



**Before The
State Of Wisconsin
DIVISION OF HEARINGS AND APPEALS**

In the Matter of an Air Pollution Control
Construction Permit Issued to Wisconsin Public
Service Corporation for the Construction and
Operation of a 500 MW Pulverized Coal-Fired
Power Plant Known as Weston Unit 4 in
Marathon County, Wisconsin

Case No.: IH-04-21

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER

Pursuant to due notice, hearing was held at Wausau, Wisconsin, on August 1, 2005. The hearing was continued in Madison, Wisconsin, on September 26-30, 2005, Jeffrey D. Boldt, administrative law judge (the ALJ) presiding on all dates. The hearing record was closed on January 10, 2006, when the transcript was received by the Division of Hearings and Appeals (the Division). Further, a subsequent submittal was received on January 25, 2006.

In accordance with Wis. Stat. §§ 227.47 and 227.53(1)(c), the PARTIES to this proceeding are certified as follows:

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SUMMARY OF ISSUES AND RULINGS

This case focused on three key issues. These are summarized as follows:

- 1) Whether the WDNR correctly determined best available control technology (BACT) emission limits for the following regulated pollutants to be emitted by the SCPC boiler:
 - a) Nitrogen Oxides: The permit limits established by the WDNR reflected BACT for NO_x and are upheld with one modification. The WDNR is directed to amend the permit to require a NO_x emission limit of 0.06 lbs./mmBtu on a 30-day average not including start-up and shut-down. This modification brings the 30-day average emission limit down to a level that is consistent with BACT level for the permit's 12 consecutive month limit.
 - b) Sulfur Dioxides: The mass limits set by the WDNR for SO₂ are accepted as BACT for this facility. Additionally, the permit is modified to include a new SO₂ control efficiency limit in addition to the prior mass limit requirements. The control efficiency of 90% suggested by the Sierra Club's expert Dr. Phyllis Fox is accepted as BACT for this facility. Further, it is expected that the permittee will continue to use low-sulfur coal unless there is some unexpected change in the availability of this type of coal.
 - c) Sulfuric Acid Mist: The SAM limits established by the WDNR in the permit represented BACT and are upheld without modification.

- 2) Whether WDNR correctly determined BACT in establishing a limit and monitoring requirements for the particulate matter to be emitted from the cooling tower(s) at Weston 4.

Ruling of Division: (a) Based on the agreement of the Sierra Club and WPSC that the drift efficiency for the cooling tower should be established at 0.0005%, the Department recommends that the Division direct WPSC to request a revision to the air construction permit to reflect this change, along with a corresponding adjustment to the particulate matter emission limits (lb./hr) for the cooling tower. The Division accepts this recommendation and has so ordered.

- 3) Whether the permit includes sufficient monitoring, testing, reporting, and record-keeping requirements to ensure continuous compliance with all applicable emission standards and limitations.

Ruling of Division: The compliance provisions, particularly those for mercury and particulate emission limits for the SCPC boiler, are reasonable and consistent with applicable administrative code provisions and other recently issued permits. Further, any visible emissions requirements for particulate matter (PM) and SAM are met and achieve BACT by virtue of the direct emission limits on these pollutants.

FINDINGS OF FACT

1. Wisconsin Public Service Corporation (WPSC) – Weston Plant, Wisconsin, applied to the Department of Natural Resources (WDNR) for an air pollution control construction permit. On October 18, 2004, the WDNR issued an air pollution control construction permit (the permit or the air permit) to the WPSC, c/o David Harpole, Vice President – Energy Supply Projects which authorized the WPSC to construct and initially operate an Electric Generating Facility at the Weston Power Plant referred to as Weston 4 – North Site. The Weston 4 project is described in the plans and specifications dated between September 15, 2003 and October 14, 2004, in conformity with the emission limits, monitoring, record keeping and reporting requirements and specific and general conditions set forth in the permit.

2. On November 15, 2004, the WDNR received a request for a contested case hearing pursuant to Wis. Stat. §§ 227.42 and 285.81 and Wis. Admin. Code § NR 2.05, from Attorney David C. Bender on behalf of Sierra Club. By letter dated December 2, 2004, the WDNR granted the petition for a contested case hearing. On December 14, 2004, the WDNR filed a Request for Hearing with the Division of Hearings and Appeals.

3. On June 2, 2005, the Division entered a Ruling that granted partial summary judgment to WPSC on three of the issues set forth in the November 14, 2004, petition. The issues that remain are those summarized above.

4. The WDNR complied with applicable public participation requirements in issuing the Weston 4 permit. The WDNR seriously considered all relevant public comments and prepared an extensive responsive memorandum. (Ex. 101)

5. The WDNR evaluates best available control technology (BACT) analyses using the “top-down” approach set forth by the USEPA in the draft New Source Review (NSR Manual) Workshop Manual (Draft October, 1990). (Ex. 453) Applicable WDNR regulations also require that BACT analysis be determined on a “case-by-case” basis, taking into account energy, environmental and economic impacts. § NR 405.02(7)(2004)

6. The initial step in a BACT analysis is defining the proposed process or source to be permitted. The proposed process is to be determined “in terms of its physical and chemical unit operations used to produce the desired result from a specified set of raw materials.” (Ex. 453) After the process has been identified, the following five steps are considered as part of a top-down BACT analysis.

- (1) identifying all available control technologies for the proposed process or source;
- (2) evaluating the technical options for feasibility taking into consideration source specific factors;
- (3) comparing the remaining control technologies based on effectiveness;
- (4) evaluating the remaining options taking into consideration energy, environmental and economic impacts; and selecting BACT.

(See Ex. 453 at B.5-9 (NSR Manual)) After conducting a site-specific top-down analysis for determining what constitutes the appropriate control technology, an emission limitation is established in the facility’s permit. (*Id.* at B.2.)

7. There was essentially no dispute among the expert witnesses as to the role of the applicant and the WDNR in the BACT process. The applicant has the responsibility for conducting the BACT analysis; and the WDNR evaluates the BACT analysis of the applicant and establishes the BACT emission limit in the air permit. Sierra Club’s expert and the WDNR’s expert agreed that there are a number of resources that a permit applicant and a permit reviewing agency can rely on in getting relevant information for a BACT analysis. These sources include the BACT/RACT/LAER Clearinghouse reports, other permits that have been issued, contacts with U.S. EPA air staff and air permitting staff from other states, trade journals, and professional conferences and vendor guarantees. (TR, p. 893) The BACT/RACT/LAER Clearinghouse maintained by U.S. EPA is a compendium of recently issued PSD permits which is a basic resource and starting point for BACT analyses. This Clearinghouse information and other information relating to BACT emission limits established by other air permitting agencies for similar facilities are important factors in determining a BACT emission limit which is achievable.

8. Further, WDNR's principal expert witness, Jeff Hanson, emphasized the significance of recent BACT determinations for similar facilities in reviewing a BACT analysis and making BACT emission limit determinations, saying that such reviews are "probably given the highest weight" in the WDNR's BACT analyses. (TR, pp. 894-895)

SO₂ Emission Limits

9. During its BACT analysis, the applicant and the WDNR considered two basic control options to control SO₂ emissions to a level that represents BACT. These are broadly described as Wet and Dry flue gas desulfurization (FGD) systems.

"Wet FGD is a mature technology that is available from a number of suppliers. In a Wet FGD system, the flue gas passes through a recirculating alkaline slurry that collects the SO₂. Most Wet FGDs use limestone or lime as the alkali source. A wet FGD system produces a waste product that requires disposal. Historically, landfills or ponds have been used to dispose of Wet FGD wastes. Most new Wet FGDs, however, utilize the limestone forced oxidation process (LSFO). The waste product from the LSFO process is gypsum, which can potentially be sold as a byproduct." (Ex. 200) Wet FGD systems require more electric energy to operate and are somewhat more expensive than Dry FGD systems as a matter of both capital and operating costs. (*Id.*)

"In a Dry FGD, flue gas contacts alkaline slurry to remove SO₂ using essentially the same primary chemical reactions as a Wet FGD. However, the quantity of water introduced to the flue gas in a Dry FGD is limited so that the flue gas does not reach saturation temperature. The dry FGD product and fly ash is then collected in the particulate control equipment (usually a baghouse) located downstream of the FGD system along with the fly ash. Dry FGD is a well-established technology that is commercially available from numerous vendors." (Ex. 200) Dry technology offers superior performance in controlling fine particulate and sulfuric acid mist emissions relative to Wet FGD. (*Id.*)

10. Another technology discussed at hearing is a new type of wet FGD system, a jet bubbling reactor (JBR). "The JBR is a proprietary absorber design by Japan's Chiyoda Corporation. Black & Veatch is the US licensee for this purpose. This absorber module is unique in the FGD industry because the surface area required for absorption of SO₂ from the flue gas is created by bubbling the flue gas through a pool of slurry rather than by recycling slurry through the flue gas as in the other absorber type. Flue gas is pre-cooled with makeup water and slurry prior to entering the JBR's inlet plenum. The inlet plenum is formed by upper and lower deck plates. The flue gas is directed through multiple, 6-inch diameter, sparger tube opening in the lower deck." (Ex. 3)

11. The air permit issued for the Weston 4 project included several SO₂ emission limits for the super critical pulverized coal (SCPC) boiler which must be met through the use of a dry FGD system. (Ex. 102) As the Department's expert witness testified, for BACT purposes the Department considered an FGD system generally (wet or dry) to be the top control technology for SO₂ emissions from the SCPC boiler. For BACT analysis purposes, the WDNR concluded that since either a wet FGD or a dry FGD could meet the same BACT emission rate, the

applicant's selection of which FGD to use for control of SO₂ emissions could be made based on the consideration of other energy, environmental and economic factors.

The WDNR expert witness, Jeff Hanson, testified that:

The department's conclusion was that the end emission rate, that BACT emission rate, would be equivalent. As I stated earlier, I didn't do the technical review, so I have to go back and look as far as the removal efficiencies. I do believe though that Raj [Vakharia] had mentioned in the response to interrogatories or some place that there was maybe a 1 or 2 percent difference between the control efficiencies between wet and dry.

(TR, pp. 540-541)

After selecting FGD (generically) as the control technology, Mr. Vakharia determined what an appropriate emission limit would be after considering *all* types of FGD, both wet and dry. (Ex. 442 at pp. 91-92) Mr. Vakharia testified in his deposition that he was fully aware of the range of control efficiencies for wet and dry FGD units and the emission rates. (Ex. 442 at pp. 92-93) As stated by Mr. Hanson, the Department concluded that the choice of the control technology (i.e., wet or dry FGD) would not change the *BACT emission rate*. (TR, pp. 540-541) In this context, qualitative factors were then looked at in order to further refine the choice between wet and dry, and based on these qualitative factors, dry FGD was selected. (Ex. 442 at pp. 44-42 (Vakharia Dep.); Ex. 100 at pp. 33-34)

12. The BACT SO₂ emission limits for the SCPC boiler at Weston 4 are generally consistent with, and generally more stringent than, the BACT SO₂ emissions limits established for similar utility boilers in air permits issued contemporaneously with the Weston 4 permit. The SO₂ emission limits are clearly "reasonable" when compared with BACT emission limits for similar utility boilers being permitted across the country. In contrast, the SO₂ emission limits calculated and proposed by Sierra Club's expert witness for Weston 4 are considerably different from the other BACT SO₂ emission limits set in air permits for other utility boilers. Dr. Fox acknowledged this distinction when she testified that, as of the date that the Weston 4 project was issued its permit (October 2004), she was not aware of any permit limit or BACT determination for a SCPC boiler burning PRB coal at 0.014 lbs./mmBtu, or of any such facility which was consistently achieving an SO₂ emission rate of 0.014 lbs./mmBtu on a 30-day average. (TR, p. 303) This was the alternative BACT emission rate suggested by Dr. Fox on behalf of the Sierra Club.

13. Sierra Club introduced a series of documents from the applicant's files which it had obtained during the discovery process for the proceedings. These documents were not found in Sierra Club's review of the WDNR's files and the documents included information which could be considered as inconsistent with or contrary to the applicant's position in the air permitting process. These included information relating to the Chiyoda JBR control technology. (Exs. 3 and 33)

14. Several of these documents (Exhibits 3, 57, 48, 33 and 28) suggested that a wet FGD at Weston could achieve a greater percent SO₂ removal efficiency than dry FGD (95 % vs. 90%). Further, that a wet FGD could achieve a lower SO₂ ppmv outlet concentration than a dry FGD. And most interestingly, that in Japan wet FGDs were being used to achieve SO₂ emission rates of 0.02 pounds per million Btu (equating to an FGD efficiency in the range of 97 to 98 % for Weston). Mr. Hanson testified that, to his recollection, such documents or information were not provided by the applicant to the department. (TR, pp. 547-557)

15. The petitioners were aware of the Chiyoda system and its operation at an experimental facility in Georgia at the time of the hearings before the Wisconsin Public Service Commission in 2004. (TR, p. 1009) However, Dr. Fox testified that she did not believe that there was a sufficient basis to find the Chiyoda system in 2004 as BACT for the Weston facility at that time. Subsequently, the Sierra Club became aware of vendor information which the applicants had obtained from Black & Veatch. (Exs. 3 and 33)

This vendor information included the following:

“Chiyoda has installed over 20 JBR FGD systems around the world treating flue gas from over 10,000 MWe of generating capacity. In the US a 110-MWe FGD system was installed at Georgia Power Company’s Plant Yates Unit 1 in 1992 as part of the US DOE CCT program. A JBR has been in operation at the University of Illinois on a 40 MWe facility since 1988. The largest North American installation is at Suncor, Inc. in Alberta, Canada. This unit handles flue gas from process boilers (350 MWe equivalent) and has been in operation since 1996.

(Ex. 3, pp. 4-14)

One of the e-mails between Michael Meadows and Mr. O’Brien provided very precise estimates of JBR removal efficiency.

Tim O’Brien:

*4. Identify what the removal efficiency is for a wet scrubber on PRB coal. This could be just to identify what the lb/MBtu value is.
[Mike Meadows] At Weston 4, we are anticipating an inlet SO₂ level in the range of 480 ppmvd (design) to 300 ppmvd (Black Thunder). In Japan, the current SO₂ emission limit is 10 ppmv (~0.02 lb/MBtu), and several plants are currently attaining that level using limestone wet FGD systems with inlet SO₂ values of 700 to 1200 ppmvd (double the Weston design). A 10 ppmvd equates to a FGD efficiency in the range of 97 to 98% for Weston. As we have discussed with B&W, the economic, if not technical, performance limit of a dry FGD system is around 0.08 lb/MBtu (35 to 40 ppmvd). This is not intended in any way to indicate that a wet limestone system is required to achieve BACT at Weston.*

Upon obtaining this vendor information, and particularly the O'Brien/Meadows e-mails, Dr. Fox became convinced that the Chiyoda JBR system should have been considered as BACT in 2004.

16. The untimely death of Mr. Vakharia, the WDNR's technical reviewer and permit writer for the Weston 4 permit precluded any more definitive assessment from WDNR on any impact that the information reflected in Exs. 3, 57, 48, 33 and 28, would have had on the BACT analysis. However, there was testimony that similar information relating to the difference in control efficiencies between wet and dry FGDs was in the record before WDNR. (TR, p. 818; Ex. 200, pp. 5-17; TR, pp. 834-835; Ex. 220, pp. 5-17; and TR, p. 246; Ex. 101)

17. While it was unfortunate and highly unusual that WPSC engineers did not provide the Chiyoda vendor information to the WDNR, the Division finds that the failure to do so does not impact the final determination on the BACT technology. The petitioners have not carried their burden of proof on this issue. The information contained in Exs. 3 and 33 does not provide a sufficient basis to overturn the WDNR BACT analysis. Sufficient information relating to the Chiyoda system was not available at the time the BACT determination was made in this matter to require a determination that the JBR was the BACT (technology) for coal power-fired plant SO₂ emissions. First, as with more conventional wet FGD processes, it is not known to what extent low sulfur coal would compromise JBR control efficiencies. Mr. Gaige testified that in recent years wet FGD processes have seldom been applied to low sulfur PRB coal. (TR, pp. 661-662; Ex. 28-B) Secondly, while the technology is promising, as of the date of the BACT analysis in this matter, the JBR technology remained relatively unproven over any extended operational period. Thirdly, it is not at all clear that the vendor information contained in Exs. 3 and 33 would have been dispositive for purposes of Mr. Vakharia's BACT analysis review, given where the project stood at that point in time. Mr. Hanson testified as follows:

ALJ Boldt: Can I ask on that, based on your working with Mr. Vakharia for many years and your opinion of his diligence and so forth, do you think he would have redone the analysis if he had had Exhibit 3?

[Mr. Hanson:] No, I don't think he would have. I think he was familiar enough with the capabilities of the control systems included in it. He was satisfied that he had arrived at BACT. Whether or not the process in getting there was to his complete liking, probably not. I think he would have preferred to have some additional information leading up to the preliminary determination. So he would have had to adjust the SO₂ limits after we had already gone out for public comment or NO_x limits for that matter as well.

(TR, pp. 930-931)

18. WDNR air permitting staff concluded in September, 2004, that BACT for Weston 4 would require both a mass limit and a control efficiency for SO₂ emissions. (Ex. 512) A Department memorandum noted that: *"Both EPA and Sierra Club (comments) covered the point that control efficiency should be contained in the permit so as to guarantee that maximum emission reductions are achieved under all coal types. Comments included specific examples of*

the use of a Wet FGD that could achieve greater emission reductions of sulfur. DNR carefully evaluated the facilities presented and the control efficiency of various control equipment options. Twenty-one facilities in Table 5-3 of the permit application have SO₂ BACT limits using a Dry FGD system. At the Mega Symposium we learned that vendor guarantees are commonly being given for 94% control efficiency. Based on a careful review of all of the information now available to us, DNR believes that using a Dry FGD with this limit and a control efficiency of 94% is justified as BACT.” (Id.)

Subsequently, WPSC raised concerns about whether the 94% control efficiency was achievable on a continuous basis. Further, WPSC raised a concern that it could be forced to use higher-sulfur coal just to meet the control efficiency requirement.

19. At hearing, Dr. Fox opined that it would be reasonable to include a control efficiency of 90% as part of the BACT for SO₂, even assuming low sulfur coal as the fuel source. There was considerable testimony that supported this opinion. (TR, p. 1017) At least one other permitted facility, the Round Up plant in Montana, has included a SO₂ control efficiency limit in addition to a mass limit. (TR, p. 310)

The Round Up Power Project plan in Helena, Montana is a 780 MW coal-fired power plant. The final air permit was issued on January 1, 2003. The plant uses relatively low-sulfur coal supplied by a coal mine located on an adjacent property. (MT. Gov. press release 10/1/01)

The final Round Up air permit contains the following requirements. The use of a dry FGD technology was found to be BACT. A mass SO₂ limit of 602.0 lb/m (0.15 lb/mm/Btu) was required. Further:

The control efficiency of the SO₂ emission control equipment, as measured by the inlet SO₂ CEMS (or the “as fired” fuel monitoring system) and the outlet SO₂ CEMS, shall be maintained at a minimum of 90% based on a rolling 30-day average (ARM 17.8.340, ARM 17.8.715, and 40 CFR 60, Subpart Da). (Ex. 471)

20. The 90 percent control efficiency level would ensure that the plant consistently maintain a high level efficiency of control, without setting the control high enough to create an incentive to switch to higher sulfur coal. (Fox) Accordingly, amendment of the permit to include a control efficiency of a minimum 90 percent based on a rolling 30-day average is reasonable based upon the record as a whole. Further, to ensure that the control efficiency requirement does not lead to the use of higher sulfur coal, the permit as modified shall include a rebuttable presumption that the permit-holder continue to use low sulfur PRB coal. The 1990 Clean Air Act Amendments specifically recognizes that “clean fuels” should be considered as part of BACT analysis. Further, the use of low sulfur PRB coal is consistent with Weston 4 design parameters:

As the Preliminary Determination makes clear: The SCPC boiler will be designed to fire PRB coal. The backup fuel will be natural gas. WPSC has provided the following information in support of the PRB coal.

PRB coal was selected primarily for two reasons. First the current Weston facility utilizes PRB coal as the fuel source. The coal handling operations are configured to efficiently handle one coal type source. The addition of a second coal type, such as bituminous coal, increases the complexity and cost of the material handling by requiring separate storage and handling operations. Additional accommodations would need to be made with the rail delivery service to ensure that trains will not have conflicting delivery schedules. Second, the delivered cost of PRB is less than that of bituminous coals so total operating costs are lower for PRB than for bituminous coal at Weston.

Weston Unit 4 is designed to burn PRB coals. It is not designed for both sub-bituminous and bituminous coals. There are two aspects that make it impractical for Weston Unit 4 to burn bituminous coals. First, if it were designed for both coal types, there would be some performance concessions made for the ability to switch from one coal type to another. In addition it will be more costly to design for the worst-case situation for both types of coals. (Ex. 100, p. 5)

The permit shall be modified to include a provision that provides that the permit-holder will continue to use low sulfur coal unless there is some unexpected change in the availability of PRB coal.

21. As modified, the permit reflects BACT for SO₂ emissions.

NO_x Emission Limits

22. The BACT emission limits for the permit are based upon the use of low NO_x burners, good combustion practices and a Selective Catalytic Reduction (SCR) system. (Ex. 102) Dr. Fox agreed that this combination of control technologies represented the “top” control technologies for BACT purposes. In her expert report, Dr. Fox stated: “I agree that these three control methods in combination are the top control option for NO_x emission.” (Ex. 79, p. 6) The disagreement Sierra Club has with the NO_x emission limits for the SCPC boiler for Weston 4 are with the specific emission rates established as BACT by the WDNR.

23. Dr. Fox proposed a NO_x emission limit of 0.011 lbs./mmBtu on a 30-day average. She further testified that she was not aware of any coal-fired power plant permit with such a limit. However, Dr. Fox noted that there have been improvements in burner technology, including the development of “ultra-low” NO_x burners that do achieve her proposed emission limit. (TR, pp. 192-193)

24. The WDNR BACT emission limits are consistent with or lower than other BACT NO_x emission limits established for other coal-fired utility boilers which were issued air permits contemporaneous with the Weston 4 project. This includes the Elm Road permit in Oak Creek, the Springfield (MO) City Utilities permit, the Prairie State (IL) permit and the Longview (WV) permit. (Exs. 400, 536, 535, 103)

25. Mr. Gaige testified that the only similar units which have demonstrated lower NO_x emissions have been ozone-season only units that do not correspond to the year-round operating requirements of the Weston 4 permit. (Gaige; TR, p. 715) “[T]ypically the ozone season units that I have seen too have the opportunity to inject more ammonia, they don’t have the same kind of ammonia slip requirements that they have. So that they can over control for a short period of time. So that if they do get a degradation in the equipment towards the end of the season they can do something like that to finish out that season and then rehabilitate if they need to.” *Id.* As of the date of the BACT analysis, the NO_x emission limits required in the West 4 permit had not yet been achieved in any year-round PRB-fired units that rely upon a SCR (ammonia injection) system. (TR, p. 704)

26. The permit limits NO_x emissions to an annual limit of 0.06 lb./mmBtu, including periods of startup and shutdown, and a 30-day average of 0.07 lbs./mmBtu. (Ex. 102) In order to achieve this limit, Weston 4 will use low NO_x burners, good combustion practices and selective catalytic reduction. The Division finds that the record supports amending the permit to make both the 30-day rolling and the 12 consecutive month emission limit the lower number of 0.06. First, it appears that Mr. Vakharia misunderstood the SCR inlet concentration. He consistently charts the NO_x concentration at the SCR inlet as “in the range of 0.4 to 0.45” pounds per million Btu. (Ex. 59, Interrog. #47) However, the WPSC’s permit application and Mr. Gaige both list the true SCR inlet number at Weston 4 as 0.15 pounds per million Btu. Second, the WDNR assumed a relatively low control efficiency of between 80 to 88 percent for NO_x. However, there was evidence in the record and in established U.S. Supreme Court precedent that SCR efficiency is likely closer to 90 percent. (TR, pp. 118-119; *See: (ADEC v. EPA, 540 U.S. 461 (2004))*) Accordingly, there is plenty of operational “head-room” even at the 0.06 emission rate. The permit should be modified to require a 30-day average of 0.06 lbs./mmBtu.

27. The permit as modified represents a reasonable and appropriate BACT limit that will apply to Weston 4 year round over the life of the facility.

Cooling Towers

28. The permit requires a mass emission limit from the cooling tower of 3.76 lbs./hr., and includes compliance demonstration measures (1) monitoring water usage; (2) operating the cooling tower and drift eliminators in accordance with manufacturer specifications; and (3) maintaining MSDS sheets of chemicals used to treat water in the cooling tower. (Ex. 102) In addition, pursuant to WPSC’s WPDES permit, the facility will be required to limit total dissolved solids in the water condensate. (TR, p. 674) As WPSC’s expert testified, condensate measured in the water discharge will yield a reliable basis from which to determine cooling tower emissions. *Id.*

29. During the course of the proceedings, Sierra Club and WPSC agreed that the drift eliminators which WPSC plans to install at Weston 4 will control the particulate drift from the cooling towers to 0.0005%. However, the two parties could not agree on the level at which the corresponding BACT emission limit for PM from the cooling tower should be reduced. Further, WDNR recommended that the Division direct the permit holder to request a revision to the permit to reflect the improved drift elimination capability of the control device (0.0005%) and to

include a corresponding reduction in the PM emission limit on a lb/hr basis for the cooling tower in a revised permit.

30. Based upon the agreement of the parties, the permit is modified as follows:

Based on the agreement of the Sierra Club and WPSC that the drift efficiency for the cooling tower should be established at 0.0005%, the Department recommends that the Division direct WPSC to request a revision to the air construction permit to reflect this change, along with a corresponding adjustment to the particulate matter emission limits (lb./hr) for the cooling tower.

31. Petitioner contends that WDNR's response to comments failed to respond to the specific comment that lower PM limits were possible for the cooling tower. (Petr.'s Post-Hearing Brief 60) This issue is mooted by WPSC's agreement to install equipment that achieves the very limit that Sierra Club argues for in its comments – 0.0005%. (Ex. 101 (WDNR Resp. to Comments)). In any event, WDNR properly responded to Sierra Club's cooling tower comments by grouping the comments and providing a unified response to the essence of the comments. (*Id.*) It is established law in Wisconsin that an agency's response to comments does not need to respond to each comment in an individualized manner or be at the same level of detail as the comment, *see N.E. Hub*, 7 E.A.D. at 583; *In re Kendall New Century Dev.*, No. 093801AAN, 03-01, 2003 WL 21213227, at 14, 19 (E.P.A. Apr. 29, 2003). Accordingly, the WDNR's response to comments related to PM control for the cooling tower was legally sufficient.

Sulfuric Acid Mist

32. The BACT analysis for controlling sulfuric acid mist (SAM) was properly performed and well documented in the record. In conducting its BACT analysis for SAM, WDNR properly conditioned its technology determination on the underlying pollution control system chosen to control SO₂ emissions. Dry FGD was determined to be the best available control technology for controlling SO₂ emissions from Weston 4. (Ex. 100) In this case, dry FGD accompanied by a baghouse was found to achieve a SAM control efficiency of 90% or more, and was therefore determined to be the top control technology. (*Id.*, pp. 231-232) As stated in WDNR's response to comments:

The BACT analysis indicates that the proposed dry FGD system is capable of 90 percent removal of the potential SAM emissions. The proposed BACT SAM emission rate of 0.005 lb/MMBtu accounts for the proposed technologies chosen for other pollutants, such as dry FGD for SO₂.

(Ex. 101) The need to look to the SO₂ control technology to determine the control for SAM was explained by Mr. Gaige and by WDNR (Exs. 100 and 532) Both Mr. Gaige and the WDNR agreed that FGD has the "greatest potential" for controlling SAM from Weston 4.

Dr. Fox also agreed that "[t]he dry FGD removes more sulfuric acid mist than the wet FGD." (TR, p. 160) Therefore, the record clearly indicates that WDNR's technology determination for controlling SAM emissions was reasonable and appropriate.

33. The Department permit properly included an emission limit of 0.005 lb/mmBtu (24-hour average basis) as BACT for SAM emissions from Weston 4. (Ex. 102) Petitioner argues for a SAM emission limit of 0.0015 lb/mmBtu. In reaching this conclusion, Petitioner and its expert rely on data from facilities that use a different fuel source and neither a dry FGD or a wet ESP (the technologies at issue). Specifically, Petitioner's proposed emission limit appears to be based solely on the fact that another facility, Parish Unit 8, has a permit limit of 0.0015 lb/mmBtu. (Ex. 79) It is not clear what control technologies Parish Unit 8 uses for controlling SAM (TR, p. 669) and Dr. Fox does not provide any information on what technology is employed or how or whether the SAM emission rate is actually achieved at that facility. (*Id.*, p. 669) Parish Unit 8 most likely has a lower SAM emission rate because it uses a different fuel, i.e. natural gas, unlike Weston 4. (Ex. 101)

34. The petitioners have not carried their burden of proof in demonstrating that the SAM emission limit they propose is "achievable" as BACT for a coal-fired power plant using FGD technology.

Miscellaneous Provisions

35. The compliance provisions, particularly those for mercury and particulate emission limits for the SCPC boiler, are reasonable and consistent with applicable administrative code provisions and other recently issued permits.

36. The petitioners also argue for a visible emissions limit for both particulate matter (PM) and SAM. Mr. Hanson testified, and Dr. Fox essentially concurred, that requiring emission limits on PM and SAM (as the WDNR has in this permit) will have the effect of reducing visible emissions of these pollutants. (TR, p. 40; TR, pp. 598-599) Indeed, Mr. Hanson testified that such direct emissions limits are "a more effective" way to limit particulate matter and acid gases. (TR, pp. 598-599) To the extent a visible emissions standard is required, the permit establishes BACT for PM and SAM visible emissions.

Conclusion

37. Based upon the record as a whole, the WDNR BACT analysis shall be modified as follows:

- a) The SO₂ emission limit has been changed to include a minimum control efficiency of 90% based upon a rolling 30-day average. The presumption is that the facility will continue to use PRB coal unless the permit holder demonstrates to the WDNR that there is some significant change in the availability of such coal that necessitates seeking alternative coal sources.
- b) The cooling tower drift efficiency and PM limits are changed as set forth above.

- c) The permit shall be modified to make the 30-day average limit, not including start-up and shut-down, consistent with the 12 consecutive month limit (0.06 lbs./mmBtu) for NO_x emissions.

With these three changes, the permit as modified, represents BACT for Weston 4 as of October, 2004. The WDNR shall draft the final permit language reflecting these modifications.

DISCUSSION

This complex case was made more difficult, on many levels, by the untimely death of the WDNR permit engineer, Raj Vakharia. The highly respected Mr. Vakharia undertook the permit review for the Department and his specialized knowledge and his person were sorely missed at the hearing in this matter. Several issues were quite close, and were made more difficult by the loss of Mr. Vakharia and the inability to get his reaction to new arguments and information.

This was especially true of one of the closest issues, that relating to the Chiyoda jet bubbling reactor system. There is no dispute that this remarkable Japanese technology shows great promise in taking coal fired power plant SO₂ efficiencies to a new level of performance. The issue is whether, in 2004, the Chiyoda system had established this performance sufficiently that it be considered an “achievable” BACT for this facility. The issue is further complicated by the inexplicable and troubling failure of the WSPC to provide vendor information relating to the JBR technology to the WDNR.

The WDNR air permit section chief, Jeff Hanson, testified as follows:

“... the way the process is supposed to work is that the applicant is supposed to divulge all information that is pertinent to the review or to the application they’re submitting, and that should serve as a foundation for creating the applicable requirements that ultimately end up in the permit or ultimately are used in the decision making.

Q. So is it fair to say that the integrity of this process, permitting process, depends on the applicant disclosing all relevant information specific to this facility?

A. All relevant information, yes.

(TR, pp. 558-559)

That was not done in this case. Instead, WSPC consciously chose to risk the integrity of the air permitting process by failing to provide the WDNR with the information about the Chiyoda JBR control technology that it had obtained from its own consultant Mr. Meadows of Black & Veatch. The ultimate responsibility for this failure likely rests with the coordinator of the Weston 4 air permitting project for WSPC. (TR, pp. 504-505; TR, p. 870) WSPC did not provide any reasonable justification for this lapse of judgment. The irony is that, even if this

information had been provided as best engineering and best ethical practice would have indicated, it is unlikely that it would have altered the WDNR's conclusion regarding its BACT analysis review. (Hanson; TR, pp. 930-931) Mr. Hanson specifically testified that he did not believe Mr. Vakharia would have re-opened his BACT analysis based upon the JBR vender information. (*Id.*)

A key aspect of BACT is that the emission limitation be "achievable" for the source. The term "achievable" is not defined in either federal or state regulations. (TR, p. 255) In defining this term, in practice, WDNR takes a very reasonable and practical view. WDNR determines what is achievable based on a variety of information, including, but not limited to, permits issued to comparable facilities, emissions data from similar operations, discussions with vendors and a review of consultants' papers. (TR, p. 893) This method for determining what is achievable was articulated by Raj Vakharia, the WDNR permit engineer assigned to the West 4 matter. (Ex. 442 at 18-31)

BACT is a demonstrated emission limit or rate associated with the control technology determined to be the best control technology for controlling the pollutant at issue. In making this determination the NSR Manual analysis considers and identifies all "demonstrated" technologies applicable to the proposed source and rank these technologies based on demonstrated control effectiveness and expected emissions. (Ex. 453 at B. 7-8) U.S. EPA explicitly states in step 2 of the to-down BACT analysis, that technology and emission limits and control efficiencies are intertwined:

For example, in cases where the level of control in a permit is not expected to be achieved in practice (e.g., a source has received a permit but the project was cancelled, or every operating source at that permitted level has been physically unable to achieve compliance with the limit), and supporting documentation showing why such limits are not technically feasible is provided, the level of control (but not necessarily the technology) may be eliminated from further consideration. However, a permit requiring the application of a certain technology or emission limit to be achieved for such technology usually is sufficient justification to assume the technical feasibility of that technology or emission limit.

(*Id.* at B.7.)

Thus, as specified by U.S. EPA and as consistently implemented by WDNR, a BACT emission limit is established based upon demonstrated achievability, not theoretical extrapolations. (*See* Ex. 453 at B.7 (NSR Manual); Ex. 442 at 29) The SO₂ emission limit turns on the determination of what was "achievable" under the above definition in October, 2004.

At hearing, there was much debate between the competing experts for the WPSC and the Petitioner as to what SO₂ limits were achievable at facilities across the United State and the world. The WDNR determination of SO₂ emission rate was a reasonable conclusion on what was achievable as of October, 2004. Mr. Vakharia was aware of the JBR process, but not of the greater detail contained in the vendor information provided by Mr. Meadows and Black &

Veatch. While JBR technology appears to be extremely promising and likely to become an essential part of all future coal fired power plant BACT reviews, the Division concludes that there was not a sufficient basis to require that it be established as BACT in October, 2004. The emission limits related to the JBR technology could not reasonably be described as “achievable,” pursuant to established WDNR practice and the NSR Manual analysis, as of that date.

The Division finds that the SO₂ emission BACT review of the WDNR was appropriate with two important modifications. The permit is modified to include a control efficiency of no less than 90 percent based upon a rolling 30-day average for SO₂ emissions. Further, the permit requires continued use of low-sulfur coal unless there is some unexpected change in the availability of PRB coal. This is clearly authorized by the plain language of the 1990 Clean Air Act Amendments which explicitly requires BACT limits to account for the application of “production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques...” 42 U.S.C. § 7479(3); Wis. Admin. Code § NR 405.02(7); *see also* Ex. 59, p. 4 The Wisconsin WDNR concurs that NR 405.02(7) and EPA guidance requires BACT analysis to consider alternative processes and clean fuels.

Further, this project was **designed** for PRB coal and it should continue burning such coal as long as it is reasonably available. (Ex. 100) Finally, as the Sierra Club argues: “The EPA’s Environmental Appeals Board (EAB) has held that consideration of lower sulfur coal in a BACT analysis is “dictated both by the 1990 Clean Air Act amendments, which as discussed above, expressly require consideration of clean fuels in selecting BACT, as well as prior decisions of the Administrator, which state that a proper BACT analysis must include consideration of cleaner forms of the fuel proposed by the source.” *Inter-Power of New York, Inc.*, 5 E.A.D. 130, 145 (E.A.B. 1994). For this facility the use of low sulfur coal has long been a part of its air emissions strategy. The permit formalizes the current practice and allows for a modification if there is a change in circumstances relating to the availability of PRB coal.

The NO_x emission limits established in this permit are the lowest established year-round limits of any permit discussed at hearing. The Round Up facility set 0.07 lb./mmBtu as BACT. (Ex. 471) This permit, as modified, lowers this limit to 0.06 lbs./mmBtu for both the 12 month consecutive and 30-day average limits. This slight reduction still provides more than enough operating room, particularly given Mr. Vakharia’s confusion as to the inlet concentration to the SCR (ammonia injection) process. Further, the WDNR’s SCR control efficiency assumptions were very conservative. There are facilities that require lower NO_x emissions during peak ozone pollution seasons, but the WDNR and permit-holder established that such limits would be difficult to achieve on a continuous, year-round basis. Ozone-season only units have the advantage of being able to inject more ammonia, and to shutdown to deal with any degradation of equipment as a result of the high levels of ammonia injected. The 0.06 emission limit represents an achievable BACT for this facility and still provides some margin for operational difficulties. The permit as modified represents BACT for NO_x.

To the extent a visible emissions standard is required, the permit establishes BACT for PM and SAM visible emissions by setting specific emission limits for these pollutants.

The permit, as modified, represents BACT for this facility.

CONCLUSIONS OF LAW

1. The Division of Hearings and Appeals has authority to hear contested cases and enter necessary orders; including modifying permit terms and conditions, in the review of air permits pursuant to Wis. Stat. §§ 227.43(1)(b) and 285.81(1)(b).
2. The Sierra Club, as petitioners, have the burden of proof on all disputed issues of fact. Wis. Stat. § 285.81(2) and 227.42(1)
3. The standards for air pollution control permits are set forth in Wis. Stat. §§ 285.01 to 285.87. The permit as modified meets all relevant standards.
4. The term “best available control technology” or “BACT” is defined in Wis. Stat. § 285.01(12) as follows:

“Best available control technology” means an emission limitation for an air contaminant based on the maximum degree of reduction achievable as specified by the department on an individual case-by-case basis taking into account energy, economic and environmental impacts and other costs related to the source.

This definition is further elaborated at Wis. Admin. Code NR 405.02(7):

(7) “Best available control technology” or “BACT” means an emissions limitation, including a visible emissions standard, based on the maximum degree of reduction for each air contaminant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the department, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including clean fuels, fuel cleaning or treatment or innovative fuel combination techniques for control of the air contaminant. . . .

The control technologies and emission limits as modified in the permit represent BACT for this facility.

5. The Department and the Division have the authority pursuant to 42 U.S.C. § 7479.(3) to modify the permit to provide a rebuttable presumption that the permit holder continues to utilize low-sulfur PRB coal barring any unforeseen change in the availability of

such coal. Such modification is reasonable and necessary based upon the record developed at hearing. Wis. Stat. § 285.81(1)(b).

6. The Department and the Division have the authority to modify the permit to require a control efficiency for reduction of SO₂ emissions. Such a modification is reasonable and necessary based upon the record as a whole developed at hearing. Wis. Stat. § 285.81(1)(b).

7. The WDNR and the Division have authority to modify the permit to adjust the 30-day NO_x emission limit to make it consistent with the 12 month consecutive limit. This modification is reasonable and necessary based upon the record as a whole.

8. The permit as modified represents BACT for this facility.

ORDER

WHEREFORE, IT IS HEREBY ORDERED that based on the evidence in the record and for the reasons stated herein, there is substantial evidence to support the Department's October 19, 2004, decision to issue an air construction permit for the Weston 4 project, including the BACT emission limits and the compliance provisions incorporated into that permit, and the Division HEREBY AFFIRMS the WDNR's decision, with the modifications set forth below. The WDNR shall draft the final permit language reflecting these changes.

(a) Based on the agreement of the Sierra Club and WPSC that the drift efficiency for the cooling tower should be established at 0.0005%, the Division directs WPSC to request a revision to the air construction permit to reflect this change, along with a corresponding adjustment to the particulate matter emission limits (lb./hr) for the cooling tower.

(b) The permit shall be modified to include a control efficiency of 90 percent for SO₂ emissions as well as the existing mass emission limit. The control efficiency shall be based upon a rolling 30-day average or such other period as the WDNR deems reasonable under the circumstances. Further, the permit shall include a rebuttable presumption that the permit-holder continue to use low-sulfur PRB coal barring some unexpected change in the availability of such coal. The WDNR shall make the final determination on whether any such change of circumstances has occurred, and such determination shall be subject to review by a contested case proceeding limited to that direct issue.

(c) The permit shall be modified to make the 30-day average limit, not including start-up and shut-down, consistent with the 12 consecutive month limit (0.06 lbs./mmBtu) for NO_x emissions.

Dated at Madison, Wisconsin on February 10, 2006.

STATE OF WISCONSIN
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By: _____

Jeffrey D. Boldt
Administrative Law Judge

NOTICE

Set out below is a list of alternative methods available to persons who may desire to obtain review of the attached decision of the Administrative Law Judge. This notice is provided to insure compliance with Wis. Stat. § 227.48 and sets out the rights of any party to this proceeding to petition for rehearing and administrative or judicial review of an adverse decision.

1. Any party to this proceeding adversely affected by the decision attached hereto has the right within twenty (20) days after entry of the decision, to petition the secretary of the Department of Natural Resources for review of the decision as provided by Wisconsin Administrative Code NR 2.20. A petition for review under this section is not a prerequisite for judicial review under Wis. Stat. §§ 227.52 and 227.53.
2. Any person aggrieved by the attached order may within twenty (20) days after service of such order or decision file with the Department of Natural Resources a written petition for rehearing pursuant to Wis. Stat. § 227.49. Rehearing may only be granted for those reasons set out in Wis. Stat. § 227.49(3). A petition under this section is not a prerequisite for judicial review under Wis. Stat. §§ 227.52 and 227.53.
3. Any person aggrieved by the attached decision which adversely affects the substantial interests of such person by action or inaction, affirmative or negative in form is entitled to judicial review by filing a petition therefore in accordance with the provisions of Wis. Stat. §§ 227.52 and 227.53. Said petition must be filed within thirty (30) days after service of the agency decision sought to be reviewed. If a rehearing is requested as noted in paragraph (2) above, any party seeking judicial review shall serve and file a petition for review within thirty (30) days after service of the order disposing of the rehearing application or within thirty (30) days after final disposition by operation of law. Since the decision of the Administrative Law Judge in the attached order is by law a decision of the Department of Natural Resources, any petition for judicial review shall name the Department of Natural Resources as the respondent. Persons desiring to file for judicial review are advised to closely examine all provisions of Wis. Stat. §§ 227.52 and 227.53, to insure strict compliance with all its requirements.