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BEFORE THE  
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Wisconsin Electric Power Company for Authority to Construct Wet Flue Gas Desulfurization and Selective Catalytic Reduction Facilities and Associated Equipment for Control of Sulfur Dioxide and Nitrogen Oxide Emissions at its Oak Creek Power Plant Units 5, 6, 7, and 8

6630-CE-299

**CERTIFICATE AND ORDER**

On June 21, 2007, pursuant to Wis. Stat. § 196.49 and Wis. Admin. Code § PSC 112, Wisconsin Electric Power Company (WEPCO) filed an application with the Commission for authority to construct wet flue gas desulfurization (WFGD) and selective catalytic reduction (SCR) facilities and associated equipment for Units 5, 6, 7, and 8 at its Oak Creek Power Plant. On August 24, 2007, WEPCO filed a supplement to its original application.

WEPCO proposes to construct the facilities to meet new sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) air emissions requirements. The Oak Creek Power Plant is located in Milwaukee and Racine Counties, Wisconsin. The proposed project is estimated to cost \$830 million, including allowance for funds used during construction (AFUDC).

The application is GRANTED, subject to conditions.

**Introduction**

In its application, WEPCO requested that the Commission hold a hearing in the docket, even though one is not required by law. WEPCO made its request because it was aware of interest in the project on the part of various parties that could intervene in the docket. On June 28 and 29, 2007, the Citizens' Utility Board and Clean Wisconsin (together, CUB/CW)

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filed separate requests to intervene in this docket. On July 20, 2007, the Commission issued its Notice of Investigation and Prehearing Conference. At a prehearing conference held on August 16, 2007, both requests to intervene were granted. In addition, Wisconsin Industrial Energy Group (WIEG) and Wisconsin Paper Council were granted party status in the docket.

On August 30, 2007, CUB, on behalf of itself and Clean Wisconsin, filed a request for \$159,198 in intervenor funding to participate in this docket. The Commission, at its open meeting of October 4, 2007, modified and approved CUB/CW's application for intervenor compensation, and approved a total of \$120,000 for CUB/CW to examine the proposed project from a residential consumer's perspective. The approved amount covered legal services of Cullen, Weston, Pines and Bach; consulting services from La Capra Associates and Phyllis Fox, Ph.D.; and CUB/CW's internal costs.

As noticed in the Commission's December 14, 2007, Notice of Hearing, the subjects for hearing in this docket, as agreed to by the parties during the prehearing conference, were:

1. Should the Commission grant a certificate of authority for the project, pursuant to Wis. Stat. §§ 1.12, 196.025 and 196.49, and Wis. Admin. Code PSC 112?
2. Has the Commission's review of the project complied with the Wisconsin Environmental Policy Act, pursuant to Wis. Stat. § 1.11 and Wis. Admin. Code ch. PSC 4?

The Commission held hearings in this docket in Oak Creek on February 4, 2008 (public session), and in Madison the next day (technical session). Initial and reply briefs were filed by WEPCO, CUB/CW, and WIEG on February 21 and 28, respectively.

The Commission conducted its hearings as Class 1 contested case proceedings, pursuant to Wis. Stat. §§ 196.491(3)(b) and 227.44. The Commission discussed the record on this matter at its June 27 and July 3, 2008, open meetings.

## Summary of Parties' Positions

### WEPCO

WEPCO argues that the installation of the proposed pollution control equipment in this docket is necessary. It states that the installation of approximately \$830,000,000 in equipment to control NO<sub>x</sub> and SO<sub>2</sub> emissions is in the interest of ratepayers because it is a lower cost option than retirement of the four units. It also states that controlling all four units is a lower-cost option than the alternative of retiring just the two oldest units, Oak Creek 5 and 6. WEPCO notes that the next likely pollution control requirement facing coal-fired electric generation will be to reduce mercury (Hg) emissions and WEPCO concludes that the proposed pollution control equipment favorably sets up the four Oak Creek units to achieve up to a 90 percent reduction in Hg emissions. Finally, WEPCO notes that the proposed installation of pollution control equipment will preserve generation of electricity at four very efficient coal-fired units and that keeping these efficient units in its generation fleet is an added benefit for ratepayers, given the likely future regulation of CO<sub>2</sub> as a greenhouse gas.

WEPCO also argues that none of the Electric Generation Expansion Analysis System<sup>1</sup> (EGEAS) runs include ratepayer benefits that may accrue from the Midwest Independent Transmission System Operator, Inc. (MISO) market. WEPCO notes that Commission staff witness Mr. Kenneth Detmer concurs with this assessment.

WEPCO notes that it has performed a break-even analysis that shows the proposed pollution control equipment, if installed at Units 5 through 8, begins to pay off at about 7.5 years.

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<sup>1</sup> The Commission uses the Electric Generation Expansion Analysis System (EGEAS), a complex interactive computer model developed by the Electric Power Research Institute. Over the past decade, the Commission has consistently used and required utilities to use EGEAS to evaluate electric generation expansion plans for cost-effectiveness, and to evaluate whether expansion plans are optimum from various standpoints.

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Thus, WEPCO asserts, if an advanced form of coal-fired generation is necessary, even in the near future, the installation of the proposed pollution control equipment on the four Oak Creek units is still in the ratepayers' interest.

WEPCO refers to the testimony of Commission staff witness Mr. Detmer, who performed nearly three dozen EGEAS runs in his analysis. Mr. Detmer concludes that "in general it is cost-effective to install pollution controls on all four Oak Creek units."

WEPCO also refers to the testimony of Commission staff witness Mr. Dennis Koepke. In his testimony, Mr. Koepke concludes that the proposed project provides significant reductions in the emissions of NO<sub>x</sub>, SO<sub>2</sub>, and Hg, and controlling these four units has merit, given their high electric generation efficiency, when considering CO<sub>2</sub> emissions.

Finally, WEPCO states that the EGEAS analysis performed on behalf of the intervenors supports its conclusion that all four units should be retrofitted rather than retired. In the EGEAS modeling performed at CUB/CW's request, capital costs were inflated by 7 percent (to \$890,000,000), CO<sub>2</sub> allowance prices were set at \$16.50 per tonne, higher wind capacity factors were used (20 percent capacity value and 30 percent annual wind capacity), a lower planning reserve margin was used (14 percent), a higher capacity factor for the natural gas-fired combined-cycle units at Port Washington was assumed (40 percent), lower natural gas and higher coal prices were assumed, and maintenance and reliability capital investments were eliminated through 2012 in anticipation of retirement. This analysis indicates that retiring all four units has a net present value revenue requirement savings of \$135,000,000 over the pollution control option. WEPCO argues that given the context of its EGEAS resource portfolio cost of \$30 billion, this is statistical noise. WEPCO further argues that it does not believe that

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the assumptions in the intervenor-requested EGEAS run are internally consistent and WEPCO does not support using the runs.

### **CUB/CW**

CUB/CW argues that WEPCO has failed to adequately justify its case that pollution control equipment should be installed on the four units at Oak Creek. CUB/CW further argues that WEPCO failed to sufficiently model scenarios where Units 5 and 6 are retired while Units 7 and 8 are retrofitted, so the record cannot support a decision to retrofit Units 5 and 6. CUB/CW argues that the full record does not present a case for installing pollution control equipment for any of the units.

CUB/CW argues that there are three options for the Commission in this docket: (1) retire all four Oak Creek units; (2) retire Units 5 and 6 and retrofit Units 7 and 8; and (3) retrofit all four Oak Creek units. CUB/CW argues that WEPCO only performed one EGEAS run where Units 5 and 6 are retired and Units 7 and 8 are retrofitted, and that analysis was done with no monetary cost assigned to CO<sub>2</sub> emissions. CUB/CW notes that Commission staff did perform an EGEAS run with CO<sub>2</sub> monetized at \$22 per tonne with the option of retiring Units 5 and 6 and retrofitting Units 7 and 8. The Commission staff analysis, notes CUB/CW, showed a \$100 million benefit to ratepayers by retiring Units 5 and 6 and only retrofitting Units 7 and 8.

CUB/CW concludes that the Commission should not support retrofitting any of the units, or alternatively, should find in favor of installing equipment to reduce emissions of NO<sub>x</sub> and SO<sub>2</sub> on Units 7 and 8 only. To support this position, CUB/CW argues that the WEPCO analysis in its EGEAS runs was rife with errors that tilted WEPCO's analysis to retrofit rather than retire. These errors include a failure to monetize CO<sub>2</sub> in the base case, a failure to properly account for

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Fixed Charge Rates, use of wrong discount rates, inappropriate costs included in the retirement option, and failure to account for all costs in the retrofit option, including the frequency of SCR replacement. CUB/CW asserts that the WEPCO analysis overstates the costs associated with the retirement option, understates the costs associated with the retrofit option, and fails to account for future air pollution control costs. CUB/CW concludes that WEPCO has not offered sufficient evidence in this record to demonstrate that controlling any of the units is the most cost-effective option.

### **WIEG**

WIEG argues that WEPCO has made errors in its EGEAS analysis and has attempted to explain away those errors with general arguments and concludes that the errors were, in total, a wash and did not affect the conclusion. WIEG notes that WEPCO resisted performing more EGEAS analyses for the intervenors, even though those additional EGEAS runs, when finally performed, ended up supporting the WEPCO assertion that the proposed pollution controls are a least-cost alternative and superior to a forced retirement of the Oak Creek units. WIEG is also troubled by the representation made by WEPCO in this proceeding that it would consider Environmental Trust Financing (ETF), only to have a WEPCO witness testify in the technical hearing that WEPCO had decided against ETF. WIEG argues that the reasons cited by WEPCO for not using ETF are disingenuous and that the factors cited by WEPCO for its decision were foregone conclusions at the time that WEPCO indicated that it was still considering ETF.

While maintaining that the Commission should seek information from WEPCO that more clearly establishes that the environmental control scenario is more economic than retirement of

some or all of the Oak Creek units, WIEG, based on the information in the record, concludes that the Commission should approve the WEPCO request in this docket.

**Commission Staff Analysis**

Mr. Koepke provided economic analyses of the proposed project and of the merits of retrofitting Oak Creek Units 5 through 8, in light of the need for WEPCO to install pollution control equipment in the context of the Consent Decree. Mr. Detmer's analyses of emission controls and conformance with state statutes and administrative rules show that it is cost-effective to install pollution controls on all four Oak Creek units. Commission staff performed EGEAS runs based on the information provided by WEPCO, and information gathered through its own investigation.

**Findings of Fact**

1. WEPCO is an electric public utility engaged in the generation and distribution of electricity in the state of Wisconsin and upper Michigan. WEPCO's project consists of the installation of WFGD and SCR facilities and associated equipment for Units 5, 6, 7, and 8 at its Oak Creek Power Plant, at an estimated total cost of \$830 million, including AFUDC.
2. The estimated gross cost of this project exceeds the minimum threshold of utility projects requiring Commission review and approval under Wis. Admin. Code § PSC 112.05.
3. Completion of this project will not substantially impair the efficiency of the service that WEPCO provides.
4. Completion of this project will not provide facilities unreasonably in excess of WEPCO's probable future requirements.

5. Neither energy conservation, renewable resources, nor other energy priorities listed in Wis. Stat. §§ 1.12 and 196.025 would be a cost-effective alternative to this project.

6. When this project is placed in operation, the addition to WEPCO's cost of service associated with the project will be proportionate to the increase in value or available quantity of WEPCO's service.

7. No unusual circumstances suggesting the likelihood of significant environmental consequences are associated with the project.

8. The general public interest and public convenience and necessity require completion of the project.

9. Alternatives to the proposed project have been considered, but no other reasonable alternatives to the proposed project exist that could provide adequate service in a more reliable, timely, cost-effective, and environmentally responsible manner.

### **Conclusions of Law**

The Commission has jurisdiction under Wis. Stat. §§ 1.11, 1.12, 196.02, 196.025, 196.395, 196.40, and 196.49, and Wis. Admin. Code chs. PSC 4 and 112, to issue a certificate and order authorizing WEPCO, as an electric public utility, to construct and place in operation the facilities described in this Certificate and Order, subject to conditions stated in this Certificate and Order.

### **Opinion**

#### **Project Need**

WEPCO's Oak Creek Power Plant Units 5 through 8 are rated with a total summer capacity of 1,135 megawatts (MW). The units account for 20 percent of WEPCO's total energy

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generated, and operate at 60 to 70 percent capacity factor. Dates of installation and total summer capacity of each of the units are as follows: Unit 5, 1959, 261 MW; Unit 6, 1961, 264 MW; Unit 7, 1965, 298 MW; and Unit 8, 1967, 312 MW. On the basis of heat rate, the four Oak Creek units are among, if not the most, efficient coal-fired electric generating units in the state.

For 2008, the four Oak Creek units are estimated to represent 24 percent of WEPCO's total NO<sub>x</sub> emissions and 34 percent of WEPCO's total SO<sub>2</sub> emissions. The units are also estimated to represent 28 percent of WEPCO's Hg emissions.

WEPCO proposes to construct WFGD and SCR facilities at its Oak Creek Power Plant, Units 5 through 8. The facilities would be configured with a "cold side" design, meaning that the SCR would be installed before the WFGD in the emissions stream. WEPCO states in its application supplement that this configuration is the lower cost option, primarily because of design changes to support systems and associated operations and maintenance (O&M) costs.

WEPCO estimates the capital cost of the project to be \$830 million, including \$80 million in AFUDC. Based on its EGEAS modeling results, WEPCO states that installing the proposed facilities and continuing to operate Units 5 through 8 would save its customers \$614 million in present value revenue requirements versus retirement of the four units.

WEPCO states in its application that it proposes this project to meet its obligations under the Clean Air Interstate Rule and the federal 8-hour ozone requirements. In addition, the project will allow WEPCO to comply with a Consent Decree entered by the U.S. District Court for the Eastern District of Wisconsin on September 30, 2007.

The proposed project would allow WEPCO to achieve a 30-day rolling average emission rate from the four Oak Creek units of 0.10 pounds per million British thermal units (Btu) for both

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NO<sub>x</sub> and SO<sub>2</sub>. These emission rates represent a 60 to 70 percent reduction in NO<sub>x</sub> and an 80 to 90 percent reduction in SO<sub>2</sub> emissions over current levels. The proposed facilities would also have the co-benefit of reducing Hg emissions from the four units.

Terms of the Consent Decree require WEPCO to install WFGD and SCR technology on Units 5 through 8. WEPCO states that, if the proposed facilities are not installed by December 31, 2012, the only other option available to it under the Consent Decree would be to shut down Units 5 through 8.

The Commission takes official notice that, on April 4, 2008, the Department of Natural Resources issued the air permit for the proposed project. The Commission also takes official notice that, on June 25, 2008, the Natural Resources Board decided to adopt new Hg emissions rules, and to send those rules to the legislature for consideration.

### **EGEAS Modeling of the Proposed Project**

The Commission has previously found EGEAS modeling to be among, but not superior to, other factors considered in making its decisions.

CUB/CW contends that the assumptions used by WEPCO in its modeling runs are not appropriate. At CUB/CW's request, WEPCO performed additional EGEAS runs to reflect changes in CO<sub>2</sub> allowance costs, wind capacity, wind capacity factors, a reduced planning reserve margin, operation of the new natural-gas fired Port Washington units at a different capacity factor, lower natural gas prices, higher coal prices, and reduced maintenance costs. The Commission considered the results of these additional EGEAS runs, but does not find the results, on their own, to be dispositive.

WEPCO acknowledges that errors exist in its original EGEAS runs. Some of the criticisms by CUB/CW and WIEG of the assumptions used by WEPCO in its EGEAS runs are appropriate. Neither the EGEAS modeling presented by the applicant, that performed independently by Commission staff, nor that requested of the applicant by the intervenors, presents a complete picture of the likely present value revenue requirement of the project.

The EGEAS modeling presented in the record indicates that, if the Oak Creek units are retired, WEPCO would need 1,000 MW of new base load generating capacity in the 2018-2019 timeframe. The cost of this new capacity, if coal-fired, is estimated at \$2,500 to \$2,800 per kilowatt (kW). In comparison, the estimated cost of the proposed project is in the range of \$580 to \$785/kW. Because clean coal technologies are not yet available, nor are they likely to be available for an in-service date of 2019, retirement of the four Oak Creek units now may create the need for construction by WEPCO of a future coal plant that would be technically obsolete early in its useful life.

Taken as a whole, WEPCO's EGEAS runs, as tested with sensitivities run by Commission staff, provide certainty that it is cost-effective to install the proposed pollution controls on the four Oak Creek units. The modeling shows that, given the reductions in emissions that will be achieved by the project, the estimated cost of the project is reasonable. Therefore, the Commission finds that EGEAS modeling supports the installation of the proposed facilities on all four of the Oak Creek units.

The Commission recognizes that continued operation of the units provides some benefits that are not reflected in the EGEAS modeling. For instance, continued operation may result in

opportunity sales of energy into the MISO market, and lower congestion and loss charges for energy purchased from the MISO market by WEPCO and other Wisconsin utilities.

### **Summary of Commission Determination**

The Commission determines that EGEAS modeling supports the installation of the proposed facilities on all four of the Oak Creek units. The Commission further determines that the most cost-effective option is to install air quality control equipment on Units 5 through 8, and that there is not sufficient evidence to justify the installation of the proposed facilities on only Units 7 and 8 with retirement of Units 5 and 6. Finally, the Commission determines that economic analysis of the project shows that it will provide resources reasonably needed to serve WEPCO's customers for their probable future requirements.

The Commission bases its determinations in this docket, in large part, on the following:

1. Because Oak Creek Units 5 through 8 are among the most efficient coal-fired units in Wisconsin, they represent a very valuable generating resource to the state's utility customers. Retirement of these units at this time would leave less efficient units operating, which in turn would result in greater greenhouse gas emissions per unit of energy generated in Wisconsin.
2. Because clean coal technologies are not yet available, nor are they likely to be available for an in-service date of 2019, retirement of the four Oak Creek units now may create the need for construction by WEPCO of a future coal plant that would be technically obsolete early in its useful life. Therefore, the proposed project represents a bridge to that future that will allow WEPCO to meet its electric supply requirements in a cost-effective manner while the

details of the carbon-constrained world become clearer and technologies to operate in that world are developed.

3. WEPCO's risk analysis for the proposed project indicates the break-even point for controlling all four units at approximately 7.5 years. Under the assumptions proposed by CUB/CW, benefits do not appear until 2028 to 2030. In that long timeframe, much can change that could delay or eliminate those benefits.

4. Taken as a whole, WEPCO's EGEAS runs, as tested with sensitivities run by Commission staff, provide sufficient evidence that it is cost-effective to install the proposed pollution controls on all four Oak Creek units.

The Commission recognizes that electric utilities will likely be operating in a carbon-constrained world in the near future, and that rate increases resulting from a cap-and-trade system may be a part of that future. The Commission also acknowledges that the Oak Creek units represent an estimated 6,000,000 tons of CO<sub>2</sub> emissions per year. However, the continued operation of upgraded Oak Creek Units 5 through 8 represents a balanced approach to generation in the state that supports the needs of electric ratepayers, and provides a bridge to a time when new, reduced carbon baseload options will be available.

### **Energy Priorities Statute**

Oak Creek Units 5 through 8 represent 20 percent of the energy produced by the WEPCO fleet. Based on the record, the Commission determines that there are not enough demand-side management resources to economically offset the need for the proposed project. In addition, the Commission finds that no other technically feasible and cost-effective alternatives to the

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proposed project exist. Therefore, the Commission determines that the proposed project complies with Wis. Stat. §§ 1.12(4) and 196.025(1).

### **Environmental Review and Compliance with the Wisconsin Environmental Policy Act (WEPA)**

The Commission performed its environmental review of this project as required by Wis. Admin. Code § PSC 4.10(3). The Commission determines that this is a Type III action under Wis. Admin. Code § PSC 4.10(3). No unusual circumstances suggesting the likelihood of significant environmental effects on the human environment have come to the Commission's attention. Neither an environmental impact statement under Wis. Stat. § 1.11 nor an environmental assessment is required. The Commission also determines that its environmental review of the project complies with WEPA, pursuant to Wis. Stat. § 1.11 and Wis. Admin. Code ch. PSC 4.

### **Cost and Construction Schedule**

WEPCO estimates that the cost of construction is \$830,000,000, detailed as follows:

<b>Description</b>	<b>Amount</b>
WFGD System	\$248,486,000
SCR System	\$252,649,000
Site Work and Other Facilities	\$231,523,000
<b>Subtotal, Capital Costs</b>	<b>\$732,658,000</b>
<b>Removal</b>	<b>\$17,342,000</b>
<b>AFUDC</b>	<b>\$80,000,000</b>
<b>Total Project Cost</b>	<b><u>\$830,000,000</u></b>

Construction is proposed to begin as soon as possible, with an in-service date of March 2012.

WEPCO's estimate of AFUDC for the project is based on accruing AFUDC on 100 percent of construction work in progress (CWIP) through 2010, and 50 percent AFUDC and 50 percent return on CWIP after 2010.

**Certificate**

WEPCO is granted a Certificate authorizing it to install WFGD and SCR facilities and associated equipment for Units 5, 6, 7, and 8 at its Oak Creek Power Plant, as described in its application, at an estimated cost of \$830,000,000, subject to conditions stated in this Certificate and Order.

**Order**

1. WEPCO's application for authority to install WFGD and SCR facilities at its Oak Creek Power Plant, as described in its application, is granted subject to the conditions stated in this Certificate and Order.

2. The estimated cost of the approved project is \$830 million, including AFUDC. Should WEPCO's plans for the scope, design, or location of the project change significantly, or if the estimated cost of the project increases by more than 10 percent, WEPCO shall promptly notify the Commission.

3. WEPCO shall submit to the Commission the date that it commences construction and the date that the facilities are placed in service.

4. WEPCO shall submit quarterly progress reports to the Commission indicating the project's major construction and environmental milestones, the extent of the physical completion to date, and the expenditures to date by line item. In addition, once each year WEPCO's quarterly progress report shall include a revised total cost estimate for the project.

5. Upon completion of the project, WEPCO shall notify the Commission and report the actual costs segregated by plant account and comparable to the cost breakdown listed in this

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Certificate and Order. For any account or category where actual cost deviates significantly from those authorized, the final cost report shall itemize and explain the reasons for the deviation.

6. This authorization is valid only if construction commences no later than one year after the date this Certificate and Order is mailed.

7. Jurisdiction is retained.

8. This Certificate and Order is effective the date of mailing.

Dated at Madison, Wisconsin, July 10, 2008

By the Commission:

  
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Sandra J. Paske  
Secretary to the Commission

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See attached Notice of Appeal Rights

Notice of Appeal Rights

Notice is hereby given that a person aggrieved by the foregoing decision has the right to file a petition for judicial review as provided in Wis. Stat. § 227.53. The petition must be filed within 30 days after the date of mailing of this decision. That date is shown on the first page. If there is no date on the first page, the date of mailing is shown immediately above the signature line. The Public Service Commission of Wisconsin must be named as respondent in the petition for judicial review.

Notice is further given that, if the foregoing decision is an order following a proceeding which is a contested case as defined in Wis. Stat. § 227.01(3), a person aggrieved by the order has the further right to file one petition for rehearing as provided in Wis. Stat. § 227.49. The petition must be filed within 20 days of the date of mailing of this decision.

If this decision is an order after rehearing, a person aggrieved who wishes to appeal must seek judicial review rather than rehearing. A second petition for rehearing is not an option.

This general notice is for the purpose of ensuring compliance with Wis. Stat. § 227.48(2), and does not constitute a conclusion or admission that any particular party or person is necessarily aggrieved or that any particular decision or order is final or judicially reviewable.

Revised 9/28/98

BEFORE THE  
PUBLIC SERVICE COMMISSION OF WISCONSIN

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Construct Wet Flue Gas Desulfurization and Selective Catalytic  
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**COMMISSIONER AZAR'S CONCURRENCE IN  
OAK CREEK POLLUTION CONTROLS**

I write this concurrence to address two issues: (1) data needs for future pollution-control applications and (2) final orders capturing assurances made by the applicant.

**Future Applications for Pollution-Control Technologies**

The Applicant in this case did not establish its *prima facie* case. Indeed, there was much dispute among the parties during discovery about how many modeling runs an applicant needs to complete in pollution-control cases. Fortunately for the Applicant, Commission staff and Intervenor filled in the evidentiary holes that allowed the Commission to make a decision. However, I would have preferred more modeling runs than were contained in the final record, a few of which are identified later. Moreover, since numerous parties were submitting critical evidence, the record was difficult to read. I was forced to hunt and peck to find the evidence necessary to fulfill the statutory standards. Applicants must do better in their applications to present both a complete and an orderly case.

In the end, my decision rests primarily on the heat-rate efficiency of these four coal units. If the Commission had chosen to retire these units – the four most efficient coal plants in the state – we would essentially be signaling the retirement of the state’s entire coal fleet.<sup>1</sup> Future applications, however, cannot rest solely on heat-rate efficiency. Instead, the success of future applications will be more dependent on the modeling results, specifically, the modeling results on the cost-effectiveness of the alternatives. To establish the cost-effectiveness of control over retirement, future applicants must provide more data than was provided in this case. I worked with Commission staff to develop the following list of information that I would like to see in future pollution-control cases:

- A. **Base Case** – applicant’s best prediction of what the future will hold. (This will NOT be CO<sub>2</sub> at zero and will include the Renewable Portfolio Standard.)
- B. **Bookends from Base Case** – modeling results for potential future scenarios assuming differing values for the following:
  1. CO<sub>2</sub> costs – no longer use the predictions from Advance Plan 6.
    - Cost Per Ton: Instead use reputable current estimates from such sources as the Environmental Protection Agency (EPA) or the Pew Center on Global Climate Change to provide a reasonable range.
    - Start Date of Carbon Controls: Staff recommends 2015 for a start date.
    - Cap Amount: Staff should recommend a range of cap amounts to be consistently used in these dockets.

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<sup>1</sup> Wisconsin would need to find alternative baseload units before it transitions away from coal.

2. Natural Gas Prices – at least, low, medium and high. (Based on comments in this docket, I would also want to see at least one scenario with high natural gas prices and low coal prices.)
  3. Coal Prices – at least, low, medium and high.
  4. Reserve Margins – set at least two levels: at whatever the regional (reliability) entities are recommending, plus state requirements.
  5. Construction costs – low, medium and high.
  6. MISO impacts – both selling and buying into the market with and without the proposed plants. (Depending on the situation, this may require PROMOD runs.)
  7. Demand and Energy Forecasts – updated forecast for the next 30 years with sensitivities for, at least, low, medium and high.
  8. Generation Options –
    - It is estimated that Yucca Mountain may be online by 2020, which would automatically lift the moratorium. Also the Global Warming Task Force just recommended lifting of the moratorium. Hence, we should conduct future scenarios with new nuclear available by 2020;
    - Given the uncertainty of carbon capture and storage, no new coal; and
    - Combination of no new coal, but nuclear available by 2020.
- C. Integrated Resource Plans (IRP) – according to Mr. Detmer, the Commission needs to see “the optimal resource plan across the utility or ATC footprint. . . . An optimal

plan includes review of conservation efforts, demand side management and renewables.” [Detmer, Exh. 67, p. 1.] File an updated IRP if it has been two years or more since the last IRP was filed with a Certificate of Public Convenience and Necessity case.

This listing is intended to set forth the minimum requirements only; depending on the case, more information may be required. The purpose is to give the decision-makers the range of possible outcomes depending on what happens in the future with such things as carbon cap-and-trade, and fuel costs, etc. Confidence in modeling requires confidence in the base case assumptions and that the scenarios reasonably capture a robust range of potential futures.

#### **Final Orders Capturing Assurances Made by the Applicant**

The primary debate among the parties in this case surrounded one of the Certificate of Authority standards: whether when placed in operation, [the proposed project] adds to the cost of service without proportionately increasing the value or available quantity of service. Wis. Stat. § 196.49(3)(b)3. This standard goes to the heart of cost effectiveness. When evaluating the cost effectiveness of installing pollution controls over retiring coal plants, we must turn to modeling. No one can accurately predict the future. As explained above, applicants can run base cases with their best prediction of the future and then run a series of scenarios showing alternative futures.

In this case, Wisconsin Electric Power Company (WEPCO) and Intervenors disagreed over the number and types of future scenarios that should be modeled. Among others, the parties disagreed about what the future legal requirements would be for mercury and PM2.5 reductions and the attendant impact of such requirements. The Citizens’ Utility Board (CUB) argued that

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WEPCO should have conducted modeling for scenarios containing the costs for additional pollution controls for both mercury and PM2.5. However, WEPCO disagreed and did not conduct those analyses.

Based on the testimony in the record, I concluded that the future requirements for both mercury and PM2.5 are debatable and that WEPCO should, therefore, have conducted additional modeling for both mercury and PM2.5 controls. However, as explained below, I also concluded that the Commission should treat mercury and PM2.5 differently because WEPCO treated them differently: while it admitted additional controls may be needed in the future for mercury, WEPCO unequivocally stated that additional controls would not be needed for PM2.5. I believe if the Commission bases its decision on assurances made by an applicant, then the final order should capture those assurances.

#### Future Requirements for Mercury Reductions in Wisconsin

CUB's expert witness, Dr. Fox, argued that the requirements for mercury reductions in Wisconsin would likely increase to 90 percent. The best technology known today to consistently achieve a 90 percent reduction is TOXECON, which would cost \$95 million to install and an additional \$5.8 million/year in operation and maintenance (O&M). [Tr. 475-476.] Though it agreed that mercury reduction requirements in Wisconsin may rise to 90 percent, WEPCO testified that aggressive research and development (R&D) was currently being conducted that could allow the controls proposed in the application [wet flue gas desulfurization (WFGD) and selective catalytic reduction (SCR)] to reduce mercury to the 90 percent level. [McKinney, Tr. 199.] WEPCO, however, admitted that it was unsure whether this R&D would be successful or

whether it would fail, thereby requiring WEPCO to install very expensive mercury-reduction technology in addition to the WFGD and SCR. [Id.]

I do not expect applicants to accurately predict the future. However, when the applicants admit the future is uncertain--like WEPCO did with regard to mercury controls--I do expect applicants to run sensitivity analyses showing the possible futures (here, that would have been models with and without those expensive mercury controls). WEPCO did not do such sensitivity analyses and simply hoped that R&D would improve the WFGD and SCR technologies to reduce mercury by 90 percent. Had my decision relied on the EGEAS runs, I would have sent this case back to hearing for additional modeling runs showing the cost of control with TOXECON installed.

#### Future Requirements for PM2.5 Reductions In Milwaukee County

As to the future requirements for particulate matter, Dr. Fox testified that the sampling results recently submitted to EPA demonstrate that EPA would likely designate Milwaukee County as a non-attainment area for PM2.5, which would mandate the installation of a baghouse at the Oak Creek units at an approximate installation cost of \$82 million dollars and O&M costs of \$5.8 million/year.<sup>2</sup> [Tr. 486-7.] CUB argued that WEPCO must run a future scenario that included the cost for installing a baghouse for PM2.5.

In contrast to its admissions about uncertain mercury controls, WEPCO took a dramatically different approach to the future requirements for PM2.5: WEPCO's witnesses

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<sup>2</sup> This cost estimate does not include wet ESP, which Dr. Fox testified may also be needed for complying with future PM2.5 requirements. The costs of wet ESP are \$106 million for capital and \$4.4 million/year in O&M. [Tr. 487-489.]

testified that CUB's prediction of the future regarding PM2.5 was simply wrong and a baghouse would not be needed to control PM2.5. WEPCO's testimony on this point was unequivocal:

- "Even assuming the area is designated as nonattainment for PM2.5, Dr. Fox is incorrect . . . and the installation of a baghouse and wet ESP for PM2.5 control would not be required." [McKinney, Tr. 192:8-11.]
- "Our disagreement with Dr. Fox goes to the heart of her position, that any of this equipment will be required to comply with possible future environmental regulations. It will not be required based on all of the reasons I gave in my rebuttal testimony." [McKinney, Tr. 22:10-14.]
- "The conclusion of that testimony [Mr. McKinney] is neither a baghouse nor wet ESP will be required to meet expected regulations for PM2.5." [Durment, Tr. 244:6-7.]
- "Wisconsin Electric does not believe that significant additional equipment expenditures will be necessary in order to meet future regulatory requirement for PM2.5, the ozone standards and regional haze." [WEPCO Initial Brief, p. 14.]
- "Neither a baghouse nor wet ESP is required to reduce solid fine particulate matter in order to meet present or future requirements." [WEPCO Reply Brief, p. 14.]

WEPCO essentially testified and argued that it did not need to run a sensitivity analysis showing the costs of installing a baghouse at Oak Creek because that was not a viable future scenario.<sup>3</sup>

Without having the modeling results regarding PM2.5 controls, I was forced to base my decision in part on WEPCO's assurance that a baghouse will not be needed at Oak Creek.

Based on WEPCO's assurances about not needing a baghouse and the lack of a sensitivity analysis that included the costs of a baghouse, I proposed to my colleagues that the final order give WEPCO two choices:

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<sup>3</sup> Neither the Wisconsin Department of Natural Resources nor Commission Staff submitted testimony on this issue. Because air pollution is a complicated area of law, increased participation by the Department of Natural Resources in these types of dockets would be helpful. Additionally, the participants in this proceeding did not provide legal analysis concerning whether the sampling results purportedly contained in the record supported a non-attainment designation, and if such designation was likely, whether a baghouse would be required for the Oak Creek Units. Without such testimony or legal analysis, I was forced to find both the WEPCO and CUB witnesses on PM2.5 persuasive.

1. If WEPCO is confident in its testimony that a baghouse will not be needed even if Dr. Fox's predictions come true, then accept a condition that would require WEPCO's shareholders to pay for a baghouse if and only if one becomes necessary under the future predicted by Dr. Fox; or
2. WEPCO may move to reopen the record and run an additional sensitivity analysis to capture the future predicted by Dr. Fox, namely, a future scenario that would include the estimated costs of installing a baghouse for purposes of controlling PM2.5.<sup>4</sup> The Commission would then deliberate with this new information and render a new decision.

In lieu of the above, I was also willing to accept a single order point that would require a hearing for any future baghouse installation at Oak Creek where the hearing would include the issue of whether WEPCO's customers should pay for the baghouse. My colleagues rejected all of these options.

I am writing this concurrence to explain clearly why I preferred these options. A carbon-controlled world is slowly unfolding before our eyes and the parameters of that world are undefined and difficult to predict. If an applicant testifies it cannot predict what pollution controls will be required to meet future requirements, it simply needs to provide the Commission with sensitivity analyses showing alternative futures with and without those controls. However, if an applicant says the future predicted by the Intervenors is simply wrong and refuses to

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<sup>4</sup> If WEPCO chose to reopen the record, since they were already running additional models, I would also ask them to run a sensitivity analysis for the estimated costs of TOXECON.

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provide the data on that possible future scenario, then the Commission must be able to rely on such unequivocal statements. The latter represents WEPCO's position on PM2.5 controls.

Dated at Madison, Wisconsin,

July 10, 2008  
By Commissioner Lauren L. Azar

  
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Lauren Azar  
Commissioner

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