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CLIENT MEMO

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To: Tom Karas
Interlochen, Michigan

Date: December 18, 2007

Fr: Tom Sanzillo
Senior Associate
TR Rose Associates

Re: Wolverine 600 MW Power Plant

You have asked for a preliminary review of the Wolverine Power Cooperative (WPC) 600 MW proposed coal fired plant for Rogers City, Michigan.

Background

WPC is the plant sponsor. It is a not-for profit member owned generation and transmission electric cooperative headquartered in Cadillac, Michigan. WPC is owned by and supplies wholesale market electric power to four member cooperatives.

WPC owns and operates five electric generating facilities capable of producing 200 megawatts of internal generation primarily peaking capacity. WPC's plants are located throughout the state in Tower, Gaylord, Hersey, Vestaburg and Burnips. WPC serves member cooperatives with 1600 miles of bulk transmission line. The cooperative maintains 130 distribution and 36 transmission substations located throughout its transmission system.

The proposed 600 megawatt plant for Rogers City will be WPC's first baseload generating plant.

Any review must, by necessity, be tentative in nature as the project is at an early stage of development and very few details are available. The information you have provided, plus the Capacity Needs Forum Final Report published by the Michigan Public Service Commission (MPSC) (January 2006) has been reviewed. In addition, this review is based on a survey of state and national trends and actions taken by others regarding the planning, financing, construction and operation of new coal fired power plants.

This plant is being planned at a time when many changes are taking place in the utility markets. These changes make it disadvantageous to move forward with a coal fired plant. The economic conditions in the State, and the economics regarding coal fired plants are all pointing in the wrong direction.

Energy Forecast

In 2004 the MPSC commenced a full energy capacity needs review for the State. The Final Report covered issues regarding supply and demand, new capacity and transmission upgrades. The report covered the period 2005 through 2025.

The CNF study asserts that energy demand will increase by an average of 2.1% between 2005 and 2025. The report concludes that the state should support one or more base load power plants sometime after 2011. The report relies on electricity sales data from 1990 to 2005. The data show a 1.9% annual average increase for that period. The 1990's were a period of historic economic growth. Despite the national increases during the 1990's, the Michigan demand for electricity was quite modest. The report assumes that past growth trends will be replicated in the future. A review of recent economic trends in the State does not corroborate that view.

A recent study by Comerca Bank, *Michigan Brief, Hard Truth* casts doubt on the short term validity of the 2.2% growth assumption:

The 2006 data for Gross Domestic Product (GDP) by State confirm what most of us suspected. Michigan remains stuck in a one-state recession. Last year, Michigan was the only state that did not grow. It's real GDP contracted by 0.5 percent, while the nation expanded 3.4 percent.

The report looking forward identifies a number of key factors that need to change in order for the State to get on a growth trajectory:

But even if all of that occurs, the recovery in the near term will be gradual. The state is going through a difficult and protracted structural adjustment, not a short-lived cyclical downturn.

Subsequent to the CNF report the Consensus Revenue Agreement, Final Report was published for Fiscal Years 2007 and 2008¹. This document is the official economic and revenue forecast that is used to guide state spending. It is agreed to by the Michigan State Senate, House and State Treasurer. The report forecasts flat economic growth in 2007 and probable declines in 2008. Unemployment is expected to rise and personal income rise slightly. If these projections are correct through 2008 it will be the eighth straight year that Michigan's wage and salary employment dropped.

According to the CNF report (see: Figure ES-1) page 4, the service area involved with this plant currently has a surplus of generating capacity. This is the case according to the CNF simulation model until 2011. At this juncture actual generation equals projected demand. However, this is only true if energy use has increased by 2.2% each year since 2006. This is plainly not going to be the case.

If a relatively flat economy is assumed between 2005 and 2012, the first year of the plants operation, then Michigan's economy must grow by 3% annually for the next 13 years in order for the assumptions made in CNF report to materialize. One long term projection made by the U.S. Census Bureau assumes that Michigan's population will grow by about 1/3 of one percent annually through 2030. This clearly is not evidence of 3 percent economic growth.

The CNF Task Force group offered several caveats about its findings and recommendations:

Staff final recommendations regarding resource selection is to review the planning assumptions and results in two years. It will prove useful to assess

¹ *Consensus Revenue Agreement, Final Report; Economic and Revenue Forecasts Fiscal Years 2007 and 2008*, prepared by the Michigan Senate Fiscal Agency, House Fiscal Agency and the Michigan Department of the Treasury, May 17, 2007

whether the CNF technology assessments need to be modified and whether critical assumptions remain valid. A review at that time would also help to determine if the recommended capacity schedule should be modified.²

The MPSC should update its forecast projections prior to any final decision on this plant. Based on its own data, it is probably not necessary to the build.

The Cost of a New Coal Fired Plant

Since the release of the CNF report several critical changes regarding the market have been more fully disclosed.

- § The CNF report assumes construction cost increases of 2.47% per year consistent with GDP growth. A recent study by the Edison Foundation places construction costs during the period of 2002 through 2006 on the order of 25%, with the largest portion of the increases occurring in 2006.³ On December 18, 2007 the Chairman of the White House Council on Environmental Quality Jonathan Connaughton stated that the cost of new power plant components had “gone through the roof globally”.⁴
- § The CNF report carries a range of potential coal sources. The annual increases in price are estimated to be between 2.29% and 3.42%. Recent market information foresees coal price increases ranging from 10% - 20%. In addition, upward pressure on transportation prices suggests an increase in those costs of 7.5% annually.
- § The CNF report places debt service or interest rate costs at 9.29%. This is within the acceptable range, however a recent federal study for projects financed through the private market puts the aggregate rate at 10.5%.⁵

² CNF Task Force, Volume I Final Report, January 2006, pg. 47.

³ The Brattle Group, *Rising Utility Construction Costs: Sources and Impacts*, The Edison Foundation, September 2007 cites three places in the country where plants were either canceled, reduced in size or put on hold due to this sticker shock. Another 15 plants (see attached appendix) have also been withdrawn or delayed for the same reasons.

⁴ Wald, Matthew, *New Type of Coal Plant Moves Ahead, Haltingly*, New York Times, December 18, 2007.

⁵ See: DOE/NETL, *Cost and Performance Baseline for Fossil Energy Plants, Volume I, Bituminous Coal and Natural Gas to Electricity, Parameter Assumptions for Capital Charge Factors*, pg. 52, Revision: August 2007,

To carry out a more thorough estimate the following assumptions were made:

- § A 600 MW coal fired plant with a construction cost of \$1.5 billion.⁶
- § 9.85% financing over a 30 year period.⁷
- § Coal costs at \$30 per ton, based on the CNF projection for Rocky Mountain (RM) coal⁸
- § Transportation costs are \$20 per ton, derived from the CNF study for RM coal.
- § The NETL study places those costs at approximately \$33 million per year.⁹

If the plant were constructed in 2007, the annual cost of operation would be the following:

- § Financing costs: \$156 million
- § Coal Costs 60 million (2 million tons/yr. x \$30 per ton)
- § Transportation Cost 40 million (2 million tons/yr. x \$20 per ton)
- § O &M costs 33 million

The annual cost would be \$289 million – a busbar cost of 6.5 cents per kilowatt-hour. If the proposed plant is built, it would open sometime during 2012-2013. Five years after it opens, assuming 10% annual increases in coal, 7.5% annual increase in transportation and 2.47% increases in O&M – the cost would rise to a

⁶ The capital cost of a 600 MW coal fired power plant can vary depending on design and pollution controls. The ranges can be between \$1 billion and \$1.9 billion. The Michigan CNF study uses two 500 MW pulverized coal plants as models and places the costs between \$1.3 billion and \$1.4 billion. See: CNF Final Report, Volume II, Appendix C, page30.

⁷Typically capital available to Investor Owned Utilities is made available at a term of 15 years. While details of the financing assumptions for this plant are not available the most generous assumption for financing was made – 30 years. If traditional market financing is provided for this plant, at least an additional one cent per kilowatt hour would be added. See: pg. 47 of CNF Final Report, Volume II, Appendix C, Integration Work Group for more complete discussion of its financing assumptions.

⁸ Many new coal plants are electing to burn coal from multiple sources. The selection of RM coal for this study is done to simplify the calculation.

⁹ The CNF study projects O&M costs higher than this estimation. See page 30, Volume II, Appendix C, Integration Work Group, pg. 30.

busbar cost of \$461 million – or almost 10.75 cents per kilowatt-hour¹⁰. If the costs of transmission, carbon related and other surcharges are added, Michigan residents are looking at electricity from this plant that will approach 17- 18 cents per kilowatt-hour by 2017, if not sooner¹¹.

According to MPSC the average customer charge as of December 1, 2007 is 7.7 cents per kilowatt hour.¹² The cost of electricity from the new plant will be more than double the current price. How this translates into actual pricing for residential customers depends on the utilization of this plant, and any new plants.

According to the CNF report, the following scenario is likely:

The price volatility experienced by energy markets represents a major concern. In MISO's markets, power is priced at the marginal cost of the last unit brought on line, or opportunity cost if higher. Due to a number of reasons, this can cause customer costs to swing quickly and wildly. As load grows, proportionally more of Michigan's energy consumption could be exposed to these market prices unless a stable source is secured. Base load units provide the relatively stable power source that can provide a more predictable and, generally, lower life cycle electric energy price. (Pg. 46 - Final Report).

The core rationale for coal fired plants is based on past performance of the industry. The assumptions used regarding cost are no longer valid. Coal is rapidly approaching the day when it no longer plays the role of a predictable, stable source of energy. And, a new coal plant becomes a 30 year carbon liability, the costs of which are uncertain.

One guide to the coal industry (DTC/Hill Associates, *The Coal Trading Handbook*, 2007 Edition) characterizes the current scenario using a famous Yogi Berra adage:

¹¹ Any new greenhouse gas mitigation regime will cost between 1.5 and 4 cents per kilowatt hour. See: Rubin, Edward, S., Chao, Chen and Aao, Armand, *Cost Performance of fossil fuel power plants with CO2 capture and storage*, Energy Policy, 35, 2007, p.4446. Additional transmission and other surcharges account for the balance of the price.

¹² Michigan Public Service Commission Utility Rate Book, *Comparison of Monthly Residential Bills for MPSC – Regulated Michigan Electric Utilities* (inclusive of all applicable surcharges), December 1, 2007.

“The future ain’t what it used to be”

Since the publication of the CNF report the following important events have occurred:

§ The Edison Foundation, the utility industry’s think tank, published a report on power plant construction costs. The report shows that actual costs have risen by 25% since 2002, with the largest increases occurring in 2005-06.

The report attributes much of these increases to underlying market dynamics that are being driven by the worldwide demand for more coal plants and by global pressures on many of the raw materials used for new plant construction. It is not clear from the report when this price spike should abate.

The report expresses particular concern with those projects that are in the early stages of planning, as they are the ones that will bear the full brunt of the price increases.

§ At least twelve coal plants have been canceled, put on hold or reduced in scope due to the price shock related to construction, the uncertainties regarding future emissions controls and the long term implications of coal prices.

§ A November 27, 2007 statement released by Senator Harry Reid (D) Nevada regarding a power plant in his state illustrates how one state is handling the response to proposals for new coal fired plants.

"I am very pleased that Sierra Pacific has decided to speed up their plans to expand the Harry Allen natural gas power plant before attempting to build a dirty coal plant in Nevada.

"When the company's representatives came to me this summer saying they needed a 'bridge' to meet Nevada’s power needs while they look into renewable power, I suggested they use natural gas. I am glad they are choosing to go in that direction. I hope Sierra Pacific's executives

will take the additional time they now have to reexamine their plans to build a dirty coal plant and, instead, invest in a renewable energy and energy efficiency plan that will protect our air and create thousands of Nevada jobs."

§ A December 5th article in Business Week sums up the new market situation this way:

"As the ramp-up in electricity demand in the U.S. accelerates as predicted over the next two decades, so will the demand for steam coal to meet the need, said Arch Coal Chairman and CEO Steven Leer."

"As fuel costs soar and electric rate caps expire, Bannister (an analyst for Stifel Nicolous) forecast U.S. retail electricity prices will surge 69 percent by 2015 – more than double the growth seen in the last ten years."¹³

§ A recent presentation by Peabody Energy to its investors touts average annual increases in the price of coal between 2007 through 2009 of 10% annually. The presentation projects "Revenue growth from higher prices sales commitments"¹⁴

§ Arch Coal's recent presentation on its corporate position points to a rising price environment across the country, and, optimism about future upside potential as prices rise due to global pressures.¹⁵

§ On November 27, 2007 UBS analysts changed their rating on Alpha Natural Resources from "Hold" To "Buy". The report sent coal stocks up. According to the AP, the report pointed to strong price growth through 2009, and, tight supply growth for several years which will boost coal prices further.¹⁶

¹³ Bomkamp, Susan, *Market Spotlight: Coal Producers*, Business Week, December 5, 2007.

¹⁴ Lehman Brothers CEO, Energy/Power Conference, Peabody Energy, September 6, 2007.

¹⁵ Steve Leer, CEO and Chairman, Arch Coal, Inc. *2007 FBR Capital Markets Investor Conference*, November 27, 2007. Peabody Energy and Arch Coal are the two leading coal producers in the nation. They produce in excess of 35% of the coal produced annually in the country.

¹⁶ Associated Press, *Sector Snap: Coal Producers Soar*, November 28, 2007

§ A recent report in The Economist magazine puts the situation this way:

“No utility with any respect for its shareholders money, says Michael Morris, the boss of the biggest one in America, AEP, would build a heavily polluting coal burning power plant in America these days; for fear that it would become a liability if the government moved to limit emissions of greenhouse gases.” The article notes the steady rise in the price of coal (*Coal Power*, The Economist, November 17, 2007, p.71).

§ A recent analysis conducted by Standard and Poors of the Sandy Creek Power Plant in Texas acknowledges as part of its operating stress analysis 10% annual increases in the cost of coal and transportation.¹⁷

Conclusion

MPSC’s projections of energy demand based on a 2.1% average annual increase in electricity demand through 2025 is not borne out by either actual performance of the Michigan economy or recent short and long term projections. Furthermore, cost factors have combined at this point in time to add significant price risks to new coal fired plants for Michigan’s consumers. These price risks will be absorbed by the State ratepayers in the form of price increases. Michigan consumers can expect increases of 60% to 80% by 2017 in their electricity bills if this plant, and other new coal fired plants, move forward. The plant also remains a long term carbon liability to State ratepayers. The cost of new carbon emissions is uncertain at this time.

Several important studies have been released in the last year which can assist Michigan planners with the tasks needed to assess alternative methods for meeting need.

§ Tegen, S.M., *Comparing Statewide Economic Impacts of New Generation for Wind, Coal and Natural Gas in Arizona, Colorado and Michigan*, NREL/TP 500-37720, National Renewable Energy Laboratory, May 2007

¹⁷ Aneesh Prabhu, *Sandy Creek Associates LP*, Published September 12, 2007.

- § Western Governor's Association, *Clean and Diversified Energy Advisory Committee, Energy Efficiency Task Force Report 2006*, January 2007.
- § EconNorthwest, *Economic Analysis of Nevada's Future Electricity Generating Alternatives*, 2007.

Now is not the time to add more coal to the State's electricity generation mix, now is the time to step back and find alternatives. Because of Michigan's weak economy there is actually time to do so. There is, however, no time to waste.