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Independent Analysis of Generation Technologies for a 600 MW Coal-Fired Power Plant in Minnesota

Addendum B – SCPC Plant Levelized Nominal Cost of Electricity Comparison

Prepared for Excelsior Energy

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B1. Introduction to Addendum

In December 2005, Fluor prepared an independent report on coal power generation technologies ("Fluor Report") that compares the plant cost and performance of the 600 MW (nominal) Mesaba Energy Project Unit I with a hypothetical 600 MW grassroots Supercritical Pulverized Coal (SCPC) plant located near Monticello, Minnesota. The Fluor Report provides an overview of plant cost and performance data for the two technologies. The Fluor Report also provides an economic analysis of the hypothetical SCPC plant, under a utility rate-based payment structure. The results are presented in the form of a present value of revenue requirements (on an overall and per MWh basis) and a weighted average real cost of electricity (COE).

This addendum compares the levelized nominal COE of the hypothetical SCPC plant described in the Fluor Report with levelized nominal costs reported for Big Stone II, a proposed 630 MW SCPC plant near Milbank, South Dakota, and Sherco 4, a potential 750 MW SCPC in Sherburne County, Minnesota. A comparison with the levelized nominal COE reported by the Department of Commerce (the "Department") for the Mesaba Energy Project is also provided.

The results are summarized in Figure B1 and Figure B2. It can be seen that, when Big Stone II is compared to the Fluor hypothetical 600 MW SCPC plant on a common basis, the difference in levelized nominal COE is within 7%. Most of the difference is in the much lower O&M cost estimate for the Big Stone II plant. It is noted that the hypothetical 600 MW SCPC plant was assumed to be greenfield and includes an allowance for infrastructure and offsite costs that may be higher than those required for Big Stone II (and Sherco 4).

The results also show that the levelized nominal COE calculated by Dr. Amit for the Mesaba Energy project is very close to that estimated by Fluor for Big Stone II.

B2. Levelized Nominal COE for 600 MW SCPC

The basis for the economic analysis of the 600 MW SCPC plant is described in the December 2005 addendum to the Fluor Report. Using this basis, the levelized nominal COE is estimated at $97.67/MWh. The discount rate used in the December 2005 Fluor analysis was 7.95%, which was based on the after-tax weighted average cost of capital for Xcel (as of December 2005) that was used in Xcel's Integrated Resource Planning Process. This levelized nominal COE is consistent with the forecasted tariffs and the PVRR of $2.89 billion ($24.99/MWh) set forth in Excelsior's December 2005 Report to the Public Utilities Commission for the hypothetical SCPC plant. The PVRR of the Mesaba IGCC plant, similarly discounted at 7.95% and presented in the same report, was $2.825 billion ($24.83/MWh).

In his September 2006 testimony on behalf of the Department, Dr. Eilon Amit presents levelized nominal costs for a number of generation options based on a discount rate of 9.75%, as per the 2005 Burns & McDonnell Report described below, compared to the 7.95% used in the Fluor analysis.

To confirm that the levelization methodology used by Fluor in its analysis matches that used by Dr. Amit, a levelization calculation was run for Big Stone II, Sherco 4, and the Mesaba Energy Project based on the year-by-year costs provided with Dr. Amit's testimony. In each case, when the same discount rate was used, the result matched the levelized nominal COE reported by Dr. Amit.

Using the higher discount rate increases the estimated levelized nominal COE for the Fluor hypothetical SCPC plant to $98.72/MWh. In order to calibrate the Fluor analysis to that of the Department, the levelized nominal costs provided in the remainder of this report are all based on a 9.75% discount rate (except for Figure B2).

The Fluor estimate does not include the cost of transmission upgrades. An estimate for the transmission upgrade cost has not been made but, according to information provided with the testimony of Gonzalez, the estimated cost for Sherco 4 (built at a similar location to that of the Fluor hypothetical plant) is **[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]** . Building this cost into the Fluor analysis increases the estimated levelized nominal COE to **TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]**.

B3. Levelized Nominal COE for Big Stone II

Dr. Amit reports a levelized nominal COE of $74.40/MWh for Big Stone II. This is based on the year-by-year COE forecast provided in the September 2005 Burns & McDonnell report "Analysis of Baseload Generation Alternatives" ("2005 Burns & McDonnell Report") with a 25% margin added to account for recently reported changes in the expected plant cost, output, and heat rate (as per IR 98 Docket ET2/CN-05-619 by Otter Tail Power). All of the levelized nominal costs quoted in this report exclude the additional emission cost component added by Dr. Amit in his analysis.

In October 2006, the following documents were filed with the Minnesota PUC in support of the Big Stone II Project:

- Prefiled Supplemental Direct Testimony of Jeffrey J. Greig, General Manager, Business and Technology Services, Burns & McDonnell Engineering Company

- "Revised Analysis of Baseload Generation Alternatives" prepared by Burns & McDonnell ("2006 Burns & McDonnell Report")

- Prefiled Supplemental Direct Testimony of Kermit E. Trout, Jr., Vice President and Senior Project Manager, Black and Veatch Corporation

The information contained in the 2006 Burns & McDonnell Report, supplemented with some additional information contained in the 2005 Burns & McDonnell Report and with the $1.8 billion ($2860/kW) capital cost (excluding financing costs) quoted in Trout's testimony, was entered into the Fluor model and used to estimate a levelized

nominal COE for Big Stone II. It is noted that the $1.8 billion capital cost was the same number quoted in IR 98 Docket ET2/CN-05-619 by Otter Tail Power, referenced by Dr. Amit in his testimony. On this basis, the levelized nominal COE is estimated at $95.09/MWh.

The levelized nominal capital costs computed for Big Stone II are very close to those computed for the Fluor hypothetical 600 MW SCPC plant (including the allowance for transmission upgrades). The estimated fuel cost is somewhat higher but the estimated O&M cost (including property tax and insurance) is much lower. The difference in levelized nominal O&M costs is $12.18/MWh. This discrepancy cannot be explained by location differences alone. It is noted that the Fluor analysis included an evaluation of site-specific property tax and insurance costs in contrast to the 0.55% of capital cost allowed for in the Burns & McDonnell analysis.

The levelized nominal COE estimated by Fluor for Big Stone II includes an allowance for equity funds during construction (AFDC) i.e. the equity returns that the IOU forgoes during construction that are recovered over the economic life of the plant in order to maintain overall returns that are consistent with the required costs of capital. Greig's testimony describes the revenue requirements methodology adopted by Burns & McDonnell and it appears that this methodology does not include equity AFDC. Excluding equity AFDC from Fluor's model reduces the estimated levelized nominal COE for Big Stone II to $82.09/MWh, which may in part explain the lower costs reflected in Dr. Amit's estimate of $74.40/MWh.

B4. Levelized Nominal COE for Sherco 4

In his September 2006 testimony, Dr. Amit also calculated the levelized nominal COE for the 750 MW Sherco 4 plant, based on information provided in Xcel's response to the Department's IR No. 105. The response presents a forecasted annual cost of electricity with little supporting data. On this basis, Dr. Amit reports a levelized nominal COE of **[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]** for the 750 MW Sherco 4 plant. This excludes transmission costs; adding the same margin to the levelized nominal cost estimated above for the Fluor hypothetical 600 MW SCPC case increases the estimated levelized nominal COE to **[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]**.

The capital cost basis for the year-by-year COE forecast used in Xcel's development of the cost forecast is unknown but if the Big Stone II basis for all other costs were to be used, the capital cost (before financing) would have to be **[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]** to yield this levelized nominal COE. **[TRADE SECRET DATA BEGINS**

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B5. Levelized Nominal COE for the Mesaba Energy Project

Dr. Amit reports a levelized nominal COE for the Mesaba Energy project of $92.99/MWh. This calculation is based on the same forecasted costs for the Mesaba Energy Project as the Excelsior's December 2005 Report to the Public Utilities Commission.

This does not include the cost of transmission upgrades. This cost is not available but an estimate was used, based on the September 2006 testimony of Tyson. Adding **[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS]**, increases the levelized nominal COE to **[TRADE SECRET DATA BEGINS TRADE SECRET DATA ENDS].**

B6. Summary of Levelized Nominal COE Estimates

Figure B1 presents the results of the levelized nominal COE comparison graphically (at a discount rate of 9.75%).

When Big Stone II is compared to the Fluor hypothetical 600 MW SCPC plant on a common basis, the difference in levelized nominal COE is within 7%. Most of the difference is in the much lower O&M cost estimate for the Big Stone II plant. It is noted that the hypothetical 600 MW SCPC plant was assumed to be greenfield and includes an allowance for infrastructure and offsite costs that may be higher than those required for Big Stone II (and Sherco 4).

The levelized nominal COE estimated for Big Stone II is higher than that reported in Dr. Amit's testimony but this difference is likely due to differences between the modeling methodology adopted by Fluor and that adopted by Burns & McDonnell. For example, if AFDC is excluded from the Fluor estimate then the resulting levelized nominal COE is within 10% of that reported by Dr. Amit.

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The levelized nominal COE calculated by Dr. Amit for the Mesaba Energy project is very close to that estimated by Fluor for Big Stone II.

For reference, Figure B2 presents the results of the levelized nominal COE comparison at a discount rate of 7.95%. This does not materially affect the conclusions.

Figure B1: Levelized Nominal COE Comparison at 9.75% Discount Rate

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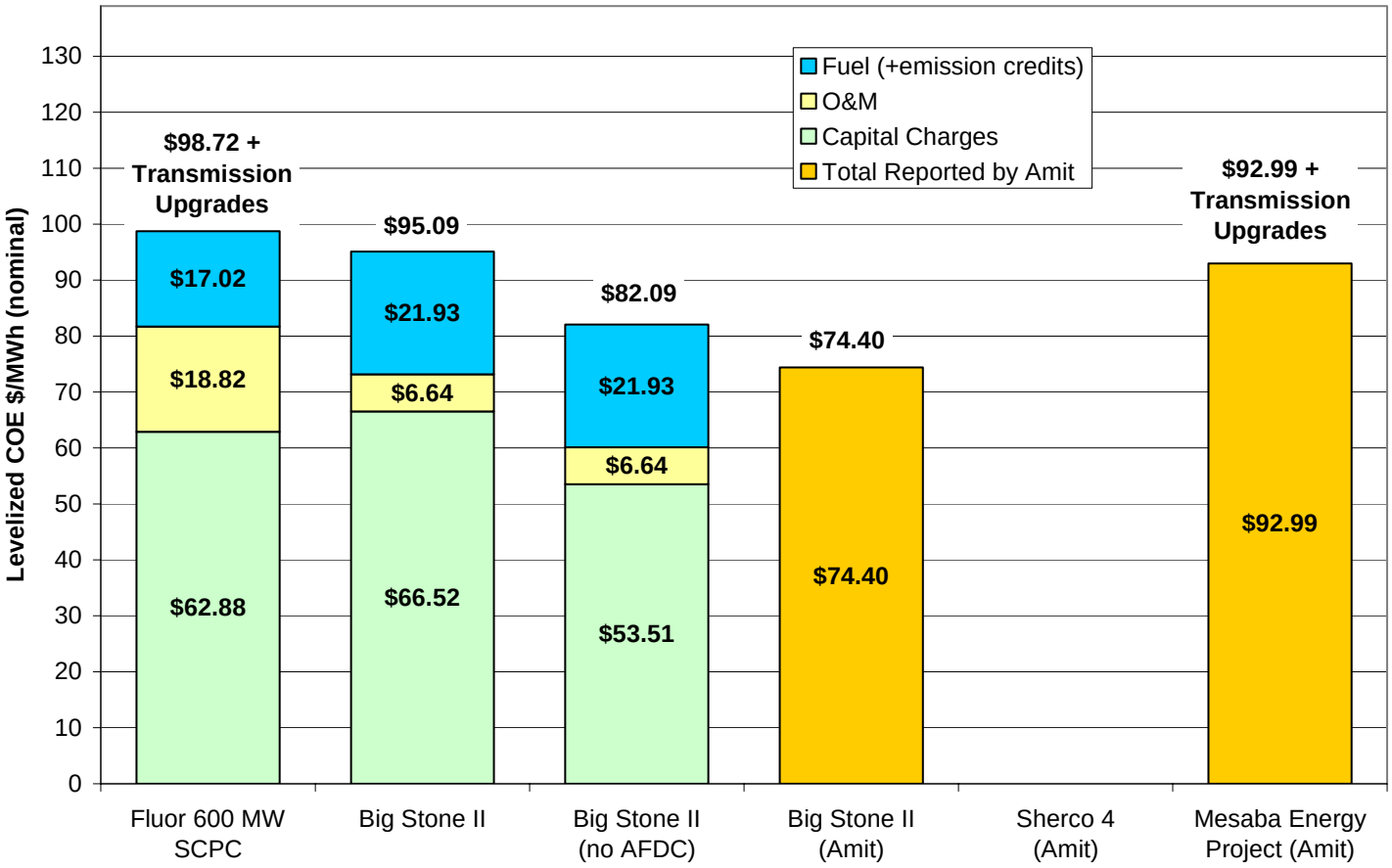

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Figure B2: Levelized Nominal COE Comparison at 7.95% Discount Rate

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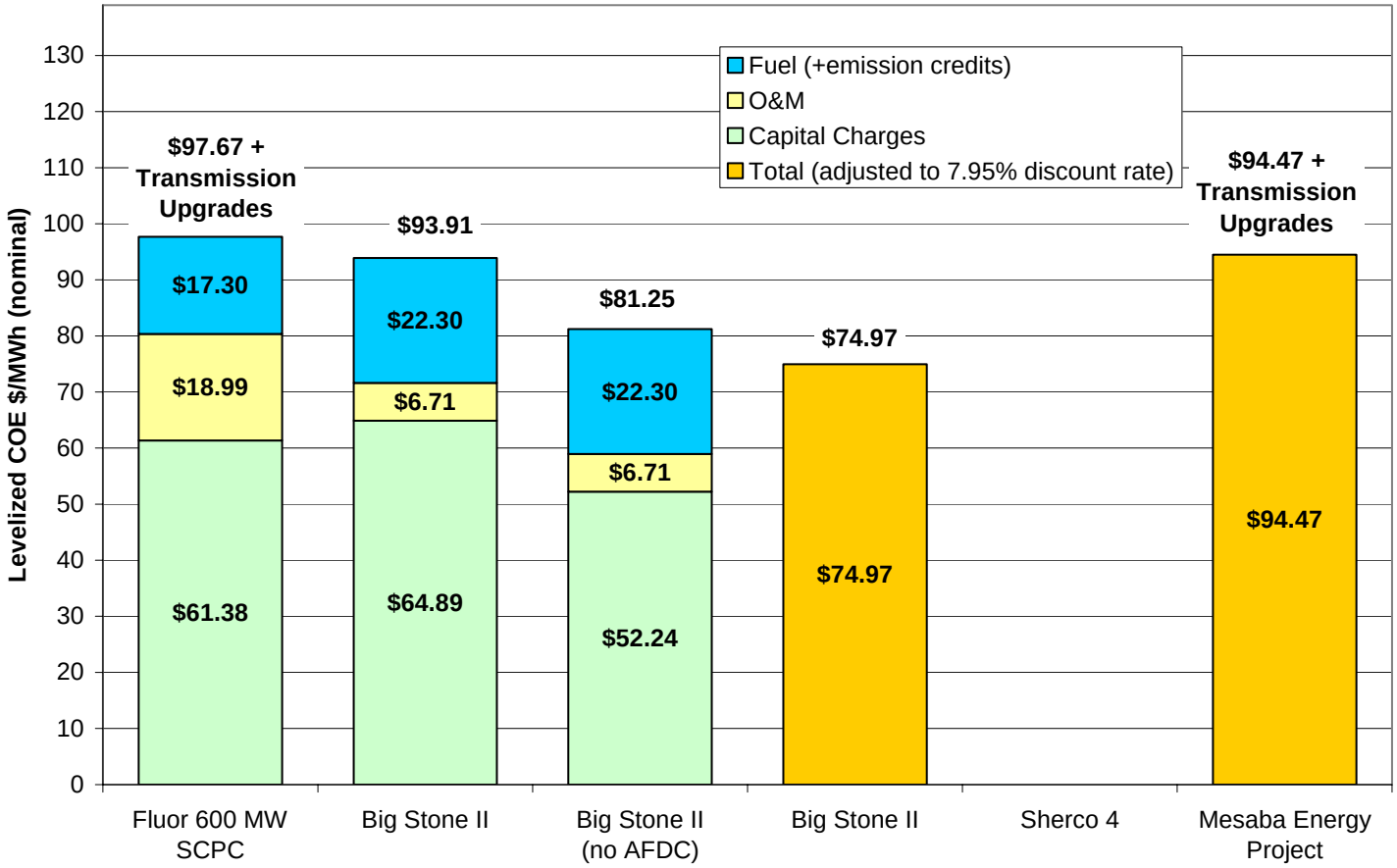

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