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Direct Testimony and Schedules
Elizabeth M. Engelking

State of Minnesota
Before the Office of Administrative Hearings
For the Minnesota Public Utilities Commission

In the Matter of a Petition by Excelsior Energy Inc. for Approval of a Power Purchase Agreement Under Minn. Stat. § 216B.1694, Determination of Least Cost Technology, and Establishment of a Clean Energy Technology Minimum Under Minn. Stat. § 216B.1693

OAH Docket No. 12-2500-17260-2
PUC Docket No. E6472/M-05-1993

System Impact Analysis

September 5, 2006

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I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME.

A. My name is Elizabeth M. Engelking.

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A. I am employed by Xcel Energy Services Inc. as Manager of Resource Planning and Bidding for Xcel Energy's northern system. In that capacity, I am responsible for planning the generating resources necessary to meet the demand for electricity from customers served by Northern States Power Company-Minnesota and Northern States Power Company-Wisconsin.

Q. FOR WHOM ARE YOU TESTIFYING?

A. I provide testimony on behalf of Northern States Power Company doing business as Xcel Energy ("Xcel Energy").

Q. PLEASE SUMMARIZE YOUR QUALIFICATIONS AND EXPERIENCE.

A. I received my MBA in finance and economics from University of Minnesota (Carlson School of Management) in 1986. From 1988-1998, I was employed as a rate analyst with the Minnesota Public Utilities Commission ("Commission"), where I oversaw the implementation of Integrated Resource Planning and advised the Commission on utility resource planning, ratemaking, and industry restructuring issues. Following my tenure at the Commission, I joined Great River Energy in 1998, first as a transmission analyst and then, in 2000, as Manager of Resource Planning. In that capacity, I directed the development, filing, and acceptance of two integrated resource plans with the Commission. I have been employed at my current position

with Xcel Energy Services Inc. since August 2004. My resume is provided as Exhibit___(EME-1), Schedule 1.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I evaluate the impact of the MEP-I LLC ("Mesaba 1 LLC") purchased power agreement ("Mesaba 1 PPA") on Xcel Energy's operating system. To do so, I compared estimates of costs of adding the Mesaba 1 PPA to Xcel Energy's system against the costs of our approved Resource Plan. Based on this analysis, I conclude that the Mesaba 1 PPA is not, and is not likely to be, a least-cost resource.

II. COST IMPACT ANALYSIS

A. Analytical Approach

Q. PLEASE DESCRIBE THE FOUNDATION OF YOUR ANALYSIS, XCEL ENERGY'S APPROVED RESOURCE PLAN.

A. On July 28, 2006, the Commission issued an Order approving a Resource Plan for our system for the years 2005 through 2019 (Docket No. E002/RP-04-1752). The Commission's Order requires or authorizes:

- Demand-side management ("DSM") increases to 3,950 MWhs of energy savings and 1,156 MWs of demand savings.
- Increased wind generation to 2805 MWs by 2019.
- Xcel Energy to file by November 1, 2006 its proposal to meet 375 MWs of baseload need in 2015.
- Xcel Energy to file by December 31, 2006 applications for all approvals needed to implement 300 MWs of capacity upgrades at our Sherco and nuclear power plants.

- A request for proposals for 136 MWs of peaking capacity to be in-service by 2011.
- That the cost of potential future carbon regulation be considered when analyzing resource options.

Q. HOW DID YOU PERFORM YOUR ANALYSIS OF THE MESABA 1 PPA?

A. I compared the system generation costs of our approved Resource Plan to our system generation costs after incorporation of the Mesaba 1 PPA. To do so, I first calculated the capital and operating costs for both scenarios using a system resource planning computer model called Strategist. By then comparing the Strategist results of our approved Resource Plan with the results of the Mesaba 1 PPA scenario, I was able to assess the impacts of the Mesaba 1 PPA. The Strategist modeling presented in this proceeding was conducted under my direction.

To estimate the costs associated with our approved Resource Plan, I used the Strategist model presented in the Resource Plan proceeding, adjusted to reflect both the specific requirements of the Commission's Order and updated data for demand and energy forecasts and fuel costs. I used the same source and methods when supplying this updated data as was used in our approved Resource Plan; thus, the analysis is simply updated to reflect the new vintage of forecast and fuel data as compared to the vintage data in our approved Resource Plan. The Strategist modeling calculates a present value of revenue requirements ("PVRR") for each generation scenario, which expresses the cost of a scenario over time. Included with my testimony is Exhibit___(EME-1), Schedule 2, which lists the assumptions used in this analysis.

Q. HOW DID YOU REFLECT THE COMMISSION'S REQUIREMENT TO ACCOUNT FOR THE POTENTIAL FUTURE COST OF CARBON REGULATION IN YOUR ANALYSIS?

A. I added a $9/ton carbon emissions value to a resource's cost to account for the carbon dioxide emitted as that resource generates electricity. This value represents a proxy for the costs that Xcel Energy may need to pay to emit carbon dioxide in the future, either directly through a tax or purchase of emission allowances, or indirectly through the dispatch of higher-cost resources to avoid carbon emissions. While this value is an estimate and is still subject to discussion among parties to the Resource Plan proceeding, I believe it represents a reasonable approach for complying with the Commission's requirement to consider a carbon regulation value in resource acquisition proceedings. For example, parties to our Resource Plan proceeding had recommended an $8/ton value for consideration.

B. Mesaba 1 PPA Modeling

Q. PLEASE DESCRIBE THE INFORMATION YOU USED TO MODEL THE MESABA 1 PPA.

A. Normally, I would model the demand and energy costs included in a PPA over the term of the agreement. In this case, however, **[TRADE SECRET BEGINS**

TRADE SECRET ENDS]. Ms. Karen T. Hyde discusses the terms of the PPA in her testimony offered in this proceeding. **[TRADE SECRET BEGINS**

TRADE SECRET ENDS], I used data provided by Mesaba 1 LLC **[TRADE SECRET BEGINS**

TRADE SECRET ENDS] the annual capacity charge, fixed O&M costs,

and variable O&M costs for Mesaba Unit 1 beginning in 2011. I added these costs as a resource option Strategist could select when developing a least-cost plan for meeting our customer requirements. Because the Mesaba 1 PPA would provide capacity and energy in excess of system needs over the planning period, I removed the 300 MWs of capacity upgrades reflected in the Resource Plan scenario to avoid Strategist selecting these lower-cost upgrades. Included with my testimony is Exhibit___(EME-1), Schedule 3, which lists the assumptions for the Mesaba 1 PPA modeling.

Q. PLEASE DESCRIBE HOW YOU MODELED THE IMPACT OF THE MESABA 1 PPA.

A. I first added the data provided by Mesaba 1 LLC to the model and allowed Strategist to determine the least-cost resource scenario with the Mesaba 1 PPA available as a resource. Strategist did not select the Mesaba 1 PPA when optimizing system resources and selecting a least-cost scenario.

I then required Strategist to accept the Mesaba 1 PPA as a system resource beginning in 2011 to determine its impact. Strategist then optimized the system and selected the least-cost expansion plan with the costs of the Mesaba 1 PPA included as a system resource.

C. Analytical Results

Q. WHAT ARE THE RESULTS OF YOUR ANALYSES?

A. My analyses show that the PVRR for the Mesaba 1 PPA is approximately $1.5 billion (4.4 percent) higher than the PVRR for the Resource Plan, and results in 474 MW of excess capacity in 2012 versus 5 MW for the approved Resource Plan. I show the results of this comparison for the year 2012, the first full year of the Mesaba 1 PPA, in Table 1 below.

1 **Table 1**

	Resource Plan	Mesaba 1 PPA	Mesaba 1 PPA PVRR vs. Resource Plan
PVRR ($000)	$34,518,681	$36,031,616	+$1,512,935 +4.4%
Excess Capacity 2012 (MW)	5	474	+469

2

3 Considering the high and low externalities values established by the
4 Commission makes no meaningful difference in this comparison, as shown in
5 Table 2 below.

6 **Table 2**

	Resource Plan	Mesaba 1 PPA	Mesaba 1 PPA PVRR vs. Resource Plan
PVRR- High Externalities ($000)	$37,753,986	$39,365,767	+$1,611,781 +4.2%
PVRR- Low Externalities ($000)	$35,122,672	$36,639,703	+$1,517,031 +4.3%

7

8 Both with and without environmental externalities, the Mesaba 1 PPA has a
9 PVRR at least $1.5 billion and 4 percent higher than our approved Resource
10 Plan.

11

12 Q. MESABA 1 LLC OFFERS A PVRR ANALYSIS IN ITS PETITION. WHAT IS THAT
13 ANALYSIS?

14 A. Mesaba 1 LLC compares the PVRR for Mesaba Unit 1 (based on the costs of
15 a hypothetical Integrated Gasification Combined Cycle plant) with the PVRR
16 for a hypothetical utility-owned Super Critical Pulverized Coal plant. Mesaba
17 1 LLC states that the PVRR for Mesaba Unit 1 is **[TRADE SECRET**
18 **BEGINS TRADE SECRET ENDS]** as compared with

[TRADE SECRET BEGINS TRADE SECRET ENDS]
for a Super Critical Pulverized Coal plant.

Q. WHY IS THERE SUCH A SIGNIFICANT DIFFERENCE BETWEEN MESABA 1 LLC'S ANALYSIS AND THE STRATEGIST RESULT?

A. Mesaba 1 LLC simply calculated a PVRR for Mesaba Unit 1 in isolation from the Xcel Energy system. Mesaba 1 LLC first developed an estimate of the total fixed and variable costs of building and operating the plant over the life of the contract, and then discounted that total cost to calculate a unit-specific PVRR. This approach is not comparable to the approach used in Resource Plans and other resource acquisition proceedings, where resources are evaluated based on their impact on the utility system as a whole. Considering the addition of a resource in light of all the other alternatives available in the system presents a clearer picture of the resource's overall cost impact.

Q. HAVE YOU CALCULATED THE RATE IMPACT OF THE MESABA 1 PPA?

A. No. Mr. Mark Hervey offers testimony regarding Mesaba 1 PPA's impact on customer rates, considering the results of my analysis and cost impacts identified by other Xcel Energy witnesses in this proceeding.

D. Risk Sensitivities

Q. DID XCEL ENERGY DO ANY OTHER ANALYSIS OF THE COST IMPACT OF THE MESABA 1 PPA?

A. Yes. As explained in the testimony of Ms. Hyde, the Mesaba 1 PPA [TRADE SECRET BEGINS

[TRADE SECRET BEGINS TRADE SECRET ENDS]. To better understand the possible impacts of this [TRADE SECRET BEGINS TRADE SECRET ENDS] situation, I performed additional modeling of the Mesaba 1 PPA assuming that [TRADE SECRET BEGINS

TRADE SECRET ENDS]. Specifically, I modeled the cost impact on the Xcel Energy system of the PPA with [TRADE SECRET BEGINS

TRADE SECRET ENDS].

Q. WHAT WERE THE RESULTS OF THIS ANALYSIS?

A. I show the results of this analysis for [TRADE SECRET BEGINS TRADE SECRET ENDS] in Graph 1 below.

Graph 1

[TRADE SECRET BEGINS

TRADE SECRET ENDS]

In each case, the Mesaba 1 PPA exceeds the costs of the Resource Plan scenario by a significant amount, at least $1.3 billion more **[TRADE SECRET BEGINS TRADE SECRET ENDS]**. The graph illustrates the trend of impact if the Mesaba 1 PPA **[TRADE SECRET BEGINS TRADE SECRET ENDS]**. Because the Mesaba 1 PPA **[TRADE SECRET BEGINS TRADE SECRET ENDS]**, it is appropriate to consider the impact **[TRADE SECRET BEGINS TRADE SECRET ENDS]** would have for Xcel Energy customers.

Q. DID YOU PERFORM ANY OTHER RISK ANALYSIS FOR THE MESABA 1 PPA?

A. Yes. Ms. Hyde notes that the Mesaba 1 PPA does not appear **[TRADE SECRET BEGINS TRADE SECRET ENDS]**. As such, I analyzed the impact on the system if Mesaba Unit 1 **[TRADE SECRET BEGINS TRADE SECRET ENDS]**.

Q. HOW DID YOU PERFORM THIS ANALYSIS?

A. I modeled the Mesaba 1 PPA under a scenario where Mesaba Unit 1 is **[TRADE SECRET BEGINS TRADE SECRET ENDS]**. I compared the resulting PVRR with the PVRR of a scenario that **[TRADE SECRET BEGINS TRADE SECRET ENDS]**.

Q. WHAT WERE THE RESULTS OF THE ANALYSIS?

A. This analysis demonstrates that the Mesaba 1 PPA [TRADE SECRET BEGINS TRADE SECRET ENDS] would cost ratepayers over $600 million more than [TRADE SECRET BEGINS TRADE SECRET ENDS]. Table 3 below shows the results of this analysis.

Table 3

2012	[TRADE SECRET BEGINS TRADE SECRET ENDS] ($000)	[TRADE SECRET BEGINS TRADE SECRET ENDS] ($000)	Mesaba 1 PPA PVRR Over Plan PVRR ($000)
	$34,943,875	$35,582,952	$639,077 +1.8%

Because [TRADE SECRET BEGINS TRADE SECRET ENDS], this cost differential is due entirely to [TRADE SECRET BEGINS TRADE SECRET ENDS].

Q. HOW SHOULD THESE ANALYSES BE CONSIDERED IN THIS PROCEEDING?

A. I believe these risk analyses should be used when evaluating the impact of the Mesaba 1 PPA on Xcel Energy's system. Given that the Mesaba 1 PPA does not [TRADE SECRET BEGINS TRADE SECRET ENDS], I offer this analysis to help assess the risks associated with this proposal. Because of [TRADE SECRET BEGINS

TRADE SECRET ENDS], the actual cost

impacts to Xcel Energy's system are **[TRADE SECRET BEGINS TRADE SECRET ENDS]**.

III. CONCLUSION

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. My analysis indicates that the Mesaba 1 PPA is not, and is not likely to be, a least cost resource. Even assuming the costs projected by Mesaba 1 LLC in this proceeding are accurate, the Mesaba 1 PPA imposes approximately $1.5 billion in higher PVRR than our approved Resource Plan. **[TRADE SECRET BEGINS**

TRADE SECRET ENDS]. The possible impacts of these risks should be considered when evaluating the Mesaba 1 PPA.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Elizabeth M Engelking
Xcel Energy
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Minneapolis, Minnesota 55401

EDUCATION

Master of Business Administration, Carlson School of Management
University of Minnesota, 1986

Bachelor of Sciences
College of William and Mary in Virginia, 1982

CURRENT RESPONSIBILITIES

I direct the development of the Company's long-range Resource Plan and manage the bidding process to procure new long-range resources for the Northern States Power Company (Minnesota and Wisconsin) system.

EMPLOYMENT

Xcel Energy
2004 – present Manager, Resource Planning and Bidding

Great River Energy
2000 – 2004 Manager, Resource Planning
1998 – 2000 Transmission Analyst

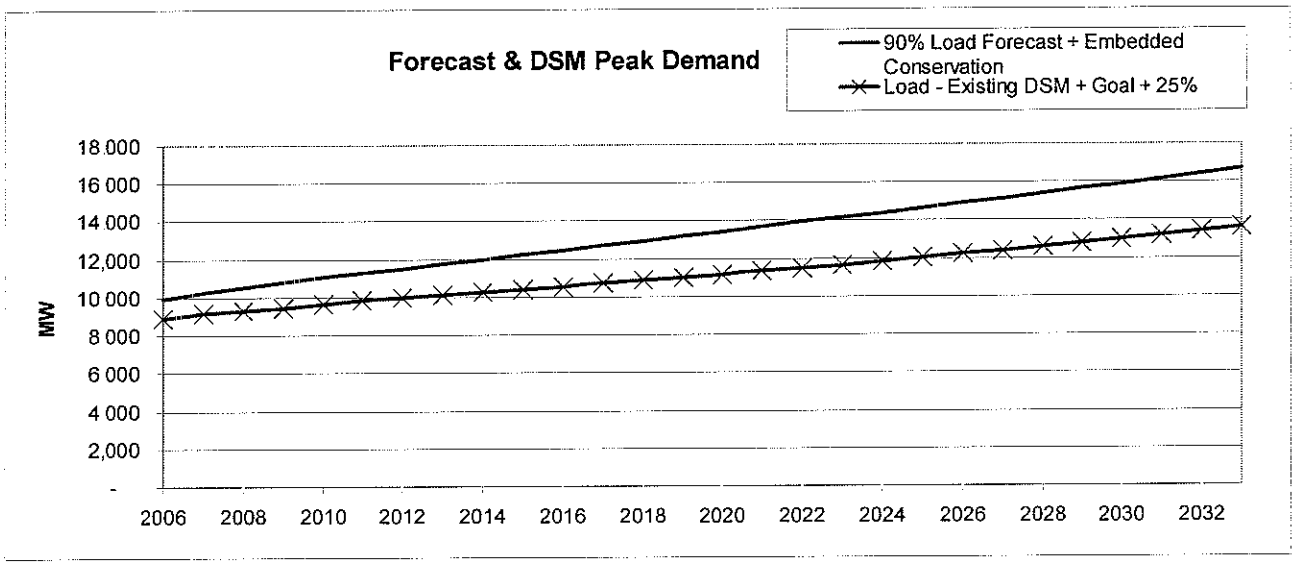
Minnesota Public Utilities Commission
1988 – 1998 Public Utilities Rates Analyst

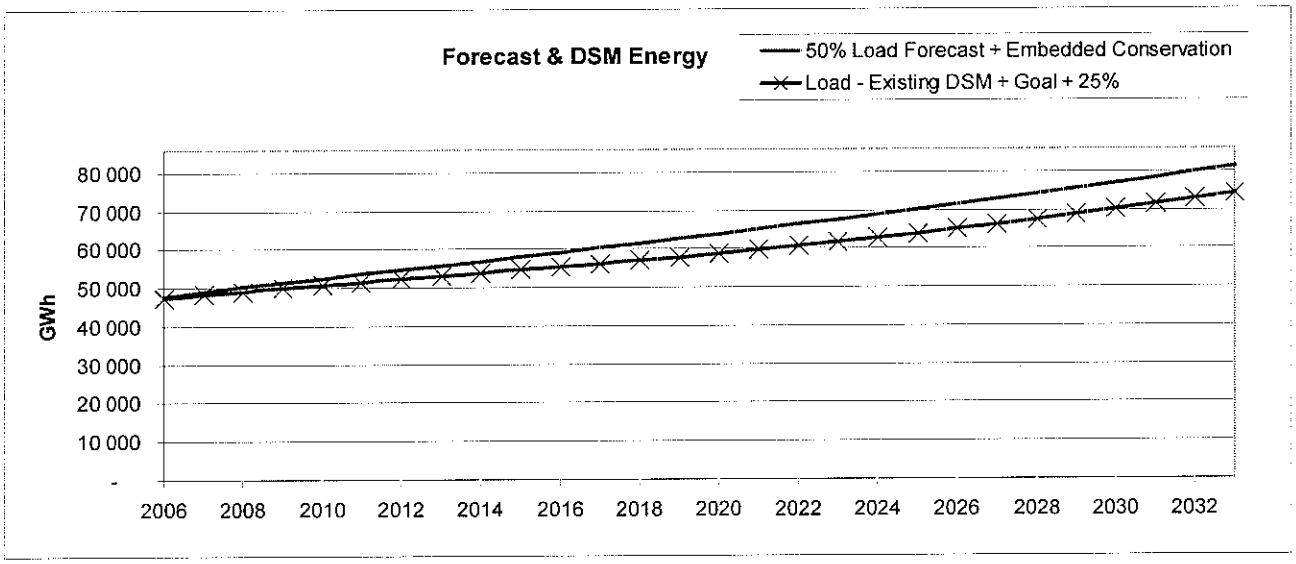
PREVIOUS PLANNING TESTIMONY

Xcel Energy	E002/CN-05-123	Cost and Alternative Analysis

Approved Resource Plan Strategist Modeling Assumptions

Load Forecast	Updated May 2006. Includes embedded conservation. *See attached graph
DSM	2004 Resource Plan ordered levels from July 28, 2006 Order (Docket No. E002/RP-04-1752): 3,950 MWhs of energy savings and 1,156 MWs demand savings *See attached graph
Gas Forecast	Aug 2006 - Dec 2008, NYMEX Futures Prices Jan 2009 - Dec 2020 PIRA Midcon 6/15/06 * See attached graph
Coal Forecast	NSP 30 year forecast *See attached graph
Existing Generation Fleet	URGE rating used in 2004 IRP, West Faribault and GRE/Basin 144 MW Flint Hills contract retired.
MERP	King 07, High Bridge 08, Riverside 09
Upgrades	Sherco 48 MW 2010, PI 136 MW 2015, Monti 66 MW 2011.
Wind	2,805 MW by 2019
Externalities	PUC values as of 4/27/05 in Docket No. E999/CI-00-1636
Carbon Tax	$9/Ton starting in 2010 escalated by 2.5% thereafter.
Cost of Capital	7.66% (after tax) from 2005 Minnesota Electric Rate Case - as proposed by Xcel Energy in filing and recommended by ALJ in finding 122


Forecast & DSM Peak Demand
90% Load Forecast + Embedded Conservation
Load - Existing DSM + Goal + 25%
MW
18 000
16 000
14 000
12,000
10 000
8 000
6 000
4 000
2,000
-
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032


Forecast & DSM Energy
50% Load Forecast + Embedded Conservation
Load - Existing DSM + Goal + 25%
GWh
80 000
70 000
60 000
50 000
40 000
30 000
20 000
10 000
-
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032

[TRADE SECRET BEGINS

TRADE SECRET ENDS]

Mesaba 1 PPA Strategist Modeling Assumptions

[TRADE SECRET BEGINS TRADE SECRET ENDS]	[TRADE SECRET BEGINS TRADE SECRET ENDS]
Variable O&M	[TRADE SECRET BEGINS TRADE SECRET ENDS]
Fixed O&M	[TRADE SECRET BEGINS TRADE SECRET ENDS]
[TRADE SECRET BEGINS TRADE SECRET ENDS]	[TRADE SECRET BEGINS TRADE SECRET ENDS]
Capacity Level	[TRADE SECRET BEGINS TRADE SECRET ENDS]
Fuel Mix	75% PRB/25% Pet Coke blend
Resource Assumptions	Same as Resource Plan Model except eliminates the upgrades to the Sherco and Nuclear units.