703,784	673,024	643,760	615,881	589,282	563,398	537,616	511,835	486,053
Equity Return	1,463,193	1,409,726	1,347,271	1,288,015	1,231,720	1,178,164	1,127,141	1,078,462	1,031,091	983,907	936,723	889,539
Current Income Tax Requirement	873,547	462,688	476,917	488,887	499,073	507,320	514,020	519,039	492,067	458,881	425,480	392,294
Book Depreciation	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909
Annual Deferred Tax	158,898	532,031	473,732	419,951	370,043	324,006	281,304	241,936	235,483	235,375	235,483	235,375
Tax Depreciation & Removal Expense	975,000	1,876,940	1,736,020	1,606,020	1,485,380	1,374,100	1,270,880	1,175,720	1,160,120	1,159,860	1,160,120	1,159,860
Tax Depreciation on Easements	-	-	-	-	-	-	-	-	-	-	-	-
Property Tax @ 1.434%	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840
Total Revenue Requirements	4,258,891	4,138,482	3,997,831	3,864,386	3,737,608	3,616,999	3,502,095	3,392,468	3,285,787	3,179,528	3,073,269	2,967,010

Interchange	84.0258%
Total MN Company Revenue Requirements	3,578,567
Total MW - hours	44,446,901
Total System $/kW-hour	0.000081

Interchange	84.0258%
Demand Allocator - MN Jurisdiction	88.2563%
MN Jurisdiction Revenue Requirements	3,158,311
MN Jurisdiction MW - hours	32,846,647
MN Jurisdiction $/kW-hour	0.000096

Bluff Creek-Westgate Upgrade
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Rate Analysis	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25
Plant Investment	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000
Depreciation Reserve	(7,681,818)	(8,272,727)	(8,863,636)	(9,454,545)	(10,045,455)	(10,636,364)	(11,227,273)	(11,818,182)	(12,409,091)	(13,000,000)	(13,590,909)	(14,181,818)	(14,772,727)
CWIP	-	-	-	-	-	-	-	-	-	-	-	-	-
Accumulated Deferred Taxes	(3,979,100)	(4,214,475)	(4,449,957)	(4,685,332)	(4,920,815)	(5,156,190)	(5,391,672)	(5,627,047)	(5,622,559)	(5,378,100)	(5,133,641)	(4,889,182)	(4,644,723)
	14,339,082	13,512,798	12,686,406	11,860,122	11,033,731	10,207,447	9,381,055	8,554,771	7,968,350	7,621,900	7,275,450	6,929,000	6,582,550
Average Rate Base	14,752,278	13,925,940	13,099,602	12,273,264	11,446,926	10,620,589	9,794,251	8,967,913	8,261,560	7,795,125	7,448,675	7,102,225	6,755,775
Debt Return	460,271	434,489	408,708	382,926	357,144	331,362	305,581	279,799	257,761	243,208	232,399	221,589	210,780
Equity Return	842,355	795,171	747,987	700,803	653,619	606,436	559,252	512,068	471,735	445,102	425,319	405,537	385,755
Current Income Tax Requirement	358,893	325,707	292,306	259,120	225,719	192,533	159,132	125,946	337,350	558,528	544,569	530,611	516,652
Book Depreciation	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909
Annual Deferred Tax	235,483	235,375	235,483	235,375	235,483	235,375	235,483	235,375	(4,488)	(244,459)	(244,459)	(244,459)	(244,459)
Tax Depreciation & Removal Expense	1,160,120	1,159,860	1,160,120	1,159,860	1,160,120	1,159,860	1,160,120	1,159,860	580,060	-	-	-	-
Tax Depreciation on Easements	-	-	-	-	-	-	-	-	-	-	-	-	-
Property Tax @ 1.434%	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840
Total Revenue Requirements	2,860,751	2,754,491	2,648,232	2,541,973	2,435,714	2,329,455	2,223,196	2,116,937	2,026,107	1,966,127	1,921,577	1,877,027	1,832,477
Interchange													
Total MN Company Revenue Requirements													
Total MW - hours													
Total System $/kW-hour													
Interchange													
Demand Allocator - MN Jurisdiction													
MN Jurisdiction Revenue Requirements													
MN Jurisdiction MW - hours													
MN Jurisdiction $/kW-hour													

Bluff Creek-Westgate Upgrade
Preferred Plan
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Rate Analysis	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38
Plant Investment	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000
Depreciation Reserve	(15,363,636)	(15,954,545)	(16,545,455)	(17,136,364)	(17,727,273)	(18,318,182)	(18,909,091)	(19,500,000)	(20,090,909)	(20,681,818)	(21,272,727)	(21,863,636)	(22,454,545)
CWIP	-	-	-	-	-	-	-	-	-	-	-	-	-
Accumulated Deferred Taxes	(4,400,264)	(4,155,805)	(3,911,345)	(3,666,886)	(3,422,427)	(3,177,968)	(2,933,509)	(2,689,050)	(2,444,591)	(2,200,132)	(1,955,673)	(1,711,214)	(1,466,755)
	6,236,100	5,889,650	5,543,200	5,196,750	4,850,300	4,503,850	4,157,400	3,810,950	3,464,500	3,118,050	2,771,600	2,425,150	2,078,700
Average Rate Base	6,409,325	6,062,875	5,716,425	5,369,975	5,023,525	4,677,075	4,330,625	3,984,175	3,637,725	3,291,275	2,944,825	2,598,375	2,251,925
Debt Return	199,971	189,162	178,352	167,543	156,734	145,925	135,116	124,306	113,497	102,688	91,879	81,069	70,260
Equity Return	365,972	346,190	326,408	306,626	286,843	267,061	247,279	227,496	207,714	187,932	168,150	148,367	128,585
Current Income Tax Requirement	502,693	488,735	474,776	460,818	446,859	432,900	418,942	404,983	391,025	377,066	363,107	349,149	335,190
Book Depreciation	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909	590,909
Annual Deferred Tax	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)
Tax Depreciation & Removal Expense	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax Depreciation on Easements	-	-	-	-	-	-	-	-	-	-	-	-	-
Property Tax @ 1.434%	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840	372,840
Total Revenue Requirements	1,787,927	1,743,377	1,698,827	1,654,276	1,609,726	1,565,176	1,520,626	1,476,076	1,431,526	1,386,976	1,342,425	1,297,875	1,253,325

Interchange

Total MN Company Revenue Requirements

Total MW - hours

Total System $/kW-hour

Interchange

Demand Allocator - MN Jurisdiction

MN Jurisdiction Revenue Requirements

MN Jurisdiction MW - hours

MN Jurisdiction $/kW-hour

Bluff Creek-Westgate Upgrade
Preferred Plan
44 YEAR LIFE

Rate Analysis	Year 39	Year 40	Year 41	Year 42	Year 43	Year 44
Plant Investment	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000	26,000,000
Depreciation Reserve	(23,045,455)	(23,636,364)	(24,227,273)	(24,818,182)	(25,409,091)	(26,000,000)
CWIP	-	-	-	-	-	-
Accumulated Deferred Taxes	(1,222,295)	(977,836)	(733,377)	(488,918)	(244,459)	(0)
	1,732,250	1,385,800	1,039,350	692,900	346,450	0
Average Rate Base	1,905,475	1,559,025	1,212,575	866,125	519,675	173,225
Debt Return	59,451	48,642	37,832	27,023	16,214	5,405
Equity Return	108,803	89,020	69,238	49,456	29,673	9,891
Current Income Tax Requirement	321,231	307,273	293,316	279,360	265,403	251,447
Book Depreciation	590,909	590,909	590,909	590,909	590,909	590,909
Annual Deferred Tax	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)	(244,459)
Tax Depreciation & Removal Expense	-	-	-	-	-	-
Tax Depreciation on Easements	-	-	-	-	-	-
Property Tax @ 1.434%	372,840	372,840	372,840	372,840	372,840	372,840
Total Revenue Requirements	1,208,775	1,164,225	1,119,678	1,075,131	1,030,584	986,037

Interchange

Total MN Company Revenue Requirements

Total MW - hours

Total System $/kW-hour

Interchange

Demand Allocator - MN Jurisdiction

MN Jurisdiction Revenue Requirements

MN Jurisdiction MW - hours

MN Jurisdiction $/kW-hour

Bluff Creek-Westgate Upgrade
Alternative Plan
44 YEAR LIFE

Cost Assumptions			
Capital Structure	Rate	Ratio	Weighted Cost
Long Term Debt	6.6100%	46.2500%	3.0600%
Short Term Debt	4.4100%	1.2800%	0.0600%
Preferred Stock	0.0000%	0.0000%	0.0000%
Common Equity	10.8800%	52.4700%	5.7100%
Required Rate of Return			8.8300%
Tax Rate (MN)	41.3700%		

Easement = -

Rate Analysis	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Plant Investment	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000
Depreciation Reserve	(340,909)	(681,818)	(1,022,727)	(1,363,636)	(1,704,545)	(2,045,455)	(2,386,364)	(2,727,273)	(3,068,182)	(3,409,091)	(3,750,000)
CWIP	-	-	-	-	-	-	-	-	-	-	-
Accumulated Deferred Taxes	(91,672)	(398,613)	(671,920)	(914,200)	(1,127,686)	(1,314,613)	(1,476,903)	(1,616,482)	(1,752,337)	(1,888,131)	(2,023,986)
	14,567,419	13,919,569	13,305,352	12,722,164	12,167,769	11,639,933	11,136,733	10,656,245	10,179,481	9,702,779	9,226,014
Average Rate Base	14,783,709	14,243,494	13,612,461	13,013,758	12,444,966	11,903,851	11,388,333	10,896,489	10,417,863	9,941,130	9,464,396
Debt Return	461,252	444,397	424,709	406,029	388,283	371,400	355,316	339,970	325,037	310,163	295,289
Equity Return	844,150	813,304	777,272	743,086	710,608	679,710	650,274	622,190	594,860	567,639	540,417
Current Income Tax Requirement	503,970	266,935	275,145	282,050	287,927	292,685	296,550	299,445	283,885	264,739	245,469
Book Depreciation	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909
Annual Deferred Tax	91,672	306,941	273,307	242,280	213,486	186,927	162,291	139,579	135,855	135,793	135,855
Tax Depreciation & Removal Expense	562,500	1,082,850	1,001,550	926,550	856,950	792,750	733,200	678,300	669,300	669,150	669,300
Tax Depreciation on Easements	-	-	-	-	-	-	-	-	-	-	-
Property Tax @ 1.434%	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100
Total Revenue Requirements	2,457,052	2,387,586	2,306,441	2,229,454	2,156,312	2,086,730	2,020,440	1,957,193	1,895,646	1,834,343	1,773,040

Interchange	84.0258%
Total MN Company Revenue Requirements	2,064,558
Total MW - hours	44,446,901
Total System $/kW-hour	0.000046

Interchange	84.0258%
Demand Allocator - MN Jurisdiction	88.2563%
MN Jurisdiction Revenue Requirements	1,822,102
MN Jurisdiction MW - hours	32,846,647
MN Jurisdiction $/kW-hour	0.000055

Bluff Creek-Westgate Upgrade
Alternative Plan
44 YEAR LIFE

Rate Analysis	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23
Plant Investment	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000
Depreciation Reserve	(4,090,909)	(4,431,818)	(4,772,727)	(5,113,636)	(5,454,545)	(5,795,455)	(6,136,364)	(6,477,273)	(6,818,182)	(7,159,091)	(7,500,000)	(7,840,909)
CWIP	-	-	-	-	-	-	-	-	-	-	-	-
Accumulated Deferred Taxes	(2,159,779)	(2,295,634)	(2,431,428)	(2,567,283)	(2,703,076)	(2,838,932)	(2,974,725)	(3,110,580)	(3,246,373)	(3,243,784)	(3,102,750)	(2,961,716)
	8,749,312	8,272,547	7,795,845	7,319,081	6,842,378	6,365,614	5,888,911	5,412,147	4,935,445	4,597,125	4,397,250	4,197,375
Average Rate Base	8,987,663	8,510,930	8,034,196	7,557,463	7,080,729	6,603,996	6,127,263	5,650,529	5,173,796	4,766,285	4,497,188	4,297,313
Debt Return	280,415	265,541	250,667	235,793	220,919	206,045	191,171	176,297	161,422	148,708	140,312	134,076
Equity Return	513,196	485,974	458,753	431,531	404,310	377,088	349,867	322,645	295,424	272,155	256,789	245,377
Current Income Tax Requirement	226,323	207,054	187,908	168,638	149,492	130,222	111,077	91,807	72,661	194,625	322,228	314,175
Book Depreciation	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909
Annual Deferred Tax	135,793	135,855	135,793	135,855	135,793	135,855	135,793	135,855	135,793	(2,589)	(141,034)	(141,034)
Tax Depreciation & Removal Expense	669,150	669,300	669,150	669,300	669,150	669,300	669,150	669,300	669,150	334,650	-	-
Tax Depreciation on Easements	-	-	-	-	-	-	-	-	-	-	-	-
Property Tax @ 1.434%	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100
Total Revenue Requirements	1,711,736	1,650,433	1,589,130	1,527,826	1,466,523	1,405,220	1,343,916	1,282,613	1,221,310	1,168,908	1,134,304	1,108,602

Interchange

Total MN Company Revenue Requirements

Total MW - hours

Total System $/kW-hour

Interchange
Demand Allocator - MN Jurisdiction

MN Jurisdiction Revenue Requirements

MN Jurisdiction MW - hours

MN Jurisdiction $/kW-hour

Bluff Creek-Westgate Upgrade
Alternative Plan
44 YEAR LIFE

Rate Analysis	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36
Plant Investment	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000
Depreciation Reserve	(8,181,818)	(8,522,727)	(8,863,636)	(9,204,545)	(9,545,455)	(9,886,364)	(10,227,273)	(10,568,182)	(10,909,091)	(11,250,000)	(11,590,909)	(11,931,818)	(12,272,727)
CWIP	-	-	-	-	-	-	-	-	-	-	-	-	-
Accumulated Deferred Taxes	(2,820,682)	(2,679,648)	(2,538,614)	(2,397,580)	(2,256,545)	(2,115,511)	(1,974,477)	(1,833,443)	(1,692,409)	(1,551,375)	(1,410,341)	(1,269,307)	(1,128,273)
	3,997,500	3,797,625	3,597,750	3,397,875	3,198,000	2,998,125	2,798,250	2,598,375	2,398,500	2,198,625	1,998,750	1,798,875	1,599,000
Average Rate Base	4,097,438	3,897,563	3,697,688	3,497,813	3,297,938	3,098,063	2,898,188	2,698,313	2,498,437	2,298,562	2,098,687	1,898,812	1,698,937
Debt Return	127,840	121,604	115,368	109,132	102,896	96,660	90,423	84,187	77,951	71,715	65,479	59,243	53,007
Equity Return	233,964	222,551	211,138	199,725	188,312	176,899	165,487	154,074	142,661	131,248	119,835	108,422	97,009
Current Income Tax Requirement	306,122	298,069	290,015	281,962	273,909	265,856	257,803	249,750	241,697	233,644	225,591	217,538	209,485
Book Depreciation	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909
Annual Deferred Tax	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)
Tax Depreciation & Removal Expense	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax Depreciation on Easements	-	-	-	-	-	-	-	-	-	-	-	-	-
Property Tax @ 1.434%	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100
Total Revenue Requirements	1,082,900	1,057,198	1,031,496	1,005,794	980,092	954,390	928,688	902,986	877,284	851,582	825,880	800,178	774,476

Interchange

Total MN Company Revenue Requirements

Total MW - hours

Total System $/kW-hour

Interchange

Demand Allocator - MN Jurisdiction

MN Jurisdiction Revenue Requirements

MN Jurisdiction MW - hours

MN Jurisdiction $/kW-hour

Bluff Creek-Westgate Upgrade
Alternative Plan
44 YEAR LIFE

Rate Analysis	Year 37	Year 38	Year 39	Year 40	Year 41	Year 42	Year 43	Year 44
Plant Investment	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000
Depreciation Reserve	(12,613,636)	(12,954,545)	(13,295,455)	(13,636,364)	(13,977,273)	(14,318,182)	(14,659,091)	(15,000,000)
CWIP	-	-	-	-	-	-	-	-
Accumulated Deferred Taxes	(987,239)	(846,205)	(705,170)	(564,136)	(423,102)	(282,068)	(141,034)	(0)
	1,399,125	1,199,250	999,375	799,500	599,625	399,750	199,875	(0)
Average Rate Base	1,499,062	1,299,187	1,099,312	899,437	699,562	499,687	299,812	99,937
Debt Return	46,771	40,535	34,299	28,062	21,826	15,590	9,354	3,118
Equity Return	85,596	74,184	62,771	51,358	39,945	28,532	17,119	5,706
Current Income Tax Requirement	201,432	193,379	185,326	177,273	169,222	161,171	153,120	145,069
Book Depreciation	340,909	340,909	340,909	340,909	340,909	340,909	340,909	340,909
Annual Deferred Tax	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)	(141,034)
Tax Depreciation & Removal Expense	-	-	-	-	-	-	-	-
Tax Depreciation on Easements	-	-	-	-	-	-	-	-
Property Tax @ 1.434%	215,100	215,100	215,100	215,100	215,100	215,100	215,100	215,100
Total Revenue Requirements	748,774	723,072	697,370	671,668	645,969	620,270	594,571	568,872

Interchange

Total MN Company Revenue Requirements

Total MW - hours

Total System $/kW-hour

Interchange
Demand Allocator - MN Jurisdiction

MN Jurisdiction Revenue Requirements

MN Jurisdiction MW - hours

MN Jurisdiction $/kW-hour

Appendix D

Demand Side Management Data

Appendix D
Xcel Energy Demand Side Management ("DSM") Data

Minn. Rules 7849.0290 requires that an application for a Certificate of Need include information regarding the applicant's conservation and load management programs (collectively, "Demand Side Management" or "DSM"). This information is presented below for Xcel Energy.

Minn. R. 7849.0290 requires that an application must include:

A. The name of the committee, department, or individual responsible for the applicant's energy conservation and efficiency programs, including load management;

Lee Gabler, Director, DSM and Renewable Operations is responsible for Xcel Energy's demand-side management (conservation and load management) programs.

B. A list of the applicant's energy conservation and efficiency goals and objectives;

Xcel Energy's[1] proposed 2010-2012 Triennial Plan[2] represents a budget of over $240 million, energy savings of 1,116 GWh and demand savings of 315 MW over the three years.

C. A description of the specific energy conservation and efficiency programs the applicant has considered, a list of those that have been implemented, and the reasons why the other programs have not been implemented;

Minn. Stat. § 216B.2401, states "it is the energy policy of the state of Minnesota to achieve annual energy savings equal to 1.5 percent of annual retail energy sales of electricity and natural gas unless modified by the Commissioner." The minimum energy savings goal is 1 percent of retail sales. The energy savings may occur directly through energy conservation improvement programs and rate design, and indirectly through energy codes and appliance standards, programs designed to transform the market or change consumer behavior, energy savings resulting from efficiency improvements to the utility infrastructure and system, and other efforts to promote energy efficiency and energy conservation.

Additionally, Minn. Stat. § 216B.241, Subd. 1a requires Xcel Energy to spend at least 2 percent of its electric gross operating revenue ("GOR") on electric conservation programs and 0.5 percent of its gas GOR on gas conservation programs.

To comply with the minimum spending requirement, Xcel Energy offers an extensive portfolio of programs. In general, these programs can be categorized as direct or indirect. Further, the direct programs can be categorized as prescriptive or custom.

Direct programs result in quantifiable energy savings. The Lighting Efficiency program, for example, offers rebates for the installation of energy efficient lighting within our business customer segment. Prescriptive programs use technical assumptions based on stipulated or deemed technical assumptions that are assigned to measures in order to calculate gross energy and demand savings.

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[1] Northern States Power Company, a Minnesota corporation.
[2] Docket No. E,G002/CIP-09-198.

The rebates and savings are predetermined based on the deemed technical assumptions. Custom programs use technical assumptions that are specific to the actual measure characteristics in order to calculate the energy and demand savings. The rebates and savings vary with the measure. Further, direct programs can be categorized as conservation or load management programs. Load management programs are specifically designed to manage peak load.

At this time, indirect programs do not result in quantifiable energy savings. They are largely information-based and are intended to create customer awareness as well as encourage customers to participate in our direct impact programs.

Table 1 below includes a list of our comprehensive program offerings over the last ten years. Please note that some of the programs have been discontinued, modified or incorporated into other programs.

Table 1

Business Segment
Conservation
Commercial Heating Efficiency f.k.a. Boiler Efficiency
Commercial Real Estate
Compressed Air Efficiency
Commercial Audit and Contract Management
Computer Efficiency
Cooling Efficiency
Custom Efficiency
Data Center Efficiency
Distributed Generation Incentive
Efficiency Controls
Energy Assets
Energy Design Assistance (EDA)
Energy Design Assistance - Business New Construction
Energy Efficient Buildings – Business New Construction
Energy Efficient Rebate
Energy Management Systems
Food Service
Furnace Efficiency
Government Conservation
Heat Recovery Rebate
Industrial Efficiency
Lighting Efficiency
Market Transformation – Computer Efficiency
Market Transformation – Vending Efficiency
Motor & Drive Efficiency f.k.a Motor Efficiency
Process Efficiency

Business Segment
Recommissioning
Refrigeration Efficiency
Roofing Efficiency
Segment Efficiency
Load Management
Electric Rates Savings f.k.a Peak Controlled Rates
Business Saver's Switch
Indirect Impact
Business Education
Energy Advisory Service
Energy Analysis
Energy Financing
Lamp Recycling
School Financing
Turn Key Services – pending DER approval to move to direct impact

Residential Segment
Conservation
Central AC Quality Installation
ENERGY STAR Homes
ENERGY STAR Rebates
Energy Efficiency Showerheads f.k.a High-Efficiency Showerheads
Home Efficiency
Home Lighting Direct Purchase
Home Performance with ENERGY STAR
Insulation Rebate Program
Refrigerator Recycling
Residential Cooling
Home Energy Squad f.k.a Residential Quick Fix
Premier Home
School Education Kits
Water Heater Rebates
Load Management
Residential Saver's Switch
Indirect Impact
Consumer Education
Energy Loans
Home Energy Audits
Lamp Recycling
Energy Efficiency Support Services

Low-Income Segment
Conservation
Conservation Kits
Home Electric Savings
Low Income Weatherization
Home Energy Squad – Low Income f.k.a. Residential Quick Fix

Research, Evaluation & Pilots
Annex 49 Pilot
Energy Feedback Pilot

For more details on our current business, residential and low-income programs, see the Xcel Energy website at http://www.xcelenergy.com.

Xcel Energy's Product Development department continually analyzes potential measures and concepts to add to our program portfolio offering. Products or programs are selected for development based on several criteria including, but not limited to energy efficiency potential, ability to develop quickly, longevity of the offering (i.e. how long until it become the standard), level of market barriers and risk (technological, press, market, education) among others.

D. A description of the major accomplishments that have been made by the applicant with respect to energy conservation and efficiency

The 2010-2012 CIP Triennial Plan continues Xcel Energy's long-standing commitment to DSM. Although DSM activities in many states around the country have ebbed and flowed, Minnesota and Xcel Energy as its largest utility have generally maintained a consistent approach to DSM. This long-standing commitment and dedication to excellence in running cost effective conservation and load management programs places the Company among the nation's top utilities in terms of energy and demand saved and most innovative programs.

Between 1992 and 2010, Xcel Energy has invested over $888 million (nominal) resulting in 5,280 GWh of electric energy savings, and an estimated 10 million Dth of natural gas savings. The total electric energy savings from 1992 through 2010 present is equivalent to avoiding the cost of over nine 250 MW power plants. The following graphs highlight electric and natural gas achievements and spending between 2002 and 2010. 2011 achievements and spend are currently being finalized and will be published in our April 1, 2012 Annual Status report filing.

Figure 1: CIP Electric Expenditures and Achievements 2000-2010

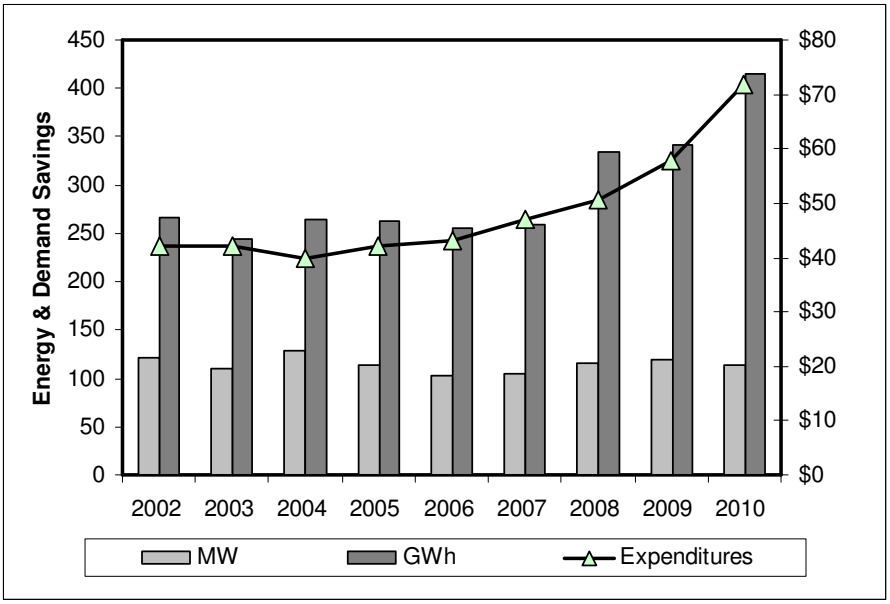
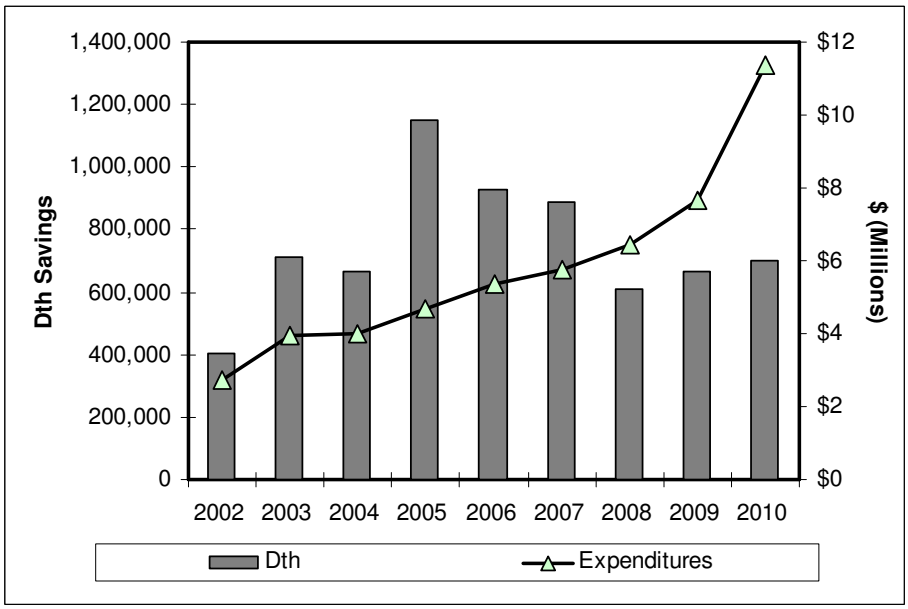


Figure 2: CIP Gas Expenditures and Achievements 2000-2012



E. A description of the applicant's future plans through the forecast years with respect to energy conservation and efficiency

On August 5, 2009, the Commission approved our immediate (2010-2012) plans for DSM through our 2008-2022 Resource Plan3. Due to the significantly higher goals required from The Next Generation Act of 2007, we proposed to ramp our goals up by 2013 to our highest energy savings potential levels. The table below illustrates our proposed energy and demand savings from 2010-2025. In the next Resource Plan filing, we are required to model higher energy savings scenarios, as requested by intervenors. In 2010 we reached 1.35 percent of sales and significantly exceeded our goals. In the short term, we fully expect to continue to achieve 1.3 percent of sales and will strive towards 1.5 percent over the next several years. We will investigate those opportunities during our next planning process. In addition, we will continue to investigate and evaluate new potential programs and measures available within the marketplace for their cost-effective applicability within our next Resource and DSM Triennial Plans. These actions may take place within our Product Development group, market potential studies and program evaluations.

Approved 2008-2022 Resource Plan DSM Energy and Demand Savings Levels

	Energy Savings (MWh)	% of Triennial Goal Sales	Demand Savings EE (MW)	Demand Savings EE (MW) (1.1% Scenario)	Energy Savings (MWh) (1.1% Scenario)	Budget (EE Only) - Nominal Dollars
2010	358,217	1.15%	114	105	327,830	$127,974,675
2011	373,792	1.20%	123	109	333,150	$136,690,307
2012	404,941	1.30%	127	106	338,214	$151,575,882
2013	420,951	1.30%	133	108	342,812	$161,287,349
2014	420,951	1.30%	130	107	346,999	$165,093,730
2015	420,951	1.30%	128	107	350,960	$168,989,942
2016	437,189	1.30%	140	113	354,831	$179,650,710
2017	437,189	1.30%	145	119	358,812	$183,890,467
2018	437,189	1.30%	148	123	362,920	$188,230,282
2019	452,789	1.30%	154	125	367,214	$199,547,245
2020	452,789	1.30%	169	139	371,585	$204,256,560
2021	452,789	1.30%	169	140	376,016	$209,077,015
2022	467,626	1.30%	175	142	380,478	$221,024,049
2023	467,626	1.30%	175	144	385,001	$226,240,217
2024	467,626	1.30%	175	146	389,621	$231,579,486
2025	482,389	1.30%	180	147	394,296	$244,528,511

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F. A quantification of the manner by which these programs affect or help determine the forecast provided in response to part 7849.0270, subpart 2, a list of their total costs by program, and a discussion of their expected effects in reducing the need for new generation and transmission facilities

Load forecasts are based on historical data. Therefore, the forecasted annual peak demand for electricity and annual energy consumed reflect the savings due to DSM programs that have been implemented in the past. Because load forecasts are based on historic load data, a certain amount of continued DSM is already included in the forecast. This "amount" is known as embedded DSM and is roughly equal to the average annual DSM achievements obtained during the historical years. Thus, the energy and demand savings as ordered in the Resource Plan are not fully reflected in the forecasts. However, the forecast does include the historical or embedded DSM amount.

The energy and demand goals ordered in the 2008 Resource Plan are fully reflected in the resource planning analysis that determines future generation needs. An estimate of the embedded DSM is added to the load forecast in Strategist to derive an estimate of peak and energy as if no DSM were going to be implemented in future years. Then the approved DSM goals are subtracted from the modified forecast to calculate net peak and energy forecasts. If embedded DSM were not added to the load forecast, DSM would be double counted and the forecasts would consistently be too low.

Below is a list of our proposed 2010-2012 DSM programs including their individual proposed budgets, energy and demand savings. Following the annual tables is a three year Triennial Plan roll-up.

2010 Program Costs and Impacts

2010	Electric Participants	Electric Budget	Customer kW	Generator kW	Generator kWh	Gas Participants	Gas Budget	Dth Savings
Business Segment								
Commercial Heating Efficiency						304	1,265,238	221,818
Commercial Real Estate	55	$635,417	808	690	3,004,195	8	$30,290	1,495
Compressed Air Efficiency	373	$2,067,507	3,860	3,659	26,321,602			
Cooling Efficiency	206	$1,906,924	3,366	2,427	6,083,882			
Custom Efficiency	128	$3,018,198	5,168	2,890	25,440,451	43	$655,024	69,215
Data Center Efficiency	10	$713,796	1,022	1,100	7,689,482			
Efficiency Controls	70	$1,304,328	2,280	741	16,090,860	21	$190,162	15,750
Energy Design Assistance-Business New Construction	63	$4,455,564	6,876	6,868	25,186,059	9	$211,058	20,826
Energy Efficient Buildings-Business New Construction	18	$362,504	766	765	2,915,863	9	$42,439	6,767
Furnace Efficiency						209	$100,219	4,014
Lighting Efficiency	416	$2,721,510	5,491	5,033	20,000,014			
Market Transformation - Computer Efficiency	23,251	$260,812	442	476	2,620,085			
Market Transformation - Vending Efficiency	9	$41,700	54	52	497,439			
Motor & Drive Efficiency	714	$2,902,950	5,761	4,820	30,574,217			
Process Efficiency	101	$5,756,733	6,680	4,799	37,912,052	27	$1,444,907	138,608
Recommissioning	101	$2,050,038	2,898	1,485	14,518,829	20	$103,091	12,178
Business Segment Energy Efficiency Total	**25,514**	**$28,197,980**	**45,472**	**35,805**	**218,855,030**	**650**	**$4,042,428**	**490,672**
Business Saver's Switch	1,164	$1,979,611	25,385	8,342	49,598			
Electric Rate Savings	110	$627,550	25,000	12,610	887,589			
Business Segment Load Management Total	**1,274**	**$2,607,161**	**50,385**	**20,952**	**937,187**			
Business Education	13,323	$237,392				1,817	$35,923	
Energy Advisory Service	63	$98,679				7	$6,685	
Energy Analysis	275	$293,668				128	$113,995	
Lamp Recycling	30,146	$30,000						
Turn-Key Services								
Indirect Business Subtotal	**43,807**	**$659,739**				**1,952**	**$156,603**	
Business Segment Total	**70,595**	**$31,464,880**	**95,857**	**56,757**	**219,792,217**	**2,602**	**$4,199,031**	**490,672**
Residential Segment								
Energy Efficient Showerhead Program	1,500	$16,308	2,700		401,864	8,500	$92,415	11,169
ENERGY STAR Homes	1,115	$394,908	314	181	1,385,005	654	$751,377	36,493
Heating System Rebate						5,500	$1,589,077	75,997
Home Lighting	275,000	$3,174,033	52,360	4,597	62,150,759			
Home Performance with ENERGY STAR	175	$177,142	305	111	316,614	175	$530,393	5,784
Insulation Rebate Program	70	$26,282	247		245,291	930	$349,174	14,063
Refrigerator Recycling	2,000	$407,608	468	283	2,394,060			
Residential Cooling	10,000	$3,122,290	6,962	6,868	5,071,837			
Residential Quick Fix Efficiency Service	2,700	$474,607	2,957	600	2,032,553	2,700	$661,082	18,936
School Education Kits	10,000	$301,267	5,888	91	1,947,399	10,000	$265,498	17,007
Water Heating Rebate						1,050	$231,573	3,288
Residential Segment Energy Efficiency Total	**302,560**	**$8,094,445**	**72,201**	**12,730**	**75,945,383**	**29,509**	**$4,470,589**	**182,737**
Load Management Segment - Residential Saver's Switch	**21,000**	**$6,479,078**	**63,302**	**19,970**	**171,406**			
Consumer Education	412,949	$726,144				363,498	$488,998	
Home Energy Audits	3,077	$363,363				2,030	$177,197	
Lamp Recycling	224,964	$181,980						
Energy Efficiency Support Services		$443,940					$664,110	
Indirect Residential Subtotal	640,990	$1,715,427				365,528	$1,330,305	
Residential Segment Total	**964,550**	**$16,288,949**	**135,503**	**32,700**	**76,116,789**	**395,037**	**$5,800,894**	**182,737**
Low Income Segment								
Conservation Kits	15,000	$569,014	17,324	398	7,128,430	15,000	$290,159	40,524
Home Electric Savings Program	1,416	$969,633	397	120	803,660			
Single Family Weatherization Program						295	$864,093	3,624
Low Income Segment Total	**16,416**	**$1,538,647**	**17,721**	**517**	**7,932,090**	**15,295**	**$1,154,252**	**44,148**
Planning Segment								
Advertising & Promotion		$2,000,000					$500,000	
Application Development & Maintenance		$960,000					$240,000	
CIP Training		$139,910					$48,308	
Regulatory Affairs		$530,154					$108,229	
Planning Segment Total		**$3,630,064**					**$896,537**	
Research, Evaluations & Pilots Segment								
Market Research		$951,558					$228,319	
Product Development		$903,400					$199,200	
Annex 49 Pilot	4	$5,436	19	18	177,224	4	$72,216	5,750
Energy Feedback Pilot	35,225	$272,203	683	105	6,345,530	35,000	$271,303	62,471
Product Development Total	**35,229**	**$1,181,039**	**702**	**123**	**6,522,754**	**35,004**	**$542,719**	**68,221**
Research, Evaluations & Pilots Segment Total	**35,229**	**$2,132,597**	**702**	**123**	**6,522,754**	**35,004**	**$771,038**	**68,221**
PORTFOLIO SUBTOTAL	**1,086,790**	**$55,055,138**	**249,784**	**90,097**	**310,363,850**	**447,938**	**$12,821,752**	**785,778**
Renewable Energy Segment-Solar*Rewards	**414**	**$5,003,198**	**2,046**	**1,062**	**2,791,427**			
Anticipated Alternative Filings								
CEE County Government Initiative		$300,000					$40,000	
CEE One Stop Efficiency Shop		$11,500,000		10,253	37,847,872			
Energy Smart		$300,000						
Anticipated Alternative Filings Total		**$12,100,000**		**10,253**	**37,847,872**		**$40,000**	
Assessments Segment		**$1,318,120**					**$361,442**	
Electric Utility Infrastructure								
Supply Side Resources Segment - U of M IREE		**$1,270,986**					**$97,230**	
PORTFOLIO TOTAL	**1,087,204**	**$74,747,442**	**251,830**	**101,412**	**351,003,149**	**447,938**	**$13,320,424**	**785,778**

2011 Program Costs and Impacts

2011	Electric Participants	Electric Budget	Customer kW	Generator kW	Generator kWh	Gas Participants	Gas Budget	Dth Savings
Business Segment								
Commercial Heating Efficiency						304	1,338,017	221,818
Commercial Real Estate								
Compressed Air Efficiency	420	$2,532,898	4,666	4,424	31,667,218			
Cooling Efficiency	229	$2,013,323	3,408	2,468	6,112,294			
Custom Efficiency	154	$3,563,725	6,112	3,496	30,253,803	50	$733,175	70,318
Data Center Efficiency	11	$776,592	1,226	1,319	9,227,378			
Efficiency Controls	71	$1,390,655	2,313	752	16,320,729	24	$221,600	18,000
Energy Design Assistance-Business New Construction	62	$4,895,586	6,846	6,839	25,078,607	8	$232,716	19,120
Energy Efficient Buildings-Business New Construction	20	$399,225	851	851	3,239,848	10	$50,089	7,519
Furnace Efficiency						222	$136,999	4,256
Lighting Efficiency	440	$2,893,031	5,773	5,297	21,000,018			
Market Transformation - Computer Efficiency	25,125	$324,364	542	583	3,234,486			
Market Transformation - Vending Efficiency	9	$41,800	54	52	497,439			
Motor & Drive Efficiency	915	$3,442,944	6,911	5,785	36,626,728			
Process Efficiency	101	$6,278,844	6,896	4,920	39,408,781	27	$1,536,622	138,608
Recommissioning	108	$2,201,652	3,092	1,585	15,476,361	24	$119,540	14,885
Business Segment Energy Efficiency Total	**27,664**	**$30,754,638**	**48,690**	**38,368**	**238,143,690**	**669**	**$4,368,758**	**494,524**
Business Saver's Switch	1,164	$2,036,351	25,385	8,342	49,598			
Electric Rate Savings	110	$640,838	25,000	12,610	887,589			
Business Segment Load Management Total	**1,274**	**$2,677,189**	**50,385**	**20,952**	**937,187**			
Business Education	13,323	$238,972				1,817	$36,138	
Energy Advisory Service	138	$153,738				15	$8,788	
Energy Analysis	295	$344,968				132	$146,999	
Lamp Recycling	31,653	$32,000						
Turn-Key Services	8	$301,176				5	$36,296	
Indirect Business Subtotal	**45,417**	**$1,070,854**				**1,969**	**$228,221**	
Business Segment Total	**74,355**	**$34,502,681**	**99,075**	**59,320**	**239,080,877**	**2,638**	**$4,596,979**	**494,524**
Residential Segment								
Energy Efficient Showerhead Program	1,500	$17,080	2,700		401,864	8,500	$96,789	11,169
ENERGY STAR Homes	1,172	$418,384	333	192	1,465,518	687	$785,469	38,467
Heating System Rebate						5,500	$1,631,938	75,997
Home Lighting	250,000	$2,893,018	47,600	4,179	51,878,595			
Home Performance with ENERGY STAR	200	$209,690	340	121	345,415	200	$540,810	6,618
Insulation Rebate Program	74	$27,511	259		257,555	977	$365,500	14,766
Refrigerator Recycling	4,000	$789,924	936	565	4,788,120			
Residential Cooling	11,001	$3,415,117	7,659	7,555	5,579,647			
Residential Quick Fix Efficiency Service	3,000	$506,308	3,286	666	2,185,358	3,000	$732,663	21,040
School Education Kits	20,000	$597,356	11,775	183	3,490,850	20,000	$527,946	34,014
Water Heating Rebate						1,050	$233,192	3,288
Residential Segment Energy Efficiency Total	**290,947**	**$8,874,388**	**74,888**	**13,460**	**70,392,924**	**39,914**	**$4,914,307**	**205,358**
Load Management Segment - Residential Saver's Switch	**21,000**	**$6,641,978**	**63,302**	**19,970**	**171,406**			
Consumer Education	423,273	$751,839				373,085	$525,028	
Home Energy Audits	3,231	$372,262				2,088	$179,987	
Lamp Recycling	236,212	$194,913						
Energy Efficiency Support Services		$374,240					$560,570	
Indirect Residential Subtotal	662,716	$1,693,254				375,173	$1,265,585	
Residential Segment Total	**974,663**	**$17,209,621**	**138,190**	**33,430**	**70,564,330**	**415,087**	**$6,179,892**	**205,358**
Low Income Segment								
Conservation Kits	15,000	$597,228	17,324	398	7,128,430	15,000	$303,678	40,524
Home Electric Savings Program	1,375	$1,003,824	397	120	803,660			
Single Family Weatherization Program						408	$865,955	6,038
Low Income Segment Total	**16,375**	**$1,601,052**	**17,721**	**517**	**7,932,090**	**15,408**	**$1,169,633**	**46,562**
Planning Segment								
Advertising & Promotion		$2,100,000					$525,000	
Application Development & Maintenance		$1,008,000					$252,000	
CIP Training		$144,278					$49,971	
Regulatory Affairs		$544,080					$111,533	
Planning Segment Total		**$3,796,358**					**$938,504**	
Research, Evaluations & Pilots Segment								
Market Research		$1,828,035					$310,452	
Product Development		$885,900					$201,000	
Annex 49 Pilot								
Energy Feedback Pilot	35,225	$215,958	683	105	6,345,530	35,000	$215,058	62,471
Product Development Total	**35,225**	**$1,101,858**	**683**	**105**	**6,345,530**	**35,000**	**$416,058**	**62,471**
Research, Evaluations & Pilots Segment Total	**35,225**	**$2,929,892**	**683**	**105**	**6,345,530**	**35,000**	**$726,510**	**62,471**
PORTFOLIO SUBTOTAL	**1,100,618**	**$60,039,604**	**255,670**	**93,373**	**323,922,826**	**468,132**	**$13,611,517**	**808,916**
Renewable Energy Segment-Solar*Rewards	**414**	**$5,003,198**	**2,046**	**1,062**	**2,791,427**			
Anticipated Alternative Filings								
CEE County Government Initiative								
CEE One Stop Efficiency Shop		$12,600,000		11,392	42,053,191			
Energy Smart		$315,000						
Anticipated Alternative Filings Total		**$12,915,000**		**11,392**	**42,053,191**			
Assessments Segment		**$1,318,120**					**$361,442**	
Electric Utility Infrastructure								
Supply Side Resources Segment - U of M IREE								
PORTFOLIO TOTAL	**1,101,032**	**$79,275,922**	**257,716**	**105,827**	**368,767,444**	**468,132**	**$13,972,959**	**808,916**

2012 Program Costs and Impacts

2012	Electric Participants	Electric Budget	Customer kW	Generator kW	Generator kWh	Gas Participants	Gas Budget	Dth Savings
Business Segment								
Commercial Heating Efficiency						304	1,348,109	221,818
Commercial Real Estate								
Compressed Air Efficiency	490	$2,980,895	5,648	5,355	38,005,065			
Cooling Efficiency	279	$2,046,350	3,433	2,492	6,128,212			
Custom Efficiency	176	$4,228,193	7,544	4,333	37,808,710	51	$764,504	70,817
Data Center Efficiency	12	$840,397	1,430	1,539	10,765,275			
Efficiency Controls	72	$1,395,084	2,346	762	16,550,599	27	$241,018	20,250
Energy Design Assistance-Business New Construction	62	$5,015,614	7,166	7,158	26,247,910	8	$234,484	19,728
Energy Efficient Buildings-Business New Construction	30	$568,796	1,277	1,276	4,859,771	11	$65,759	8,271
Furnace Efficiency						240	$149,649	4,611
Lighting Efficiency	483	$3,105,707	6,373	5,836	23,250,018			
Market Transformation - Computer Efficiency	30,375	$442,567	761	819	4,578,543			
Market Transformation - Vending Efficiency	9	$41,900	54	52	497,439			
Motor & Drive Efficiency	994	$3,807,662	7,734	6,476	41,017,202			
Process Efficiency	108	$7,058,772	7,656	5,474	43,895,686	27	$1,500,020	138,608
Recommissioning	110	$2,250,290	3,157	1,618	15,795,538	27	$126,307	16,238
Business Segment Energy Efficiency Total	**33,199**	**$33,782,226**	**54,578**	**43,189**	**269,399,967**	**695**	**$4,429,850**	**500,342**
Business Saver's Switch	1,164	$2,086,837	25,385	8,342	49,598			
Electric Rate Savings	110	$654,098	25,000	12,610	887,589			
Business Segment Load Management Total	**1,274**	**$2,740,935**	**50,385**	**20,952**	**937,187**			
Business Education	13,323	$238,972				1,817	$36,138	
Energy Advisory Service	222	$219,866				24	$11,673	
Energy Analysis	304	$381,421				137	$155,945	
Lamp Recycling	33,235	$35,000						
Turn-Key Services	9	$314,520				6	$37,916	
Indirect Business Subtotal	**47,093**	**$1,189,779**				**1,984**	**$241,672**	
Business Segment Total	**81,566**	**$37,712,940**	**104,963**	**64,141**	**270,337,154**	**2,679**	**$4,671,522**	**500,342**
Residential Segment								
Energy Efficient Showerhead Program	1,500	$17,629	2,700		401,864	8,500	$99,901	11,169
ENERGY STAR Homes	1,244	$470,611	367	211	1,617,498	736	$820,015	41,981
Heating System Rebate						5,500	$1,687,969	75,997
Home Lighting	225,000	$2,612,899	42,840	3,761	43,531,041			
Home Performance with ENERGY STAR	225	$215,979	367	124	363,231	225	$571,352	7,452
Insulation Rebate Program	77	$28,856	272		270,556	1,026	$383,376	15,511
Refrigerator Recycling	5,000	$994,336	1,171	706	5,985,151			
Residential Cooling	12,000	$3,657,237	8,354	8,241	6,086,205			
Residential Quick Fix Efficiency Service	7,500	$1,157,020	8,215	1,666	5,295,719	7,500	$1,735,382	52,600
School Education Kits	20,000	$616,126	11,775	183	3,490,850	20,000	$543,578	34,014
Water Heating Rebate						1,050	$235,165	3,288
Residential Segment Energy Efficiency Total	**272,546**	**$9,770,693**	**76,062**	**14,893**	**67,042,114**	**44,537**	**$6,076,738**	**242,012**
Load Management Segment - Residential Saver's Switch	**21,000**	**$6,797,971**	**63,302**	**19,970**	**171,406**			
Consumer Education	433,854	$775,640				382,912	$540,806	
Home Energy Audits	3,392	$386,062				2,192	$189,124	
Lamp Recycling	248,023	$205,260						
Energy Efficiency Support Services		$385,510					$577,370	
Indirect Residential Subtotal	685,269	$1,752,472				385,104	$1,307,300	
Residential Segment Total	**978,815**	**$18,321,136**	**139,364**	**34,863**	**67,213,520**	**429,641**	**$7,384,038**	**242,012**
Low Income Segment								
Conservation Kits	15,000	$626,952	17,324	398	7,128,430	15,000	$318,401	40,524
Home Electric Savings Program	1,375	$1,037,857	397	120	803,660			
Single Family Weatherization Program						408	$891,563	6,038
Low Income Segment Total	**16,375**	**$1,664,809**	**17,721**	**517**	**7,932,090**	**15,408**	**$1,209,964**	**46,562**
Planning Segment								
Advertising & Promotion		$2,205,000					$551,250	
Application Development & Maintenance		$1,058,400					$264,600	
CIP Training		$149,741					$51,707	
Regulatory Affairs		$560,676					$115,548	
Planning Segment Total		**$3,973,817**					**$983,105**	
Research, Evaluations & Pilots Segment								
Market Research		$1,021,735					$209,435	
Product Development		$864,616					$202,854	
Annex 49 Pilot								
Energy Feedback Pilot	35,225	$113,839	683	105	6,345,530	35,000	$112,939	62,471
Product Development Total	**35,225**	**$978,455**	**683**	**105**	**6,345,530**	**35,000**	**$315,793**	**62,471**
Research, Evaluations & Pilots Segment Total	**35,225**	**$2,000,189**	**683**	**105**	**6,345,530**	**35,000**	**$525,228**	**62,471**
PORTFOLIO SUBTOTAL	**1,111,982**	**$63,672,892**	**262,730**	**99,626**	**351,828,294**	**482,728**	**$14,773,857**	**851,387**
Renewable Energy Segment-Solar*Rewards	**414**	**$5,003,198**	**2,046**	**1,062**	**2,791,427**			
Anticipated Alternative Filings								
CEE County Government Initiative								
CEE One Stop Efficiency Shop		$14,000,000		12,531	46,258,510			
Energy Smart		$330,000						
Anticipated Alternative Filings Total		**$14,330,000**		**12,531**	**46,258,510**			
Assessments Segment		**$1,318,120**					**$361,442**	
Electric Utility Infrastructure								
Supply Side Resources Segment - U of M IREE								
PORTFOLIO TOTAL	**1,112,396**	**$84,324,210**	**264,776**	**113,219**	**400,878,231**	**482,728**	**$15,135,299**	**851,387**

2010-2012 Triennial Plan Program Summary

Three Year Summary	Electric Participants	Electric Budget	Customer kW	Generator kW	Generator kWh	Gas Participants	Gas Budget
2010	1,087,204	$74,747,442	251,830	101,412	351,003,149	447,938	$13,320,424
2011	1,101,032	$79,275,922	257,716	105,827	368,767,444	468,132	$13,972,959
2012	1,112,396	$84,324,210	264,776	113,219	400,878,231	482,728	$15,135,299
2010 - 2012 Total	**3,300,632**	**$238,347,573**	**774,322**	**320,457**	**1,120,648,824**	**1,398,799**	**$42,428,682**

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Phyllis Reha	Commissioner
David C. Boyd	Commissioner
J. Dennis O'Brien	Commissioner
Betsy Wergin	Commissioner

APPLICATION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION FOR A CERTIFICATE OF NEED FOR THE SCOTT COUNTY – STRUCTURE #57 115/115 KV CONVERSION AND STRUCTURE #57 – WESTGATE 115 KV UPGRADE	DOCKET NO. E-002/CN-11-332 **PETITION**

SUMMARY OF FILING

Please take notice that on March 9, 2012, Northern States Power Company doing business as Xcel Energy submitted a Certificate of Need application for approval from the Minnesota Public Utilities Commission. The Application seeks authorization to convert and upgrade approximately 20 miles of 69 kV transmission line to 115 kV capacity along the existing Scott County – Bluff Creek – Westgate transmission line located in parts of Carver, Scott, and Hennepin Counties.

CERTIFICATE OF SERVICE

I, Mark Suel, hereby certify that I have this day served copies or summaries of the foregoing document on the attached list of persons by delivery by hand, electronically or by causing to be placed in the U.S. mail at Minneapolis, Minnesota.

DOCKET NO. E002/CN-11-332

Dated this 9th day of March 2012

/s/

Mark Suel

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Lisa	Agrimonti	lagrimonti@briggs.com	Briggs And Morgan, P.A.	2200 IDS Center80 South 8th Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_11-332_Official
Julia	Anderson	Julia.Anderson@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota St St. Paul, MN 551012134	Electronic Service	No	OFF_SL_11-332_Official
James J.	Bertrand	james.bertrand@leonard.com	Leonard Street & Deinard	Suite 2300 150 South Fifth Street Minneapolis, MN 55402	Paper Service	No	OFF_SL_11-332_Official
Steven	Bosacker		City of Minneapolis	City Hall, Room 301M 350 South Fifth Street Minneapolis, MN 554151376	Paper Service	No	OFF_SL_11-332_Official
Jim	Callaghan	jimcallaghan_90@msn.com		2369 Fawn Hill Court Chanhassen, MN 55317	Paper Service	No	OFF_SL_11-332_Official
Christopher	Clark	christopher.b.clark@xcelenergy.com	Xcel Energy	5th Floor 414 Nicollet Mall Minneapolis, MN 554011993	Paper Service	No	OFF_SL_11-332_Official
Jeffrey A.	Daugherty	jeffrey-daugherty@centerpointenergy.com	CenterPoint Energy	800 LaSalle Ave Minneapolis, MN 55402	Paper Service	No	OFF_SL_11-332_Official
Ron	Elwood	relwood@mnlsap.org	Legal Services Advocacy Project	2324 University Ave Ste 101 St. Paul, MN 55114	Electronic Service	No	OFF_SL_11-332_Official
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 500 Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_11-332_Official
Burl W.	Haar	burl.haar@state.mn.us	Public Utilities Commission	Suite 350 121 7th Place East St. Paul, MN 551012147	Electronic Service	No	OFF_SL_11-332_Official

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Valerie	Herring	vherring@briggs.com	Briggs and Morgan, P.A.	2200 IDS Center 80 S. Eighth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_11-332_Official
Alan	Jenkins	aj@jenkinsatlaw.com	Jenkins at Law	2265 Roswell Road Suite 100 Marietta, GA 30062	Electronic Service	No	OFF_SL_11-332_Official
Douglas	Larson	dlarson@dakotaelectric.com	Dakota Electric Association	4300 220th St W Farmington, MN 55024	Electronic Service	No	OFF_SL_11-332_Official
John	Lindell	agorud.ecf@ag.state.mn.us	Office of the Attorney General-RUD	900 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	No	OFF_SL_11-332_Official
Pam	Marshall	pam@energycents.org	Energy CENTS Coalition	823 7th St E St. Paul, MN 55106	Paper Service	No	OFF_SL_11-332_Official
Andrew	Moratzka	apm@mcmlaw.com	Mackall, Crounse and Moore	1400 AT&T Tower 901 Marquette Ave Minneapolis, MN 55402	Paper Service	No	OFF_SL_11-332_Official
David W.	Niles	david.niles@avantenergy.com	Minnesota Municipal Power Agency	Suite 300 200 South Sixth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_11-332_Official
Richard	Savelkoul	rsavelkoul@felhaber.com	Felhaber, Larson, Fenlon & Vogt, P.A.	444 Cedar St Ste 2100 St. Paul, MN 55101-2136	Paper Service	No	OFF_SL_11-332_Official
Byron E.	Starns	byron.starns@leonard.com	Leonard Street and Deinard	150 South 5th Street Suite 2300 Minneapolis, MN 55402	Paper Service	No	OFF_SL_11-332_Official
James M.	Strommen	jstrommen@kennedy-graven.com	Kennedy & Graven, Chartered	470 U.S. Bank Plaza 200 South Sixth Street Minneapolis, MN 55402	Paper Service	No	OFF_SL_11-332_Official

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Eric	Theship Rosales	N/A		9201 Audubon Rd Chanhassen, MN 55317	Paper Service	No	OFF_SL_11-332_Official
SaGonna	Thompson	Regulatory.Records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	OFF_SL_11-332_Official
Lisa	Veith		City of St. Paul	400 City Hall and Courthouse 15 West Kellogg Blvd. St. Paul, MN 55102	Paper Service	No	OFF_SL_11-332_Official