

BEFORE THE MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
100 Washington Square, Suite 1700
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FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 7th Place East, Suite 350
St Paul MN 55101-2147

LeRoy Koppendraye
Marshall Johnson
Kenneth Nickolai
Phyllis Reha
Thomas Pugh

Chair
Commissioner
Commissioner
Commissioner
Commissioner

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

Docket No. E6472/M-05-1993

DIRECT PUBLIC TESTIMONY AND EXHIBITS OF EILON AMIT
ON BEHALF
OF THE MINNESOTA DEPARTMENT OF COMMERCE

SEPTEMBER 5, 2006

DIRECT TESTIMONY OF EILON AMIT
EXCELSIOR ENERGY, INC.

DOCKET NO. E6472/M-05-1993

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1 **I. BACKGROUND AND PURPOSE**

2 **Q. Please state your name.**

3 A. My name is Dr. Eilon Amit.

4
5 **Q. By whom are you employed?**

6 A. I am employed as a Public Utilities Rates Analyst by the Energy division of the
7 Minnesota Department of Commerce (the Department or DOC), Suite 500, 85 7th Place
8 East, St. Paul, Minnesota 55101.

9
10 **Q. What is your educational and professional background?**

11 A. Since first joining the DOC in 1981, I have prepared and defended testimony on issues
12 such as rate of return, class cost of service, rate-design and merger issues. I have also
13 analyzed various miscellaneous filings related to rate design, cost of capital, financial
14 tools, mergers and many other issues related to utility regulation. A complete summary
15 of my educational and professional background is presented in DOC Exhibit No. ____
16 (EA-1).

17
18 **Q. What is your responsibility in this proceeding?**

19 A. My responsibilities are:

- 20 1. To review the Power Purchase Agreement (PPA) submitted by Excelsior
21 Energy (Excelsior) to Northern States Power Company – Minnesota (NSP)
22 d/b/a Xcel Energy (Xcel) under Minn. Stat. §216B.1694 to determine if it

1 complies with the provisions of the relevant statutes and Commission
2 directives.

3 2. To determine, based on my review, if the PPA should be approved without
4 any modifications, should be disapproved, or should be modified.

5 3. To determine whether or not the Integrated Gasification Combined Cycle
6 (IGCC) proposed by Excelsior is, or is likely to be, a least-cost resource,
7 obligating Xcel to use the IGCC plant's generation for at least 2 percent of
8 the energy supplied to (and paid by) its retail customers, under Minn. Stat.
9 §216B.1693.

10 4. To analyze any other issues that may be related to the determination of
11 whether the petition submitted by Excelsior is in the public interest.

12
13 **II. RELEVANT STATUTES AND COMMISSION DIRECTIVES**

14 **Q. Dr. Amit, please list the Minnesota statutes or Commission directives that are**
15 **relevant to this case.**

16 A. The relevant statutes are Minn. Stats. 216B.1693 and 216B.1694. I have attempted to
17 incorporate the Commission's directives and guidance into my analysis. I will discuss
18 the relationship of Minn. Stat. 216B.1694 to the PPA in the next section and will discuss
19 Minn. Stat. 216B.1693 later in my testimony.

20
21 **Q. Has the Commission provided any guidance or directives concerning record**
22 **development in this docket?**

1 A. Yes. The Commission has discussed this docket at two different hearings. As a result of
2 its first deliberation at the docket's April 6, 2006 hearing, the Commission issued an
3 Order on April 25, 2006 that included the following questions that should be developed
4 in the evidentiary record and made part of the recommendation as to whether the
5 Commission should:

- 6 (1) approve, disapprove, amend or modify the terms and conditions of a
7 proposed power purchase agreement that Excelsior has submitted to Xcel
8 Energy under Minn. Stat. 216B.1694;
9
- 10 (2) determine that the coal-fueled Integrated Gasification Combined Cycle
11 (IGCC) power plant that Excelsior plans to construct in northern Minnesota
12 is, or is likely to be, a least cost resource, obligating Xcel to use the plant's
13 generation for at least two percent of the energy supplied to its retail
14 customers, under Minn. Stat. 216B.1693; and
15
- 16 (3) determine that, under the terms of Minn. Stat. 216B.1693, at least 13% of
17 the energy supplied to Xcel's retail customers should come from the IGCC
18 plant by 2013.
19

20 The Commission again discussed avenues of record development and issues at its July 27,
21 2006 hearing. Although the Commission did not feel the need to issue a formal order
22 reflecting its deliberations, Chairman Koppendrayer summarized the Commission's
23 intention by saying, "I think that Commissioner Nickolai spelled out quite clearly the
24 interpretation of the statute; and if it isn't satisfied, if we're not satisfied with what you
25 come back with, we're going to start over. And I don't think anybody wants to do that.
26 So the more complete the record is, the better we are." (July 27, 2006 Commission
27 Hearing transcript pg. 63 at 11-16.)
28

29 **Q. Chairman Koppendrayer mentioned Commissioner Nickolai's "interpretation of**
30 **the statute" What did Commission Nickolai say?**

1 A. Commissioner Nickolai's comments begin on page 54, line 3 of the July 27, 2006
2 Hearing transcript. He said:

3 As this cycled back to us, I spent some time with the
4 statute. I've been trying to think about this. And it seems
5 like – It seems like there's three – that the statutes require
6 us to look at this in kind of three levels. One is that all
7 items which may be claimed to be included or passed
8 through in somehow the PPA. And so if there's pass-
9 throughs, escalation clauses, anything like that, that's one
10 piece of this that we've got to make sure we've got
11 information on, because we have to approve that PPA.
12

13 The second level of this though is that we need to know all
14 of the costs that are – that could be borne by Xcel
15 customers because we're looking at – and not nec – and
16 those that are not being flown through the PPA. But, for
17 example, if – under the transmission construction, if Xcel
18 customers are going to end up – or Minnesota Power
19 customers are going to be – end up bearing up a very
20 substantial part of the costs of these transmission upgrades,
21 we need to know that.
22

23 Likewise, if there are impacts on the transmission system
24 because of these upgrades that result in more curtailment
25 payments to wind in western Minnesota being made by
26 Xcel and the Xcel customers, we need to know that. So
27 we've got the direct costs going – going through the PPA.
28 We've got any kind of costs that might come to –
29 ultimately come to Xcel customers.
30

31 And then, finally, we've got this unusual kind of public –
32 public interest requirements that the statute tells us that
33 we're going to have to make findings on economic
34 development benefits. And I assume that means costs as
35 well. We're going to have to look at costs as well as
36 benefits to be able to say yes, that actually is a net benefit.
37 The abundant domestic fuel supply. The stability of the
38 price of the output.
39

40 We also have to make findings on the project's potential to
41 contribute to a transition to a hydrogen as a fuel resource
42 and an emission – and the emissions reductions achieved
43 compared to other solid fuel baseloads so that if they've got
44 claims – say you've got – we've got the potential to capture

1 carbon, therefore, you've got to give us credit for that, well,
2 then we need information about is it really feasible.
3

4 So to me when I look at the specific list that's developed
5 here, I can't tell you that any one of those really is relevant
6 because I don't know what – who's bearing those costs,
7 whether or not there's any proposal that is going to go
8 through or not. But this is something I think we need the
9 ALJ . . . Let the parties raise these issues, bring their
10 relevant base – their relevance based on those three
11 screens, because that's what we're going to end up having
12 to look at are those three screens when we finally sit down
13 with the statute and the record.
14

15 As I stated above, without responding point-by-point to Commissioner Nickolai's
16 guidance, I have incorporated his thoughts into my approach to the potential issues
17 surrounding the PPA in this docket.
18

19 **III. THE PPA AND MINN. STAT. 216B.1694**

20 **Q. Dr. Amit, please summarize the features of Minn. Stat. §216B.1694 that relate to the**
21 **PPA.**

22 A. Minn. Stat. §216B.1694, subd. 2 part (7) states that a project that meets parts (1), (2) and
23 (3) of Minn. Stat. §216B.1694, subd. 1, shall be entitled to enter into a PPA with NSP to
24 provide 450 megawatts (MW) of baseload capacity and energy. I have included the full
25 text of the relevant Statutes, Minn. Stats. 216B.1693 and 216B.1694 at DOC Exhibit ____
26 (EA-7.)
27

28 **Q. What are the conditions stated in subd. 1?**

29 A. Subd. 1 states:

30 **Definition.** For the purposes of this section, the term
31 “innovative energy project” means a proposed energy-

1 generation facility or group of facilities which may be
2 located on up to three sites:

3
4 (1) that makes use of an innovative generation technology
5 utilizing coal as a primary fuel in a highly efficient
6 combined-cycle configuration with significantly reduced
7 sulfur dioxide, nitrogen oxide, particulate, and mercury
8 emissions from those of traditional technologies;

9 (2) that the project developer or owner certifies is a project
10 capable of offering a long-term supply contract at a hedged,
11 predictable cost; and

12 (3) that is designated by the commissioner of the Iron
13 Range Resources and Rehabilitation Board as a project that
14 is located in the taconite tax relief area on a site that has
15 substantial real property with adequate infrastructure to
16 support new or expanded development and that has
17 received prior financial and other support from the board.
18

19 **Q. Does the PPA meet part (1) of Minn. Stat. §216B.1694?**

20 A. The technology described in the PPA, and in more detail in Volume I of Excelsior's
21 filing before the Minnesota Public Utilities Commission (Commission) (December 23,
22 2005) has not been tested on a large scale electric plant such as proposed in the PPA.
23 However, based on the description of the project in Excelsior's filing, the project
24 described in the PPA appears to meet the requirements of part (1) of Minn. Stat.
25 §216B.1694, subd. 1.

26 In particular, based on the data provided by Excelsior, the project will
27 significantly reduce emissions of sulphur dioxide (SO₂), nitrogen dioxide (NO_x), (PM10)
28 and Mercury when compared to emission from a supercritical coal plant (DOC Exhibit
29 No. ____ (EA-3).

30
31 **Q. Does the project meet parts (2) and (3) of Minn. Stat. §216B.1694, Subd. 1?**

32 A. Yes, it does.

1 **Q. Does the PPA, as presented, stay true to the expressed language of Minn. Stat.**
2 **§216B.1694?**

3 A. No, it does not.

4
5 **Q. Please explain.**

6 A. Part (7) of subd. 2 of Minn. Stat. §216B.1694 states that if parts (1), (2), and (3) of Minn.
7 Stat. §216B.1694, subd. 1 are met, then Excelsior is entitled to enter into a PPA with
8 Xcel for 450 megawatts (MW). The PPA proposes that NSP be obligated to purchase
9 603 MW. This is 153MW more than the 450 MW that the statute says an innovative
10 energy project is entitled to.

11
12 **Q. Dr. Amit, how do you propose to deal with this issue?**

13 A. Since the additional 150 MW proposed by Excelsior in its PPA is beyond the plain
14 language of Minn. Stat. §216B.1694, it is a question that Excelsior will need to address,
15 and other parties may respond, during the course of this proceeding.

16
17 **Q. In the meantime, how do you propose to analyze the PPA?**

18 A. The Department will analyze the PPA under two alternatives:

- 19
- Alternative one is the proposed PPA of 603 MW; and
 - Alternative two is the PPA as modified from 603 MW to 450 MW.
- 20

1 **Q. Dr. Amit, what criteria do you use to analyze the 603 MW PPA?**

2 A. I use the same public interest criteria to analyze this PPA as I use to analyze any other
3 PPA.

4
5 **Q. Please identify the criteria.**

6 A. A PPA is in the public interest if:

- 7 1. The ratepayers are appropriately protected from the operational risk
8 associated with the PPA;
- 9 2. The ratepayers are appropriately protected from the financial risks of the
10 PPA; and,
- 11 3. The purchase price to be paid by Xcel for the electric energy and capacity is
12 reasonable, when considered in combination with other socioeconomic
13 factors that may be beneficial.

14

15 **Q. Minn. Stat. §216B.1694, subd 3, part (7) requires the Commission to consider the**
16 **economic development and other benefits of the project and the emission reductions**
17 **of the project. How do you propose to account for these requirements?**

18 A. To fully analyze the costs/benefits of the PPA, the Department will discuss the net
19 statutorily listed benefits in the price valuation of the projects.

20

21 **Q. What are those benefit types listed in the statute?**

22 A. Minn. Stat. 216.1694 Subd. 2(7) lists benefits that should be considered including,
23 “economic development benefits to the state; the use of abundant domestic fuel sources;

1 the stability of the price of the output from the project; the project’s potential to
2 contribute to a transition to hydrogen as a fuel source and the emission reductions
3 achieved compared to other solid fuel baseload technologies.”
4

5 A. *OPERATIONAL RISKS*

6 **Q. Dr. Amit, going back to your three general criteria to help determine whether a**
7 **PPA is in the public interest, please discuss the first criteria which is the operational**
8 **risks of the PPA.**

9 A. The operational risks are the risks that the project will not be built and operated as
10 expected. These risks include a complete shut down or partial shut down of the project
11 or under performance of the project due to technical problems. In the case of complete or
12 partial shut down, ratepayers must be assured that their payments would not be increased
13 to pay for the replacement of energy and capacity, and Xcel must be protected from the
14 consequences of not meeting its reserve requirements.
15

16 **Q. Please discuss the specific features in the PPA that deal with the operational risks**
17 **discussed above.**

18 A. Following is a discussion of the main features of the PPA that relate to the issue of
19 operational risks.
20

21 *1. Fuel Risks*

22 Article 6 of the PPA deals with the obligation to sell and purchase capacity and energy.
23 Section 6.1 of Article 6 states:

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22 This feature requires NSP to purchase or pay (take or pay) the contract capacity and
23 energy even when the project uses natural gas only.

24
25 **Q. Please explain.**

26 A. Under Section 8.3 of the PPA NSP must pay Excelsior for the fuel used in the Facility
27 (Facility means the proposed 603 MW IGCC Plant). Therefore, when the Facility uses
28 natural gas as the primary or only fuel, NSP would have to pay for the cost of the natural
29 gas. These fuel costs would flow through to NSP's ratepayers. Given the cost and
30 volatility of natural gas, when the Facility uses natural gas it is likely to be non-economic
31 to dispatch it. However, Section 6.1 requires NSP to pay for the Contract energy
32 regardless whether it dispatches the Facility or not ("Take or Pay"). Therefore, NSP and
33 NSP's ratepayers would be forced to pay for more expensive energy when cheaper
34 energy may be available (i.e., when it is uneconomic to dispatch the Facility).

1 **Q. Is it possible to change Section 6.1 to more properly allocate the fuel risk between**
2 **NSP and Excelsior?**

3 A. Yes. The following alternative is a more reasonable allocation of the fuel risk among
4 NSP, NSP's ratepayers and Excelsior. Section 8.3 of the PPA describes the payments for
5 fuel. The monthly fuel payments include, among others, the Consumed Fuel Costs
6 (CFC).

7 Section 8.3 could be amended as follows: Regardless of the actual fuel mix used
8 in the Facility, the amount of fuel cost to be paid will be based on the fuel mix forecasted
9 by Excelsior in Section III, page 7 of Volume I of Excelsior's filing before the
10 Commission. **[TRADE SECRET DATA BEGINS**

11 **TRADE SECRET DATA ENDS]** The price for each
12 component in the fuel mix will be the market price including transportation costs, if any.

13
14 **Q. Please discuss this Alternative.**

15 A. Under this Alternative the price is partially capped by fixing the fuel mix. Thus, price
16 volatility is reduced and the ratepayers are protected from the volatility of natural gas
17 prices. Moreover, ratepayers are less likely to pay higher energy costs when Excelsior
18 uses natural gas as its primary fuel, while the market energy costs are lower. Excelsior
19 will be better able to forecast the fuel payments it would receive from NSP, but would
20 face more volatile net fuel costs because, depending on its actual mix of fuel, it may pay
21 above or below its actual cost of fuel. If its actual fuel mix is the same as it has
22 forecasted, Excelsior's fuel cost and revenue will be the same. If its actual fuel mix is
23 cheaper than its forecasted mix, Excelsior will benefit, and the opposite is true if its

1 actual fuel mix is more expensive. Under this alternative, the fuel risk is more
2 appropriately shared between Excelsior and NSP's ratepayers.

3
4 **Q. Dr. Amit, do you propose amendment of Section 8.3 as you have previously**
5 **discussed as an alternative?**

6 A. No, I do not.

7
8 **Q. Please explain.**

9 A. Section 8.1 of the PPA provides the formula for capacity payments. Under this formula,
10 the monthly capacity payments are inversely related to the monthly gas usages. The
11 higher the percentage of natural gas used in the fuel mix, the lower are the capacity
12 payments. While conceptually energy price adjustments may better reflect changes in the
13 fuel mix usage, the reduction in capacity payments associated with higher natural gas
14 utilization, reasonably allocates the fuel risk between Excelsior Energy and Xcel's
15 ratepayers. For this reason, while I describe an alternative for the Commission to
16 consider, above, I do not affirmatively recommend its adoption.

17
18 *2. Events of Default and Cures*

19 **Q. Please discuss the main events of default that are related to operational risks.**

20 A. The PPA includes two types of default events: non-curable and curable.

1 **Q. Please discuss the main non-curable events.**

2 A. Most of the non-curable default events are related to the Seller's inability to meet its
3 financial obligations. Therefore, I will discuss them later in the financial risk section.

4

5 **Q. Please discuss the curable default events.**

6 A. Article 11 of the PPA describes curable default events. The main ones include:

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1 **Q. Dr. Amit, do you find the curable default provisions to appropriately allocate the**
2 **operational risks of the PPA among NSP, NSP's ratepayers and Excelsior?**

3 A. No, I do not. The provisions in the PPA are too general. For example, Article 11
4 [Article 11] does not provide specific cures for the Main Events of Default. Given the
5 lack of specific cures, the Department concludes that the PPA may not appropriately
6 protect NSP's ratepayers from operational risks. In particular, if the Seller abandons the
7 construction in the later years or abandons production, NSP will have to contract for a
8 significant amount of replacement capacity and energy. Such replacement capacity and
9 energy may be much more expensive than the PPA's proposed rates or alternative
10 projects that could have been contracted for by NSP earlier. If such a default should
11 occur, Section 11.6 of Article 11 sets a limitation on damages. In case of termination of
12 the PPA the damages are limited to **[TRADE SECRET DATA BEGINS**

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20 Based on these numbers and the ambiguity of the cure provisions the operational risks
21 are unreasonably allocated to NSP's ratepayers rather than to Excelsior.

1 **Q. Dr. Amit, do you have specific recommendations regarding the allocation of the**
2 **operational risks in the PPA?**

3 A. The Department recommends that Article 11 of the PPA be changed to more
4 appropriately allocate the operational risks of the PPA. In particular, for each Event of
5 Default, Article 11 must specify the proposed cure, monetary or otherwise. The
6 provision that allows the Facility Lender to cure any specific Event of Default, without
7 specifying the alternative cures, is too general and unreasonably shifts the operational
8 risks to NSP's ratepayers. The Department is mainly concerned with the partial or full
9 shut down of the Facility. The PPA is not specific enough regarding the remedies for
10 such events.

11
12 *B. FINANCIAL RISKS*

13 **Q. Dr. Amit, please discuss the financial risks of the PPA.**

14 A. There are two financial risks that may have negative impacts on NSP's ratepayers. They
15 are:

16 i. A Seller default and termination of the PPA during the late years of
17 construction or early years of the contract.

18 ii. Entitlement by the facility lender or other party, as a result of the Seller's
19 failure to pay debt, to take over the project and terminate the PPA.

20
21 **Q. Dr. Amit, please discuss the specific provisions in the PPA that deal with the**
22 **financial risks.**

1 A. Article 11 of the PPA discusses these provisions. In particular, Section 11.1 of Article 11
2 states:

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29 Also, Article 18 of the PPA provides the conditions under which the PPA could be
30 assigned to a third party. Any transfer of the PPA by the Seller, except for a transfer to
31 the Facility Lender, must be first approved by NSP.
32

33 **Q. Based on the provisions in the PPA, do you have any concerns that NSP's**
34 **ratepayers may not be reasonably protected from the financial risks of the PPA?**

35 A. Yes, I have concerns because ratepayers are not reasonably protected. The Department
36 is concerned with the financial risks associated with Seller's dissolution or liquidation. If

1 such events occur in the late construction period or in early years of production, NSP
2 would have to find replacement energy and capacity that could be very costly due to the
3 short replacement time available. The PPA specifies no financial instruments such as a
4 letter of credit, an escrow account or any other similar instrument that could serve as a
5 financial warranty. Therefore, the Department concludes that the PPA does not
6 reasonably protect NSP's ratepayers from the financial risk of the PPA.
7

8 *C. SUMMARY OF THE OPERATIONAL AND FINANCIAL RISKS*

9 **Q. Dr. Amit, please summarize your conclusions regarding the operational and**
10 **financial risks of the PPA.**

11 A. Based on its review and analysis of the PPA as offered by Excelsior, the Department has
12 concerns regarding the operational risks and financial risks of the PPA and whether those
13 risks are unreasonably shifted away from Excelsior to NSP's ratepayers. In particular:

- 14 1. The operational risks associated with curable Events of Defaults and Article
15 11 provisions.

16 Article 11 of the PPA must be modified by providing specific cures, monetary or
17 others, for each main Event of Default. The provision in Article 11 that gives the Facility
18 Lender the right to cure is too general and does not sufficiently protect NSP's ratepayers
19 from the operational risks.

- 20 2. The financial risks of the project associated with non-curable Events of
21 Default.

22 The PPA does not provide reasonable measures to protect NSP's ratepayers from
23 dissolution, liquidation and bankruptcy of the project. The PPA does not provide for any

1 financial instruments such as letter of credit or escrow accounts to protect NSP's
2 ratepayers from the project's complete or partial liquidation.

3 To reasonably protect NSP's ratepayers from the financial risks of the PPA, the
4 Department recommends that the PPA include financial warranties to protect NSP's
5 ratepayers from event of dissolution or bankruptcy of the project.

6
7 *D. THE PRICE OR COST OF THE PPA—STATUTORY COMPLIANCE AND COST*
8 *COMPARISONS*

9 **Q. Please discuss the price of the PPA.**

10 A. The price of the PPA includes four components:

- 11 1. the price for Contract Capacity;
- 12 2. the price for Variable O&M;
- 13 3. the price of fuel; and
- 14 4. the price of Fixed O&M.

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16 **Q. Dr. Amit, please discuss each component of the price.**

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Q. Dr. Amit, Excelsior has included only one set of cost numbers in its initial filing but the Company is looking at two different sites for the plant. Are the costs of the project and the PPA the same whether the plant is sited at the East Range site or the West Range site?

A. I don't believe so. Since Excelsior's initial petition only included cost information regarding the West Range site (Excelsior's preferred site,) the information for the East Range site is presently not in the record. However, Excelsior has committed to providing in their direct testimony the same set of information for the East Range Site as it filed initially for the West Range site. Once that information is available, I will look at the cost differentials between the two sites later in the proceeding to see if a material difference exists that could impact the outcome of this matter.

Q. Dr. Amit, what is the average price per MWh over the life of the project?

A. As I mentioned earlier in my testimony, I analyze both the 603 MW from the PPA and the 450 MW found in the Statute. Under certain assumptions it is possible to convert the

1 prices per MW to prices per MWh. Assuming a Capacity Factor of [TRADE SECRET
2 DATA HAS BEEN EXCISED] percent as provided by
3 Excelsior in its filing, the average price is [TRADE SECRET DATA HAS BEEN
4 EXCISED]. This price is calculated based on
5 Excelsior's provided data. If the project is restricted to 450 MW the average price would
6 be [TRADE SECRET DATA HAS BEEN EXCISED].

7 DOC Exhibit No. ____ (EA-2) summarizes the calculations of these prices.
8

9 **Q. How do you propose to evaluate the emission costs?**

10 A. The emission costs should be included in the price (cost) of the project. Based on the
11 emission information provided by Excelsior, and the Commission's May 3, 2005 updated
12 externality values in Docket No. E999/CI-05-1636, the emission costs of the IGCC are
13 \$3.45 per MWh and \$3.69 per MWh for Rural and Fringe Metro areas, respectively.
14 These costs are the average costs over the life of the project, adjusted for annual inflation
15 of 2.5 percent. DOC Exhibit No. ____ (EA-3) summarizes the calculations of these costs.
16

17 **Q. What are the average prices of the PPA including the environmental costs?**

18 A. Using the environmental costs based on a rural area the average prices of the PPA are
19 [TRADE SECRET DATA HAS BEEN EXCISED]

20 for the 603 MW and the 450 MW, respectively.

1 **Q. Dr. Amit, how do you propose to evaluate the reasonableness of these prices?**

2 A. These prices must be compared to the prices of alternative baseload facilities of similar
3 sizes. If the prices of the PPA are lower or similar to the prices of energy and capacity of
4 the alternative baseload facilities, we can conclude that the PPA's prices are reasonable.

5
6 **Q. Dr. Amit, what comparable baseloads do you propose to use?**

7 A. I recognize that Excelsior has already included a detailed cost comparison which was
8 provided by its project consultant, Fluor Enterprises, Inc.(Fluor). Since the Fluor study is
9 in the record and is available to all Parties to review, I will offer a number of other cost
10 comparisons in order to provide a reasonable framework or context to use in comparing
11 the PPA costs.

12
13 **Q. Please explain your first set of cost comparison scenarios.**

14 A. A group of seven utilities filed a request for Certificate of Need (CON) (Docket No. CN-
15 065-619) to build a transmission line to serve a newly proposed supercritical coal plant
16 near Milbank, South Dakota (Big Stone II). As part of the CON's application, the group
17 filed an economic study of various baseload alternatives. Among the alternatives used in
18 the economic study are a supercritical 600 MW coal plant, and a 600 MW subcritical
19 coal plant, I will use these two coal plants for comparison to the price proposed by
20 Excelsior.

1 **Q. Please discuss the price of the supercritical coal facility.**

2 A. The price of the supercritical coal plant in the Big Stone proceeding is based on the
3 period 2011 through 2030. To compare it to the price of Excelsior Energy over the same
4 time period, I used the average annual price increase of the supercritical plant over the
5 period 2011-2030 to estimate its annual prices for the period 2031-2036. Based on the
6 information provided in the economic study filed with the Big Stone II initial petition, the
7 average price of this project, over the period 2011 through 2036 is \$62.46 per MWh and
8 the levelized price of the project is \$59.52 per MWh. These calculations are summarized
9 in DOC Exhibit No. ____ (EA-4). This cost information was subsequently revised by the
10 Big Stone II proposers, as I discuss later in this testimony.

11
12 **Q. Please explain the concept of levelized price.**

13 A. The levelized price is the annual price (the same for each year of the contract) that will
14 result in the same net present value (NPV), over the life of the project, as the NPV of the
15 actual annual prices of the project. The levelized price provides an appropriate
16 comparison of projects with different annual prices and different durations.

17
18 **Q. What is the levelized price for the PPA?**

19 A. The levelized price for the PPA is [TRADE SECRET DATA HAS BEEN EXCISED]
20 (DOC Exhibit No. ____ (EA-2)).

21
22 **Q. Dr. Amit, please compare the prices of Big Stone II and the PPA, including the**
23 **external cost of emission.**

1 A. Using the Rural external costs of emissions, the average annual emission costs of the
 2 PPA and Big Stone II are \$3.45/MWh and \$3.83/MWh, respectively. Including these
 3 emission costs, the average annual price of the PPA is [TRADE SECRET DATA HAS
 4 **BEEN EXCISED**] per MWh compared with an
 5 average annual cost of \$66.29 per MWh for the Big Stone II project. The levelized
 6 external costs are \$3.05/MWh and \$3.40/MWh, respectively. Therefore, the levelized
 7 prices of the PPA and Big Stone II including emission costs are [TRADE SECRET
 8 **DATA HAS BEEN EXCISED**] and \$62.92 MWh,
 9 respectively. The emission cost analysis is summarized in DOC Exhibit No. ____ (EA-3).

11 **Q. Dr. Amit, please summarize your price comparisons.**

12 A. Table 1 summarizes my price comparisons.

13 **Table 1: Price Comparison – Excelsior PPA Versus**
 14 **Comparably-Sized Supercritical Coal Plant**

	Average Annual Price (\$/MWh)	Levelized Price (\$/MWh)
Excelsior IGCC	[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]	[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]
Supercritical Coal (Big Stone II)	62.46	59.52

23 Table 2 Summarizes my price comparison including emission costs.

24 **Table 2: Price Comparison Including Emission Costs –**
 25 **Excelsior PPA Versus Comparably-Sized Supercritical Coal Plant**

	Average Annual Price (\$/MWh)	Levelized Price (\$/MWh)
Excelsior IGCC	[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]	[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]
Supercritical Coal (Big Stone II)	66.29	62.92

1 **Q. Dr. Amit, please compare the price of a subcritical coal plant alternative studied in**
2 **the CON for Big Stone II with the price of Excelsior Energy.**

3 A. The subcritical Coal plant is a 600 MW plant which includes measures to reduce NO_x
4 and SO₂. The average annual price of the subcritical coal plant over the period 2011
5 through 2036 is \$62.04 per MWh and its levelized price is \$59.12 per MWh. These
6 prices are compared with the average price of [TRADE SECRET DATA HAS BEEN
7 **EXCISED]** per MWh and [TRADE SECRET DATA
8 **HAS BEEN EXCISED]** per MWh for Excelsior Energy's
9 average annual price and levelized price, respectively.

10
11 **Q. Dr. Amit, please summarize your comparison of the prices for a subcritical coal**
12 **plant versus the prices for Excelsior Energy.**

13 A. Table 3 summarizes my price comparison without emission costs and Table 4 does the
14 same including emission costs.

15 **Table 3: Price Comparison – Excelsior PPA Versus**
16 **a Comparably-Sized Subcritical Coal Plant**

	<u>Average Annual</u> <u>Price (\$/MWh)</u>	<u>Levelized Price</u> <u>(\$/MWh)</u>
Excelsior IGCC	[TRADE SECRET DATA BEGINS	
Subcritical Plant (Big Stone II)	TRADE SECRET DATA ENDS] 62.04	59.12

**Table 4: Price Comparison – Excelsior PPA Versus
a Comparably-Sized Subcritical Coal Plant Including Emission Costs**

	<u>Average Annual Price (\$/MWh)</u>	<u>Levelized Price (\$/MWh)</u>
Excelsior IGCC	[TRADE SECRET DATA BEGINS	
Subcritical Coal (Big Stone II Alt.)	66.19	62.80

Q. Dr. Amit, as you mentioned earlier, did you update your analysis for the revised Big Stone II cost information provided recently in that docket?

A. Yes, I did.

Q. Please explain.

A. Based on several newspaper articles it appears that the construction costs of Big Stone II are likely to be higher than initially anticipated. In response to the DOC Information Request (IR) No. 98 (Docket No. E017/CN-05-619), Big Stone II explained that their construction cost will increase by about 25 percent per MWh. These costs include the upgrading and construction of the transmission system from 230 kV to 345 kV from the Big Stone II plant to the load center in the Twin Cities area. Based on this information I updated my analysis of the Big Stone II study. This analysis is summarized in DOC Exhibit No. ____ (EA-5).

The updated Big Stone II information includes estimated upgraded transmission costs from the plant to the Twin Cities area. Whereas, the PPA in this proceeding appears to provide estimated transmission costs from the plant to the interconnecting substation, it does not appear to contain transmission costs from the substation to the load center in the Twin Cities. I note this only because the Commission discussed this topic at

length at their July 27, 2006 hearing and expressed the desire to have transmission cost information from the plant to the load included in the record.

Q. Please provide a summary of your updated analysis.

A. Tables 5 and 6 summarizes my updated analysis.

Table 5: Price Comparison – Excelsior PPA Versus Comparably-Sized Supercritical Coal Plant Including Emission Costs (Updated)

	<u>Average Annual Price (\$/MWh)</u>	<u>Levelized Price (\$/MWh)</u>
Excelsior IGCC	[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]	
Supercritical Coal	81.91	77.88

Table 6: Price Comparison – Excelsior PPA Versus Subcritical Coal Plan Including Emission Costs

	<u>Average Annual Price (\$/MWh)</u>	<u>Levelized Price (\$/MWh)</u>
Excelsior IGCC	[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]	
Subcritical Coal (Big Stone II Alt.)	81.71	77.58

Q. Did you compare Excelsior Energy with other alternatives besides Big Stone II?

A. Yes, I did.

Q. Please discuss these additional comparisons.

A. I have analyzed two additional alternatives. The first of the two additional alternatives is an Xcel plant in Colorado that has been approved and is beginning construction. The plant, Comanche Unit 3, is a 750 MW baseload supercritical coal plant. The proposed

1 service date for the plant is October 2009. The plant will be constructed on a brown field
2 which has two existing coal plants, Comanche Units 1 and 2. The second additional
3 alternative is a 750 MW supercritical coal plant that may be built in Becker, Minnesota
4 by Xcel. The plant, Sherco 4, would be built on a brown field with existing coal plants.
5 Xcel to date has made no public announcement regarding a proposed Sherco Unit 4.
6 However, Xcel has been ordered by the Commission in its Integrated Resource Plan
7 (IRP) Docket No. E002/RP-04-1752 to file a proposal to fulfill the baseload need
8 determined in that IRP docket.
9

10 **Q. Please discuss the Comanche Unit 3 plant.**

11 A. Comanche Unit 3 is a 750 MW supercritical plant which will be built on an existing site,
12 near Pueblo, Colorado. The site already has two coal units, Comanche 1 and Comanche
13 2. The projected cost of Comanche 3 includes emission control equipment installed for
14 Units 1 and 2 to meet the required reduction of SO₂ on Comanche Unit 2 and the required
15 reduction of NO_x for Comanche Unit 1 and Comanche Unit 2. The average annual cost
16 (price) for Comanche 3, over the period 2011 through 2036 is [TRADE SECRET
17 DATA HAS BEEN EXCISED] per MWh
18 and its levelized cost (price) is [TRADE SECRET DATA HAS BEEN EXCISED]
19 per MWh. These costs do not include emission costs. To account for emission
20 costs, I used the emissions from the Excelsior initial filing as a reasonable proxy. For the
21 rural area, for a super critical plant, the annual emission costs \$3.83 per MWh and the
22 levelized emission costs are \$3.40 pre MWh. Therefore, the annual average cost (price)
23 for Comanche 3, including emission costs, is [TRADE SECRET DATA HAS BEEN

1 **Q. Dr. Amit, please summarize your cost (price) comparison analysis.**

2 A. Table 7 below provides a summary of my cost (price) comparison analysis.

3 **Table 7: Cost (price) Comparison, Including Emission Costs**

4 <u>Alternative</u>	5 <u>Average Annual</u>	6 <u>Levelized Price</u>
	7 <u>Price (\$/MWh)</u>	8 <u>(\$/MWh)</u>
9 Excelsior Energy (603 MW PPA)	10 [TRADE SECRET DATA BEGINS	
11 Excelsior Energy (450 MW Statute)	12 [TRADE SECRET DATA ENDS	
13 Big Stone II Supercritical Coal	14 81.91	15 77.88
16 Big Stone II Alt. Subcritical Coal	17 81.71	18 77.58
	19 [TRADE SECRET DATA BEGINS	
20 Comanche 3 Supercritical Coal	21 [TRADE SECRET DATA ENDS	
22 Sherco 4 Supercritical Coal	23 [TRADE SECRET DATA ENDS	

24 **Q. Are there other issues that may impact the public interest?**

25 A. Yes. There is the issue of the timing of the commencement of the PPA payments billed
26 to ratepayers compared to the timing of when Xcel will experience an energy deficit.

27 **Q. Please discuss this timing mismatch issue.**

28 A. The PPA proposes to provide about **[TRADE SECRET DATA BEGINS**

29 **TRADE**
30 **SECRET DATA ENDS]** In its analysis of Northern States Power Company's (NSP)
31 2004 resource plan (Docket No. E002/RP-04-1752) the Department concluded that NSP
32 will need additional baseload of 375 MW in 2015 and 2017, respectively. Therefore, if

1 the PPA is to be approved including the price proposed in the PPA, then for the years
2 2011 through 2014, the PPA could impose extra costs on NSP's ratepayers as they will
3 start paying for it before they ever need the energy.

4
5 **Q. Please explain.**

6 A. For these four years the average price of the PPA is [TRADE SECRET HAS BEEN
7 **EXCISED**]. This price is
8 significantly higher than the projected price of energy and capacity that may be displaced
9 by the PPA's contracted energy and capacity, per Xcel's IRP information. (Response to
10 DOC Information Request No. 72, Docket No. E002/IRP-04-1752, Low
11 Externalities/Base Forecast Scenario.)

12
13 **Q. Could Xcel sell its excess energy and capacity in the wholesale market?**

14 A. According to a settlement in the most recent Xcel's rate case, Xcel's ratepayers are
15 entitled to 100 percent of the margin from wholesale sales of energy from Xcel's own
16 assets (Docket E002/GR-05-1428). So it would be possible for Xcel to sell its owned
17 generation into the market that would be displaced by the Excelsior PPA generation with
18 ratepayers receiving the proceeds from the margins of the sale. Assuming, for example,
19 that the MISO clearing price is \$80 per MWh, than Xcel's ratepayers will pay [TRADE
20 **SECRET DATA HAS BEEN EXCISED**
21 for each MWh sold by Excelsior
22 that displaces a MW of Xcel-owned generated power.

1 The aforementioned Xcel rate case settlement also provided ratepayers recovery,
2 albeit partial recovery, for contracted sales margins from non-Xcel asset based generation
3 purchases. Since ratepayers would only recoup part of any contracted margin costs that
4 would be displaced by Excelsior PPA sales, the estimated cost difference between the
5 cost of the PPA energy that ratepayers paid and the proceeds that ratepayers would
6 recover from the sale of the PPA energy would be even larger than in the trade secret
7 example above.

8
9 **V. TRANSMISSION, ANCILLARY SERVICES AND CARBON**
10 **CAPTURE/SEQUESTRATION ISSUES**

11 **Q. Dr Amit, does the PPA reflect transmission costs associated with the Mesaba plant?**

12 A. As discussed at the Commission's July 27, 2006 hearing in this docket, the costs of the
13 Excelsior project does include estimated transmission costs from the plant to the
14 substation but does not include the costs associated with needed transmission upgrades of
15 the transmission system from the substation to the load in the Twin Cities area. As I
16 quoted earlier, the Commission, in its deliberation, was clear that such costs should be
17 addressed in the record. As such, such costs must be included in the final cost analyses
18 in order to provide the information that the Commission has indicated that it wants.

19
20 **Q. What are Excelsior's estimated transmission costs from the plant to the substation?**

21 A. Based on the report in Section IV of Volume I of Excelsior's filing, the network upgrades
22 would be \$75 million for the West Range Site (from the plant to the Blackberry
23 Substation) and \$255 million for the East Range site (from the plant to the Forbes

1 Substation.) These costs are converted to about \$0.86/MWh for the West Range site and
2 \$2.92/MWh for the East Range site.

3
4 **Q. Do your comparable cost estimates for other plants include transmission costs?**

5 A. The Comanche 3 costs already include the needed transmission upgrades. The Big Stone
6 II, original Certificate of Need petition included estimated costs from the plant to the load
7 in the Twin Cities area and the updated costs include the incremental costs of upgrading
8 the transmission system from 230 kV to 345 kV. Based on the Applicant's Exhibit 30-A
9 in Docket No. CN-05-619 (Big Stone II Certificate of Need) the costs of the 230 kW line
10 are \$78,525,000 which translates to about \$0.62/MWh. The estimated costs for Sherco 4
11 do not include transmission costs as of this time. Based on this preliminary analysis of
12 transmission costs, it appears that the cost comparisons discussed in the previous section
13 are not completely comparable across all alternatives.

14
15 **Q. Would the estimated cost of transmission be large enough to materially impact the
16 cost of this project?**

17 A. The cost of transmission will be large—perhaps hundreds of millions of dollars.
18 However, comparing the overall costs of the transmission component versus the much
19 larger cost of the proposed generating plant shows that the overall cost of the project may
20 not be significantly impacted by the inclusion or exclusion of transmission costs. Based
21 on previous discussions among the Parties at the Commission's July 27, 2006 hearing
22 and the Administrative Law Judge's July 28, 2006 Prehearing Conference, the
23 Department anticipates that further transmission information will be provided to the

1 record as the proceeding progresses. I will review whatever additional transmission
2 information is given, and may include more detailed analysis of transmission costs in
3 later testimony.

4
5 **Q. Ancillary Service costs have been raised as a potential issue in this case? What are**
6 **ancillary service costs and are such costs included in the PPA price?**

7 A. The types of services that are considered ancillary services may vary from project to
8 project. They are generally separate services that the plant requires to generate
9 electricity. These services may be located appurtenant to or connected to the plant site.
10 Transmission costs may, in some cases, be considered ancillary services. Other ancillary
11 services could include, for this project, the natural gas pipeline and the railroad spur to
12 the plant.

13 As I mentioned earlier in my testimony, the costs of the ancillary services for the
14 West Range site are included in the PPA price with the exception of the transmission
15 costs from the substation to the load center. Excelsior has stated that it will provide
16 comparable cost numbers regarding the East Range site in direct testimony.

17
18 **Q. Dr. Amit, what is Excelsior's position on potential carbon capture and sequestration**
19 **at this proposed plant?**

20 A. At the July 28, 2006 Prehearing conference, Mr. Tom Osteraas (General Counsel for
21 Excelsior) stated, "The only qualitative point we have made, and we've tried to produce
22 testimony to this effect, is that over the life of this plant it is likely that IGCC technology

1 would lend itself to more cost-effective retrofits to be able to capture and do something
2 with CO2, if and when regulations come into force that would warrant such activity.”
3

4 **Q. Are the costs of carbon capture and sequestration included in the PPA price?**

5 A. No. Therefore, this is not included in my analysis. Department Witness and Deputy
6 Commissioner Edward A. Garvey addresses policy matters concerning these two issues
7 and Mr. William Cole Storm of the Department’s Energy Facility Permitting Unit
8 provides technical information of these issues in the Department’s Environmental Impact
9 Statement which is included in the concurrent siting and routing proceeding in Docket
10 No. E6472/GS-06-668
11

12 **VI. CONCLUSIONS**

- 13 1. The statutes governing this PPA are Minn. Stat. 216B.1693 and 216B.1694.
14 2. The Commission provided guidance and directives, specifically, the following
15 questions should be developed in the record to recommend to the Commission
16 whether they should:
- 17 (1) approve, disapprove, amend or modify the terms and conditions of a proposed
18 power purchase agreement that Excelsior has submitted to Xcel Energy under
19 Minn. Stat. 216B.1694;
20
 - 21 (2) determine that the coal-fueled Integrated Gasification Combined Cycle
22 (IGCC) power plant that Excelsior plans to construct in northern Minnesota is,
23 or is likely to be, a least cost resource, obligating Xcel to use the plant’s
24 generation for at least two percent of the energy supplied to its retail
25 customers, under Minn. Stat. 216B.1693; and
26
 - 27 (3) determine that, under the terms of Minn. Stat. 216B.1693, at least 13% of the
28 energy supplied to Xcel’s retail customers should come from the IGCC plant
29 by 2013.

3. Because Excelsior filed a PPA for 603 MW rather than the 450 MW amount cited in the statute, the Department provides a cost analysis comparison for both levels.
4. An evaluation of this PPA should use the same criteria as used to evaluate other PPA's. A PPA is in the public interest if:
 1. The ratepayers are appropriately protected from the operational risk associated with the PPA;
 2. The ratepayers are appropriately protected from the financial risks of the PPA; and,
 3. The purchase price to be paid by Xcel for the electric energy and capacity is reasonable, when considered in combination with other socioeconomic factors that may be beneficial.
5. The Table below provides a summary of my cost (price) comparison analysis.

Table 7: Cost (price) Comparison, Including Emission Costs

<u>Alternative</u>	<u>Average Annual Price (\$/MWh)</u>	<u>Levelized Price (\$/MWh)</u>
Excelsior Energy (603 MW PPA)	[TRADE SECRET DATA BEGINS]	[TRADE SECRET DATA BEGINS]
Excelsior Energy (450 MW Statute)	[TRADE SECRET DATA ENDS]	[TRADE SECRET DATA ENDS]
Big Stone II Supercritical Coal	81.91	77.88
Big Stone II Alt. Subcritical Coal	81.71	77.58
Comanche 3 Supercritical Coal	[TRADE SECRET DATA BEGINS]	[TRADE SECRET DATA BEGINS]
Sherco 4 Supercritical Coal	[TRADE SECRET DATA ENDS]	[TRADE SECRET DATA ENDS]

6. Costing information only concerns the West Range site. Excelsior has indicated that it will provide comparable cost information for the East Range site in direct testimony.

1 7. The PPA includes costs for required ancillary services such as the natural gas
2 pipeline, the railroad spur and transmission from the plant to the substation.
3 Transmission cost information from the substation to the load center is not included,
4 nor is equipment necessary to capture and sequester carbon dioxide.
5

6 **VII. IS THE IGCC PLANT PROPOSED BY EXCELSIOR A LEAST COST**
7 **RESOURCE PURSUANT TO MINN. STAT. 216B.1693?**

8 A. *ANALYSIS*

9 **Q. Dr. Amit, you mentioned at the beginning of your testimony that you would also**
10 **address Minn. Stat. 216B.1693. Can you provide an overview of this Statute?**

11 A. Yes. Provision (a) of this Statute states that, “If the commission finds that a clean energy
12 technology is or is likely to be a least-cost resource, including the costs of ancillary
13 services and other generation and transmission upgrades necessary,” then NSP “shall
14 supply at least two percent of the electric energy provided to retail customers from clean
15 energy technology.” Provisions (b) and (c) state that the energy referenced in (a) must be
16 generated by an “innovative energy project” as Minn. Stat. 216B.1694 defines it. Minn.
17 Stat. 216B.1694 expires on January 1, 2012. See Exhibit ____ (EA-7) for the full text of
18 the Statute.
19

20 **Q. Dr. Amit, please discuss the issue of the least cost resource pursuant to Minn. Stat.**
21 **216B.1693.**

22 A. The Second Prehearing Order issued on June 2, 2006 requires the parties to investigate
23 whether the Commission should:

1 Determine that coal-fueled Integrated Gasification Cycle
2 (IGCC) power plant that Excelsior plans to construct in
3 northern Minnesota is, or is likely to be, a least-cost
4 resource, obligating Xcel to use the plant's generation for
5 at least 2% of the energy supplied to its retail customers,
6 under Minn. Stat. §216B.1693.
7

8 Minn. Stat. §216B.1693 states:

9 (a) If the commission finds that clean energy technology
10 is or is likely to be a least-cost resource, including the costs
11 of ancillary services and other generation and transmission
12 upgrades necessary, the utility that owns a nuclear
13 generating facility shall supply at least two percent of the
14 electric energy provided to retail customers from clean
15 energy technology.
16

17 Therefore, based on the second prehearing order, and Minn. Stat. §216B.1963, it is
18 necessary to determine whether the IGCC plant proposed by Excelsior is or likely to be a
19 least cost resource. If it is, then Xcel is obligated to buy from Excelsior at least two
20 percent of its energy, supplied to its retail customers.
21

22 **Q. Dr. Amit, regarding the issue of the least cost resource as stated in Minn. Stat.**
23 **216B.1693, has there been a determination on the role of the two percent**
24 **contemplated in relation to Minn. Stat. 216B.1694?**

25 A. Not to date, no.
26

27 **Q. Dr. Amit, how may one test whether the IGCC costs proposed by Excelsior are**
28 **likely to be a least cost resource?**

29 A. As I previously showed, a comparison of the PPA costs to the costs of other new or
30 proposed comparably-sized baseload generating plants would test whether the PPA costs
31 would likely be a least cost resource as compared to other comparably-sized options.

1 | B. *CONCLUSION*

2 | **Q. Dr. Amit, please state your conclusion regarding the determination of whether or**
3 | **not the IGCC is a least cost resource.**

4 | A. Based on my comparable plant analysis, the cost of Excelsior's proposed IGCC plant is
5 | higher than the comparable projects and does not meet the provisions of Minn. Stat.
6 | 216B.1693 as being likely to be a least cost resource. This would mean that Xcel would
7 | not be obligated under the Statute to supply at least two percent of the electric energy
8 | provided to its retail customers from the IGCC plant.

9 | A question remains of whether the 450MW stated in Minn. Stat. 216B.1694 is
10 | included in or additive to the two percent stated in Minn. Stat. 216B.1964. I assume that
11 | the question will be addressed during the proceeding.

12 |

13 | **Q. Dr. Amit, does this complete your testimony?**

14 | A. Yes, it does.