



South Dakota Department of Environment and Natural Resources

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1.0 Introduction

DENR public noticed South Dakota's Regional Haze Program for public comments on or before August, 26, 2010. South Dakota's Regional Haze Program consists of "South Dakota's Regional Haze State Implementation Plan" which addresses the federal requirements in 40 Code of Federal Regulations (CFR), Part 51, Section 308 and the proposed rule changes that incorporate the Best Available Control Technology requirements. On September 15, 2010, a public hearing in front of the Board of Minerals and Environment was held to take testimony on South Dakota's Regional Haze Program.

DENR received comments from the United States Environmental Protection Agency (EPA) – Region 8; the Sierra Club, National Parks Conservation Association and Plains Justice, hereinafter referred to as the Sierra Club; and Otter Tail Power Company. The comments without attachments may be viewed in Appendix A.

This document contains a summary of the comment and DENR's responses to the comments received during the public notice period.

2.0 EPA's Comments

1. Additional details are necessary to ensure BART emission limits will be enforceable as a practical matter. The BART emission limits, compliance schedule, monitoring, recordkeeping, and compliance determining methods for Big Stone I must be specified in the text of the Regional Haze State Implementation Plan or in a permit that is incorporated into the State Implementation Plan. For example, in your response to our comment on this issue (#1 and #39 from Appendix D), you relied heavily on requirements of your Title V program (ARSD 74:36:05). As this program is not part of the State Implementation Plan, our concerns with reliance on the Title V program in this area remain. EPA provided examples from Colorado and Wyoming.

Response: DENR believes it already satisfied EPA's concerns involving the enforceability of the BART emission limits, compliance schedules, monitoring, recordkeeping, and compliance determining methods as outlined in Appendix D of South Dakota's Regional Haze State Implementation Plan. EPA's initial comments noted BART needed to be specified as part of South Dakota's State Implementation Plan or the BART requirements need to be incorporated in a permit that is incorporated in South Dakota's State Implementation Plan. DENR decided to include the BART requirements as part of its State Implementation Plan.

DENR drafted rules in the Administrative Rules of South Dakota (ARSD), Chapter 74:36:21 and the Board of Minerals and Environment unanimously approved the rules during the public hearing on September 15, 2010. The final rules will be submitted to EPA for approval in South Dakota's Regional Haze State Implementation Plan.

DENR adopted the BART emission limits in ARSD § 74:36:21:06 – BART determination for a BART-eligible coal fired power plant. This section also specifies the method of determining compliance for each air pollutant. The section requires an annual performance test be conducted to determine compliance with the particulate matter BART emission limit based on the average of three 1-hour test runs and a continuous emission monitoring system to determine compliance with the sulfur dioxide and nitrogen oxide BART emission limits based on a 30-day rolling average. The performance test for particulate matter is based on South Dakota's existing State Implementation Plan which adopts federal performance testing requirements by reference in 40 CFR Part 60, Appendix A, 40 CFR Part 63 Appendix A, and 40 CFR Part 51, Appendix M. South Dakota's existing State Implementation Plan also includes the specific requirements on monitoring and recordkeeping associated with continuous emission monitoring systems. These requirements are identified in ARSD Chapter 74:36:11 and 74:36:13 and are identified by EPA as being part of South Dakota's State Implementation Plan in 40 CFR § 52.2170.

In accordance with 40 CFR § 308(1)(e)(1)(iv), DENR identified Otter Tail Power Company must install BART on Big Stone I as expeditiously as practicable, but no later than 5 years from EPA's approval of South Dakota's Regional Haze State Implementation Plan. EPA may observe the compliance schedule in ARSD § 74:36:21:07 – Installation of controls based on visibility impact analysis or BART determination. This section specifies BART must be installed, operated, and complied with as expeditiously as practicable; but no later than five years from EPA's approval of South Dakota's Regional Haze State Implementation Plan.

EPA may observe the operation and maintenance requirements for air pollution control devices and the monitoring, recordkeeping, and reporting requirements for determining compliance with the BART emission limits in ARSD § 74:36:21:08 – Operation and maintenance of controls and ARSD § 74:36:21:09 – Monitoring, recordkeeping, and reporting. The continuous emission monitoring requirements reference ARSD Chapter 74:36:13 which is part South Dakota's State Implementation Plan and the monitoring, recordkeeping and reporting requirements reference the appropriate sections in South Dakota's Title V air quality permit program which is approved by EPA.

Otter Tail Power Company is also required to meet other independent requirements under ARSD Chapter 74:36:16 – Acid Rain Program. South Dakota's continuous emission monitoring requirements for the Acid Rain program are the same as EPA's (40 CFR Part 75). 40 CFR Part 75 specifies monitoring provisions, operation and maintenance requirements, missing data substitution procedures, recordkeeping and reporting requirements for the monitored data.

EPA repeats its concern that DENR references South Dakota's EPA approved Title V air quality permit program for implementing the BART requirements. As discussed above, the BART limits, recordkeeping, monitoring, compliance schedules, etc. are either already part of South Dakota's State Implementation Plan or will be once EPA approves ARSD Chapter 74:36:21. The rules are designed to fit within South Dakota's current established rules and regulations. DENR is clarifying and acknowledging the BART requirements are required to be incorporated in Otter Tail Power Company's Title V air quality permit. Some of which are

already established in Otter Tail Power Company's current Title V air quality permit #28.0801-29 such as recordkeeping, reporting, and monitoring requirements associated with performance tests and continuous emission monitoring systems.

DENR believes EPA's concerns are addressed in South Dakota's Regional Haze State Implementation Plan which includes ARSD Chapter 74:36:21 and will be submitted to EPA for approval in South Dakota's State Implementation Plan.

2. EPA states footnote 5 references a 1999 EPA Technical Bulletin on nitrogen oxide controls as justification for the 35% to 90% control efficiency range for the top three options. The large range in EPA's bulletin is due to inclusion of selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR), and fuel re-burning for wet-bottom boilers. EPA states it is well documented that a SCR achieves the high end of the range. Therefore, the proposed BART determination of SCR plus separated over-fire air (SOFA) should be better than the 90% control efficiency of SCR alone. In our response to this comment (#31 from Appendix D), EPA indicates there was no discussion regarding how the addition of SOFA would not contribute to a better than 90% control efficiency. EPA indicated our response to this comment (#31 from Appendix D) previously did not discuss how the addition of the separated over-fire air would not contribute to a better than 90% efficiency and would like this addressed.

Response: DENR believes it has addressed this issue in its initial response outlined in Appendix D of South Dakota's Regional Haze State Implementation Plan. As discussed previously, DENR considers the control efficiency of a control device to be variable and it is inappropriate to take an arbitrary emission rate Otter Tail Power Company actually emitted and multiply it by an arbitrary control efficiency to establish an air emission limit. This concept does not change if one is looking at just the addition of a selective catalytic reduction system or a combination of separated over-fire air and a selective catalytic reduction system. DENR provided examples by EPA that agree with this concept from technical documents to EPA's regulations.

Also discussed in Appendix D, none of the documents identified or provided by EPA identify under what operating conditions these control efficiencies will occur (e.g., low, mid or high loads); the time period for demonstrating compliance (e.g., hourly or 30-day average emission rate); or the inlet pollutant loading rate. Therefore, one does not know if these cited control efficiencies are based on systems that have or do not have specific combustion controls (e.g. low nitrogen oxide burners, over-fire air systems, flue gas recirculation). Without knowing this information, the information provided by EPA does not support their claim that a selective catalytic reduction system will obtain 90% control efficiency at any inlet concentration loading to the selective catalytic reduction system.

The selective catalytic reduction system is a nitrogen oxide control technology utilizing the injection of a nitrogen-based reagent, such as ammonia or urea, in combination with a precious metal catalyst to reduce nitrogen to molecular nitrogen. The catalyst provides a substrate for reaction and reduces the required reaction temperatures. The selective catalytic reduction system is typically operated from 650 to 750°F. Large deviations from this

temperature range will significantly impact the nitrogen oxide control efficiency. Ammonia injection rates also impacts the nitrogen oxide control efficiency. Increased molar ratio of ammonia to nitrogen oxide results in enhanced nitrogen oxide reduction but increased ammonia slip from the selective catalytic reduction system. Over-fired air is a nitrogen oxide control technology that controls the amount of oxygen and flame temperature in the combustion zone reducing the formation of thermal nitrogen oxide. Separated over-fire air (SOFA) is an air-staging nitrogen oxide reduction technique that is usually based on withholding 15 to 20 percent of the total combustion air conventionally supplied to the firing zone. The selective catalytic reduction system must be installed with the constraints of an existing coal fired boiler. As such, Otter Tail Power Company may not be able to locate the selective catalytic reduction system in the most ideal and optimal location. Combining combustion controls (SOFA) and post-combustion controls (SCR) allows the facility to meet BART limits within the limit/confines of the identified control options.

It should be noted that in the October 19, 2010, federal register notice, EPA is proposing to require a selective catalytic reduction system be installed on the five units at the Four Corners Power Plant located on the Navajo Nation. EPA is proposing the Four Corners Power Plant must meet a BART plantwide emission limit of 0.011 pounds per million Btus, which EPA notes represents an 80% reduction in nitrogen oxide emissions. Both the emission rate and specified efficiency are less stringent than that being required for Otter Tail Power Company. EPA acknowledges in its own BART analysis for the Four Corners Power Plant that the review needs to be conducted on a case-by-case analysis and the emission rates have to be achievable for the facility being reviewed.

DENR conducted a case-by-case BART analysis of Otter Tail Power Company's facility and determined the nitrogen oxide BART emission limit is 0.10 pounds per million Btu using a selective catalytic reduction and separate over-fire air system.

3. In order for EPA to accept the establishment of separate BART limits for startup and shutdown condition versus normal operation, an adequate record showing that the otherwise applicable limits are not achievable and separate startup and shutdown limits constitute BART is required as justification. EPA indicated that DENR's previous response to this comment did not provide sufficient justification for separate startup and shutdown limits.

Response: As defined in 40 CFR § 51.301, *Best Available Retrofit Technology (BART)* means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by an existing stationary facility. The emission limitation must be established on a case-by-case basis taking into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. DENR disagrees with EPA that the BART emission limits must be in pounds per million Btus because the rule does not specify the units. The rule simply states the emission limits must be established on a case-by-case basis.

When comparing control technology's and emission limits across or within industrial sectors a generalized emission rate is used. The generalized emission rate such as a pound per million Btus allows emission rates across boilers of varying sizes to be compared. A pound per hour emission rate is difficult to compare from one boiler to the next if the heat input of the boilers are not identical. Whereas, the pound per hour emission rate is a case-by-case emission limit and is specific to an emission unit. DENR established a pound per hour BART emission limit for particulate mater, sulfur dioxide, and nitrogen oxide to represent BART since DENR used the hourly limits in the modeling analysis to demonstrate Otter Tail Power Company was not causing visibility impairment in a Class I area. The pounds per hour BART emission limits cover all normal operations including startup and shutdown.

At Otter Tail Power Company's listed maximum capacity the pounds per hour and pounds per million Btus BART emission limits are equivalent as noted by Equations 1-1. Substituting the "Emission Limit (pounds per million Btus)" and "Maximum Capacity (million Btus per hour)" from Table 1-1 into Equation 1-1 provides the BART emission limits in ARSD § 74:36:21:06 and also listed in the fourth column of Table 1-1.

Equation 1-1 – Converting from “pounds per MMBtus” to “pounds per hour”

$$\text{Emission Limit} \left(\frac{\text{pounds}}{\text{MMBtus}} \right) \times \text{Maximum Capacity} \left(\frac{\text{MMBtus}}{\text{hour}} \right) = \text{Emission Limit} \left(\frac{\text{pounds}}{\text{hour}} \right)$$

Table 1-1 – BART Emission Limit Comparison

Pollutant	BART Emission Limit (pounds/MMBtus)	Maximum Capacity (MMBtus/hour)	BART Emission Limit (pounds/hour)
Particulate Matter	0.012	5,609	67.3
Sulfur Dioxide	0.09	5,609	505
Nitrogen Oxides	0.10	5,609	561

During the public hearing on South Dakota's Regional Haze State Implementation Plan, the Board of Minerals and Environment revised the particulate pounds per million Btus limit in ARSD 74:36:21:06(2) to cover all operations including startup and shutdown based on previous testimony from Otter Tail Power Company. Otter Tail Power Company had testified the baghouse would be in operation prior to starting up the boiler and could meet the pounds per million Btus limit even during startup and shutdown.

4. In accordance with ARSD 74:36:21:11, a permit to construct is required to include the controls, emission limits, monitoring, recordkeeping, and reporting requirements identified in the BART determination and approved by DENR. EPA states without seeing the details of such permit; it is difficult to determine whether this section of the SIP adequately addresses the requirements for enforceability, including appropriate averaging times, compliance verification procedures, and recordkeeping and reporting requirements, and proper operation and maintenance procedures.

Response: DENR discusses this in the written portion of South Dakota's Regional Haze State Implementation Plan and as we responded in response to Comment #1, DENR adopted

these requirements in ARSD Chapter 74:36:21. The requirements in ARSD Chapter 74:36:21 will be submitted as part of South Dakota's State Implementation Plan and included in the permit to construct and eventually in the Title V air quality permit as applicable requirements.

DENR believes it has already satisfied EPA's concerns involving the enforceability of the BART emission limits, compliance schedules, monitoring, recordkeeping, and compliance determining methods.

5. EPA stated the public must be provided a calculation of the number of years required to reach natural conditions if the Reasonable Progress Goal provides a slower rate of improvement than that needed to attain natural conditions by 2064 per 40 CFR §51.308(d)(1)(ii). Although DENR indicates the goal of reaching natural visibility by 2064 is still achievable, EPA believes the modeling results does not support DENR's conclusion and is requesting that we identify when the current evidence indicates natural conditions will be achieved.

Response: Although DENR believes it will achieve natural conditions by 2064, DENR will project when WRAP's modeling depicts natural conditions will be achieved in South Dakota's Regional Haze State Implementation Plan.

6. Despite the fact that South Dakota's sulfur dioxide and nitrogen oxide emissions from point sources represent 1.5% and 4% of the contribution from point sources on our two Class I areas, respectively, EPA believes a four factor analysis is still required for GCC Dacotah, Black Hills Corporation (Ben French), and Pete Lien and Sons.

Response: Although DENR demonstrated in the original response to EPA's comment that South Dakota's sulfur dioxide and nitrogen oxide contributions to visibility impairment in the Class I areas is minimal based on WRAP's modeling, DENR will conduct a four factor analysis on GCC Dacotah, Black Hills Corporation (Ben French), and Pete Lien and Sons.

7. EPA states the BART requirements need to be incorporated in the state implementation plan and does not believe it appropriate for DENR to rely on the construction permit since EPA has not been approved in our State Implementation Plan yet.

Response: DENR addressed this in Comment #1.

8. EPA reiterated Comment #5 involving the recalculation of when South Dakota plans on achieving natural visibility and would like the year recalculated.

Response: DENR addressed this in Comment #5.

9. EPA stated federal land managers must be provided a 60-day consultation period prior to any public hearing on the regional haze state implementation plan. Since the BART permit is an integral part of the Regional Haze state implementation plan, the 60-day consultation period

must extend to the federal land managers' BART permit review as well. EPA did not believe our response to this comment earlier addressed their concern.

Response: Again, South Dakota's draft Regional Haze State Implementation Plan was submitted to the federal land managers on January 15, 2010, which included the BART determination and requirements. DENR adopted those requirements in ARSD 74:36:21 to be submitted as part of the state implementation plan.

DENR revised ARSD 74:36:21:12 to state federal land managers will have 60 days to submit an analysis on a BART determination or by the end of the public participation process, whichever is later. However, DENR believes this is a mute point since the federal land managers were provided 8 months to provide comments on the BART determination and requirements.

DENR believes the federal managers had over 60 days to review the BART requirements specified in South Dakota's draft Regional Haze state implementation plan. DENR established EPA's comment in ARSD 74:36:21 which will be submitted as part of South Dakota's Regional Haze State Implementation Plan.

3.0 Sierra Club's Comments

10. South Dakota's draft regional haze plan states that, because Big Stone I has a generating capacity less than 750 megawatts, the state is not required to follow the BART Guidelines in 40 CFR Part 51, Subpart Y. South Dakota Draft Regional Haze Plan at 82. Specifically, the South Dakota Regional Haze Plan states "...in identifying the available control technologies, DENR is not listing any of the permutations of the control levels for each identified control technology as suggested by EPA's guidance." While the Federal regional haze regulations mandate that BART for units of 750 megawatts or greater must follow the BART Guidelines, the fact that Big Stone I has a generating capacity less than 750 megawatts does not mean South Dakota does not have to follow a reasoned analysis in evaluating BART and setting BART emission limitations. Thus, there is no justification for the state to ignore the fact that pollution controls can be designed and operated at varying levels of control efficiency. If the state does not consider the capabilities of the various pollution controls evaluated in the case by case BART analysis, its cost impacts analysis will be skewed in favor of the lowest capital cost equipment rather than properly evaluating cost impacts in terms of amount of pollution reduced. Thus, South Dakota must consider the varying levels of control efficiency of pollution controls in the BART analyses for Big Stone.

Response: The Sierra Club appears to be singling out a specific sentence and not reading the entire BART determination on how DENR decided on the case-by-case BART emission limits. As noted on page 82 of the South Dakota's Regional Haze State Implementation Plan, DENR identified that "Otter Tail Power Company's Big Stone I facility does not have a total generating capacity greater than 750 megawatts. Therefore, DENR is not required to follow these guidelines. As such, DENR will follow the steps identified in Appendix Y with some slight differences. For example, in identifying the available control technologies,

DENR is not listing any of the permutations of the control levels for each identified control technology as suggested by EPA's guidance. DENR will use the initial step to identify control technologies without including the control levels. Step 3 is used to evaluate the control effectiveness or permutations of the control levels for those control technologies that are considered feasible to install or maintain as identified in Step 2." This approach allowed DENR to remove the infeasible technology in Step 2 before considering the permutations of the varying control efficiencies that were used to rank the control options in Step 3.

Based on the cost analysis for both the dry and wet scrubber technology discussed to control sulfur dioxide emissions, the capital cost of the scrubbers did not change with the varying level of control efficiencies. There would be operational and maintenance costs; but the cost differences would be insignificant. As such, Sierra Clubs' comment that the cost impacts would be skewed in favor of the lowest capital cost equipment did not occur.

11. The Sierra Club believes the BART analysis for sulfur dioxide is flawed because DENR based the analysis on coal with higher uncontrolled sulfur dioxide emissions than historically burned at Big Stone I. The Sierra Club took the last 10 years of data from EPA's Clean Air Markets Database and stated the highest annual average sulfur dioxide emission rate was no higher than 0.70 pounds per million Btus. The Sierra Club stated DENR should use this uncontrolled sulfur dioxide emission rate or at worst, determined the highest 30-day average uncontrolled sulfur dioxide emission rate in setting the BART emission limit for Big Stone based on the control efficiency of the sulfur dioxide controls evaluated.

Response: In considering what emission limit represents BART, one needs to consider the operation of the emission unit and the control device. DENR considers it inappropriate to take an arbitrary emission rate Otter Tail Power Company has actually emitted and multiply it by an arbitrary control efficiency to develop an emission limit.

The control efficiency is variable as recognized by EPA's fact sheet (EPA-452/F-03-024) for fabric filters controlling particulate matter emissions. The fact sheet notes a fabric filter is a constant outlet device and not a constant collection efficiency device. This fact sheet also notes the collection efficiency of the fabric filter is constantly changing and average collection efficiencies are based on tests with a constant inlet pollutant loading. EPA also recognized the variability in another fact sheet (EPA-452/F-03-034) for flue gas desulfurization (wet and dry) controlling sulfur dioxide emissions. In this fact sheet, EPA states control efficiencies range from 50 percent to 98 percent.

In addition, EPA acknowledges this concept in rules. For example, in accordance with 40 CFR §60.482-10, a vapor recovery system shall be designed and operated to recover the volatile organic compound emissions vented to them with an efficiency of 95 percent or greater or to an exit concentration of 20 parts per million by volume, whichever is less stringent. Another example is in the new source performance standard for electrical utility steam generators. In accordance with 40 CFR 60.43Da(i)(1), an electrical utility steam generating unit that commenced construction after February 28, 2005, shall not emit sulfur dioxide in excess of 1.4 pounds per megawatt hour or 5 percent of the potential combustion concentration (95 percent reduction).

DENR does not recommend any changes.

12. The Sierra Club believes the BART analysis for sulfur dioxide is flawed because DENR failed to consider the level of control achievable with wet scrubbers. The Sierra Club identified wet scrubbers in Japan that guaranteed 99% sulfur dioxide control efficiency and claimed this technology was demonstrated at the University of Illinois' Abbott power plant, Georgia Power's Plant Yates, Dayton Power & Light's Killen Unit 2, and Plant Bowen Unit #3. The Sierra Club went on to identify other facilities that identify 97.5% efficiency or better. The Sierra Club's conclusion was the BART analysis should have evaluated these levels of control based on the actual uncontrolled sulfur dioxide emissions emitted by the unit over a 30 day average basis in the evaluation of a wet scrubber for BART.

Response: The Sierra Club provided vender data for several systems implementing the Chiyoda CT-121 wet flue gas desulfurization system. With the exception of the data for the Shinko-Kobe power plant in Japan, the 2008, 2009, and 2010 data notes that to obtain the 98% and greater control efficiency the inlet sulfur dioxide concentrations to those scrubbers needed to be greater than 1,680 parts per million. At these inlet concentrations and control efficiency, this data indicates that controlled emission rate for these systems would be in the range of approximately 0.07 and 0.15 pounds per million Btus. DENR calculated these emission rates using EPA's Method 19 at 5% oxygen. Since the oxygen content of the data was not given, the calculated concentrations will vary slightly.

The Chiyoda CT-121 wet flue gas desulfurization vender data indicates that for those systems with an inlet concentration between 500 and 1,000 parts per million, an average of 95% control efficiency was obtained. At these inlet concentrations and control efficiency, this data indicates that controlled emission rate for these systems would be in the range of approximately 0.05 and 0.10 pounds per million Btus. Again, DENR calculated these emission rates using EPA's Method 19 at 5% oxygen.

As discussed in Appendix D of South Dakota's Regional Haze State Implementation Plan, for calendar years 2006, 2007, and 2008, and not considering periods of startup and shutdown, Otter Tail Power Company's hourly sulfur dioxide emission rates ranged from approximately 0.5 to 1.3 pounds per million Btus. These emission rates correspond to a sulfur dioxide inlet concentration of 262 to 683 parts per million. This range represents the data associated with the 500 to 1,000 parts per million (95% control efficiency) but is also below that range which means the control efficiency would be less than 95%. DENR's BART emission limit for sulfur dioxide of 0.09 pounds per million Btus is within the emission rate range for both the 95% and 98% control efficiencies.

In regards to the Shinko-Kobe power plant in Japan, the CT-121 wet flue gas desulfurization Kobe was designed for operation at 99 percent sulfur dioxide removal for a one percent sulfur bituminous coal, analogous to an Eastern U.S. low-sulfur coal. Otter Tail Power Company burns Powder River Basin subbituminous coal, which is a Western U.S. low-sulfur coal. Due to the coal characteristic differences, this plant is not comparable.

The Sierra Club also states Mitsubishi guarantees a control efficiency of 99.8%. The document submitted by the Sierra Club does not state Mitsubishi guarantees this control efficiency for every project. The data indicates this guarantee was associated with a sulfur dioxide inlet concentration of 7,800 parts per million. As stated above, the sulfur dioxide inlet concentration for Otter Tail Power Company's facility ranges from 262 to 683 parts per million, which is well below the range Mitsubishi guaranteed a 99.8% control efficiency for and is not comparable to Otter Tail Power Company's facility.

The Sierra Club references a permit issued by the Georgia Environmental Protection Division for Plant Washington. In reviewing this permit, on page #9, Georgia appears to have established Best Available Control Technology Limits of 0.052 pounds per million Btus on a 12-month rolling basis, 0.069 pounds per million Btus on a 30-day rolling average, and 959 pounds per hour (equivalent to 0.116 pounds per million Btus at maximum capacity) on a 3-hour average. DENR's BART emission limit for sulfur dioxide is 0.09 pounds per million Btus on a 30-day rolling average which is comparable to Georgia's BACT emission limit for that same time period.

The Sierra Club also references actual monitoring data from EPA's Clean Air Markets division for several coal fired power plants. The Sierra Club notes there is actual monitoring data that indicates lower emission rates are being achieved. DENR agrees actual monitoring data is useful information. However, DENR disagrees with the concept or emphasis that an emission rate limit should be set at the same level of the actual monitoring data. In evaluating an emission rate that will be used as an emission limit, DENR considers the variability within the actual monitoring data to determine if a facility is able to achieve an emission limit on a continuous basis underneath all proposed operations and into the future. DENR reviewed the monitoring data for Pleasant Prairie for calendar year 2008. The monitoring data notes that Pleasant Prairie had on an hourly basis actual emission rates as high as 0.22 pounds per million Btus per hour, which is approximately 10 times higher than the annual average. These higher hourly emission rates need to be considered in establishing an emission rate to ensure the emission limit may be achieved continuously and at all proposed operations.

In summary, DENR conducted a case-by-case BART determination for Otter Tail Power Company's facility and determined the BART emission limit should be 0.09 pounds per million Btu using a dry flue gas desulfurization unit to control sulfur dioxide emission and is within the range Sierra Club provided for a wet flue gas desulfurization unit.

13. The Sierra Club believes DENR and Otter Tail Power Company failed to evaluate the highest sulfur dioxide removal efficiencies achievable with a state-of-the-art dry scrubber. The Sierra Club mentioned four coal fired power plants that will or have installed a dry scrubber and are subject to higher control efficiency requirements and/or lower sulfur dioxide BACT emission limits than the 0.09 pounds per million Btu proposed by DENR. The four coal fired power plants are: 1) Newmont Nevada TS power plant; 2) White Pine power plant; 3) Toquop power plant; and 4) Dry Fork power plant. Thus DENR should have evaluated these levels of control based on the uncontrolled sulfur dioxide emissions emitted by the unit over a 30-day average basis.

Response: The Sierra Club references four coal-fired power plants that have installed or are proposing to install a “state-of-the-art” dry scrubber. DENR reviewed three of the four facilities but was unable to review Dry Fork since it was not available and the Sierra Club did not provide Exhibit 13 to DENR. DENR determined that the Newmont and White Pine power plants installed or proposed to install a dry scrubber system to control sulfur dioxide emissions. However, the Toquop power plant actually proposed to install a wet scrubber system so is not comparable in this scenario. The Newmont and White Pine are located in Nevada and have the same sulfur dioxide BACT emission limits which consist of the following:

1. 0.09 pounds per million Btu based on a 24-hour average if the sulfur content of the subbituminous coal is equal to or greater than 0.45% based on a 30-day rolling average and a 95% sulfur dioxide removal efficiency based on a 30-day rolling average; and
2. 0.065 pounds per million Btu based on a 24-hour average if the sulfur content is less than 0.45% based on a 30-day rolling average and a 91% sulfur dioxide removal efficiency based on a 30-day rolling average.

The Sierra Club identifies the sulfur dioxide BACT emission limit of 0.07 pounds per million Btu.

As the Sierra Club indicates, these four power plants either have just started operation (Newmont began operation in 2008), are currently under construction (Dry Fork), or have not started construction (White Pine). These permits established emission limits that represent best available control technology for new coal fired power plants and not a retrofit of an existing power plant that represents Best Available Retrofit Technology. After taking that into consideration, DENR established a sulfur dioxide BART emission limit of 0.09 pounds per million Btu based on a 30-day rolling average which is comparable to Newmont and White Pine.

As outlined in Appendix D of the Regional Haze State Implementation Plan submittal, DENR reviewed EPA’s Reasonable Achievable Control Technology, Best Available Control Technology, and Lowest Achievable Emission Rate Clearinghouse (RBLC) for permits issued after calendar year 2000 on the emission limits established for coal fired boilers using a flue gas desulfurization system. The RBLC notes that the best available control technology emission limits for new coal fired boilers using a flue gas desulfurization system (either wet or dry) were in the range from 0.04 to 0.17 pounds per million Btu. DENR’s sulfur dioxide BART emission limit is within the range identified for BACT emission limits for new boilers.

14. The Sierra Club believes DENR’s cost effectiveness calculation of the wet scrubber at a sulfur dioxide emission rate of 0.043 pounds per million Btu of \$1,699 per ton is a reasonable cost when compared to other sulfur dioxide BART determinations. The Sierra Club references a spreadsheet put together by the National Park Service with cost information for BART determinations. According to the Sierra Club, the spreadsheet identifies the average

cost effectiveness of sulfur dioxide BART controls as \$1,571 pounds per ton, the mean cost effectiveness as \$1,966 per ton, and the highest cost is \$7,309 pounds per million Btu. The Sierra Club states that similar facilities will have to incur similar costs to meet BART; therefore, DENR has no justification to discount installation of a wet scrubber based on costs.

Response: The Sierra Club did not provide a copy of the spreadsheet they used to provide the different effectiveness. It is impossible to compare the effectiveness since the Sierra Club uses three different units in comparing cost effectiveness, mean cost effectiveness, and highest costs. DENR was unsuccessful in obtaining the National Park Services' spreadsheet from the internet and was unable to compare the numbers.

DENR based its BART determination on a case-by-case basis taking into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. As noted one of the consideration is the improvement in visibility. Based on the visibility modeling, there was no discernable difference between installing a wet or dry flue gas desulfurization system.

In making its BART determination, DENR reviewed the modeling results and in some cases the wet flue gas desulfurization system would cause a higher visibility impact than the dry flue gas desulfurization system. Just as the modeling shows in some other cases the dry flue gas desulfurization system would cause a higher visibility impact than a wet flue gas desulfurization system. After taking everything into consideration, DENR determined a dry flue gas desulfurization system represented BART.

15. The Sierra Club states DENR and Otter Tail Power Company did not fully evaluate the environmental impacts of a wet scrubber versus a dry scrubber. Specifically, they mention a wet scrubber will provide lower sulfur dioxide emission rates which will be needed for the effective removal of carbon dioxide from the gas stream once it is required; greatly improve the removal of hydrogen chloride and hydrogen fluoride; significantly remove arsenic, beryllium, cadmium, chromium, lead, manganese, and mercury from flue gas; lower particulate matter 2.5 microns in diameter or less concentrations; and decrease the methylation of mercury.

Response: As defined in 40 CFR § 51.301, BART is established on a case-by-case basis taking into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

There are advantages and disadvantages to operating a wet and dry flue gas desulfurization system. The Sierra Club identifies what it believes to be advantages of a wet flue gas desulfurization system but do not identify the disadvantages of a wet flue gas desulfurization system or the advantages of a dry flue gas desulfurization system.

The Sierra Club cites a letter from Alstom to Duke Energy and testing data from the WYGEN II facility in Wyoming as documentation that a wet scrubber is better at reducing hydrogen chloride and hydrogen fluoride emissions. The hydrogen chloride and hydrogen fluoride emission rates for both a wet scrubber and a dry scrubber are dependent upon several factors, which include the type of coal, boiler design, inlet concentrations, etc. These factors are innately important when trying to compare control efficiencies. Unfortunately, DENR did not receive the exhibits the Sierra Club cites and is unable to locate these specific documents. Therefore, DENR was unable to determine how the efficiencies cited by the Sierra Club were derived.

The Institute of Clean Air Companies webpage cited by the Sierra Club also specifies the following: “According to the EPA and others, both wet and dry scrubbers have been shown to reduce HCl emissions by 95% and more...Others have reported ranges of 87-94% removal of chlorine and 43-97% removal of fluorine by both wet and dry scrubbers.” As indicated by the Sierra Club and the documents cited, both a wet scrubber and dry scrubber will reduce hydrogen chloride and hydrogen fluoride emissions, which notes the two control options are beneficial in reducing hydrogen chloride and hydrogen fluoride.

The Sierra Club also cites the Institute of Clean Air Companies as specifying that a wet scrubber “significantly remove arsenic, beryllium, cadmium, chromium, lead, manganese, and mercury from flue gas.” In reviewing the cited webpage, DENR could not locate what was classified as “significant,” or what type of coal was being burned in the system being referenced.

The emission rates of heavy metals are dependent upon several factors, such as the type of coal being burned. For example, mercury is present in coal in trace amounts. When coal is burned, the mercury is found in the gas stream in several forms. Mercury is volatilized and converted to elemental mercury vapor in the high temperature regions of a coal-fired boiler. As the gas stream cools, a series of complex reactions begin to convert a portion of the elemental mercury into ionic mercury compounds and particulate mercury.

This partitioning of a portion of the elemental mercury into ionic mercury and particulate mercury is known as mercury speciation, which can have considerable influence on the selection of mercury control approaches. In general, the majority of gaseous mercury in bituminous coal-fired boilers is ionic mercury. On the other hand, the majority of gaseous mercury in subbituminous and lignite fired boilers is elemental mercury.

To complicate the mercury speciation, the type of coal burned, the chlorine content of the coal, fly ash content (unburned coal), sulfur trioxide, and water concentrations of the gas stream appear to impact the mercury reactions and chemistry. The mercury chemistry is important because the particulate mercury may be captured and controlled by a particulate matter control device such as a baghouse but ionic mercury is captured and controlled more efficiently by a wet scrubber system. The hardest to capture and control with existing technology is elemental mercury. Therefore, being able to convert elemental mercury to one of the other two forms is essential in capturing a high percentage of the mercury emissions.

Regardless of the technology both a wet scrubber and dry scrubber are expected to reduce mercury emissions.

Other advantages identified in Otter Tail Power Company's BART analysis are 1) a dry flue gas desulfurization system generates a dry byproduct which can be handled with conventional ash handling systems which is not available to a wet flue gas desulfurization system, 2) the dry flue gas desulfurization system does not have true "wet zone" so there is less corrosion issues and reduces the "exotic" construction materials and 3) the dry flue gas desulfurization system also produces less acid aerosols such as sulfuric acid.

The BART determination is a case-by-case review that takes into account several factors. After taking everything into consideration, DENR determined a dry flue gas desulfurization system represented BART.

16. The Sierra Club believes the BART analysis for nitrogen oxide is flawed because DENR failed to consider the level of control achievable with the proposed selective catalytic reduction at Big Stone I. The Sierra Club indicates a selective catalytic reduction system is capable of achieving an additional 90% nitrogen oxide reduction. The Sierra Club reviewed recent selective catalyst reduction retrofits and states establishing BACT nitrogen oxide emission limits of 0.05 to 0.06 pounds per million Btu with at least one nitrogen oxide BACT emission limit as low as 0.035 pounds per million Btu. Because of this, the Sierra Club believes DENR must establish a lower nitrogen oxide BART emission limit.

Response: The response to this comment is already addressed in the response to Comment #2.

17. The Sierra Club states that DENR must lower its particulate matter BART emission limit of 0.012 pounds per million Btu to 0.010 pounds per million Btu or lower because baghouses can achieve much lower emission rates and permitting authorities have required lower limits as BACT. The Sierra Club cites the BACT limits in a permit for Plant Washington in Atlanta, Georgia that was issued April 8, 2010.

Response: The Sierra Club identifies one Prevention of Significant Deterioration (PSD) permit with a BACT particulate matter emission limit of 0.010 pounds per million Btu. DENR reviewed three of the permits the Sierra Club mentioned in this comment that have opacity limits to determine what was used for BACT particulate matter emission limits. In the three permits, MidAmerican in Council Bluffs, Iowa has a particulate matter limit of 0.027 pounds per million Btu (e.g., includes front and back half); Plum Point in Osceola, Arkansas has a particulate matter limit of 0.018 pounds per million Btu; and Desert Rock has a particulate matter limit of 0.010 pounds per million Btu and a total particulate matter 10 microns in diameter or less (PM10) emission limit of 0.020 pounds per million Btus. It appears there is a range of BACT emission limits that states and EPA have determined on a case-by-case basis.

In the December 11, 2006, application, Otter Tail Power Company proposed to replace the advanced hybrid particulate collector control system with the current day baghouse. In that

application, Otter Tail Power Company noted that the baghouse would have a maximum filterable particulate matter emission rate of 0.012 pounds per million Btu of fuel heat input. In May 2009, Otter Tail Power Company conducted a performance test on the baghouse. The test results noted an average filterable particulate matter emission rate of 0.011 pounds per million Btu. DENR decision to establish a BART PM10 emission limit of 0.012 pounds per million Btu is based on a case-by-case basis and meets the requirements to improve visibility at Class I areas.

18. The Sierra Club recommends DENR require Otter Tail Power Company to install a particulate matter continuous emission monitoring system or establish an opacity limit as an indicator of compliance. Since Otter Tail Power Company already has a continuous opacity monitoring system, the system can be used as an indicator of continuous compliance with the particulate matter BART emission limit. The Sierra Club identified the following coal plants with stringent BACT opacity limits: 1) MidAmerican facility in Council Bluffs, Iowa (5%); 2) Plum Point facility in Osceola, Arkansas (10%); 3) Fort Howard (Fort James) Paper Company's 500 megawatt coal-fired boiler in Wisconsin (10%); 4) Desert Rock (10%).

Response: The Sierra Club provided examples of states which established Best Available Control Technology (BACT) limits for particulate matter and opacity. In the case of MidAmerican in Council Bluffs, Iowa, the permit identifies a BACT opacity and particulate matter limit. However, compliance with the two limits are not related to each other. Compliance with the particulate matter limit is based on an annual stack test while the opacity limit is based on a continuous opacity monitoring system. In the case of Plum Point in Osceola, Arkansas, compliance with the BACT particulate matter limit is based on an annual stack test and compliance with the opacity limit using a continuous opacity monitoring system. In the case of Desert Rock, compliance with the particulate matter BACT emission limit is based on annual stack tests and a particulate matter continuous monitoring system. However, for particulate matter 10 microns in diameter or less (PM10), compliance is based just on annual stack performance tests.

The BART determination is based on a case-by-case basis taking into consideration a variety of situations similar to how a BACT analysis is conducted. As you can see, one state and EPA based compliance with the particulate matter and opacity limits separately while one state based compliance together. In the EPA case, EPA based compliance with the particulate matter emission limit on annual stack tests plus a particulate matter continuous emission monitoring system. In the case of PM10, EPA based compliance on annual stack tests. The BART particulate matter emission limits for Big Stone I are based on PM10. DENR agrees it has the authority to require a particulate matter continuous emission monitoring system. But like some states and EPA, DENR considers an annual stack test sufficient at this time to demonstrate compliance with the BART particulate matter limit.

DENR agrees it has the authority to establish an opacity limit. However, establishing an opacity limit is at the reasonable discretion of the permitting authority based on its case-by-case analysis of the facility. DENR believes the PM10 BART emission limits and annual stack performance test are adequate to meet the requirements to improve visibility at Class I areas.

19. The Sierra Club states there should be no exemptions from BART emission limits during startup and shutdown periods. The Sierra Club bases this on EPA's BART Guidelines which state the BART emission limits must be met on a continuous basis pursuant to section 302(k) of the Clean Air Act. Startup and shutdown are part of the normal operations of a power plant like Big Stone, and the emissions during startup and shutdown impact visibility and regional haze. So DENR's proposed BART limits must include periods of startup and shutdown. The Sierra Club also brought up that during the 2008 contested case hearing for the Big Stone II permit, Otter Tail Power Company's Terry Graumann made clear in his testimony that Otter Tail Power Company was not requesting exemptions from emission limits during periods of startup and shutdown and Otter Tail Power Company's Mark Rolfes indicated the pollution controls would operate during startup and shutdown.

Response: As outlined in Comment #3, DENR is not exempting Otter Tail Power Company's Big Stone I facility from BART emission limits during periods of startup and shutdown. Just because there is no startup and shutdown emission limit in pounds per million Btu does not mean DENR exempted the Big Stone I facility from a BART emission limit during startup and shutdown. On the contrary, DENR established a pound per hour emission limit for particulate matter, sulfur dioxide, and nitrogen oxide to represent a BART emission limit during normal operations, including startup and shutdown. The pounds per hour limit is based on the maximum capacity of the unit and the pounds per million Btu BART emission limit. In addition, the pounds per hour BART emission limit was used in the modeling analysis to demonstrate Otter Tail Power Company was not causing visibility impairment in a Class I area.

During the public hearing on South Dakota's Regional Haze State Implementation Plan and associated rules, the Board of Minerals and Environment revised the particulate pounds per million Btus limit to cover all operations including startup and shutdown based on previous testimony from Otter Tail Power Company that the baghouse would be in operation prior to starting up the boiler and could meet the pounds per million Btus hour limit even during startup and shutdown.

20. The Sierra Club indicates the state's regulation under ARSD 74:36:21:06-09 must identify Big Stone I as the source subject to these emission limits to ensure enforceability of the BART limits.

Response: In developing our rules, DENR consults with our Legislative Research Council, which approves the proposed state rules for form, style, and legality. The Legislative Research Council informed DENR that South Dakota has as part of its Constitution a clause that states private and special laws are prohibited. This may be found in Constitution 3-23 – Private and Special Laws Prohibited. The state constitution states that "In all other cases where a general law can be applicable no special law shall be enacted." The Legislative Research Council required DENR to word the language in a form which applies only to Otter Tail Power Company's Big Stone I facility and meets the requirements in South Dakota's Constitution.

21. The Sierra Club recommends the state's BART regulation should require compliance with the particulate matter BART emission limit now given Big Stone has already installed a fabric filter baghouse and can comply with the BART limit now.

Response: As Otter Tail Power Company's BART submittal notes, a dry flue gas desulfurization system must be located upstream of the particulate control devices. Two of the issues associated with adding this system are: 1) can the existing particulate control device handle the particulate loading; and 2) will the existing particulate control device still be able to meet its BART emission limits. As the Sierra Club mentions in its comments, the federal regulations under 40 CFR §308(1)(e)(1)(iv), requires each source subject to BART to install BART as expeditiously as practicable, but no later than 5 years from EPA's approval of the implementation plan revision. Since demonstrating compliance with the sulfur dioxide BART affects the compliance demonstration for particulate matter, maintaining the compliance periods as allowed under federal regulations is considered appropriate and reasonable.

4.0 Otter Tail Power Company's Comments

22. Otter Tail Power Company suggested a clarification revision to ARSD 74:36:21:11. The revision moves "in accordance with § 74:36:20" after "application" instead of at the end of the sentence to clarify the application is to be processed through the construction permit program.

Response: DENR agreed and revised ARSD 74:36:21:11 appropriately.

Appendix A

Comment Letters Received

During Public Notice Period for

South Dakota's Draft Regional Haze Program



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8

1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
<http://www.epa.gov/region08>

Ref: 8P-AR

SEP 13 2010

Brian Gustafson, Administrator
Air Quality Program
South Dakota Department of Environment and Natural Resources
523 East Capitol Avenue
Pierre, SD 57501-3182

RE: EPA Preliminary Comments on August 2010
Draft Regional Haze State Implementation Plan
(Public Comment Version)

Dear Mr. Gustafson:

EPA has completed a preliminary review of South Dakota's August 2010 draft Regional Haze State Implementation Plan (SIP). Our comments and questions are detailed in Enclosures 1 through 3 to this letter.

We understand that you intend to consider all comments received on this public comment version of the Regional Haze SIP prior to finalizing and adopting the documents for submission to EPA. We emphasize that we will only reach a final conclusion, and perform our complete review, regarding the adequacy of South Dakota's Regional Haze SIP when we act on the South Dakota Regional Haze SIP revision through our own public notice and comment rulemaking.

We look forward to continued communications to resolve the remaining concerns with the Regional Haze SIP. If you have any questions on EPA's comments, please contact me at 303-312-6434, or your staff may contact Gail Fallon at 303-312-6281.

Sincerely,

A handwritten signature in dark ink, appearing to read "Callie A. Videtich", is written over a horizontal line.

Callie A. Videtich, Director
Air Program

Enclosures

cc: John Bunyak, NPS
Sandra Silva, USFWS
Thomas Dzomba, USFS

ENCLOSURE 1

EPA Region 8 Preliminary Comments on the August 2010 Draft Regional Haze SIP (Public Comment Version)

Summary of Major Concerns – (see detailed comments for more information):

- Many comments from our March 12, 2010 letter were not sufficiently addressed. All of the detailed preliminary comments below pertain to those previous comments and provide additional information on areas which are still problematic.
- Insufficient details were provided on how the best available retrofit technology (BART) emission limits will be made enforceable as a practical matter. See comments #1, #4 and #7 below.
- No identification of the number of years to reach natural conditions was provided as required when the Reasonable Progress Goal is less than the Uniform Rate of Progress. See comments #5 and #8 below.
- No four-factor Reasonable Progress analysis was completed. See comment #6 below.
- Recommend reviewing ARSD regulation references for typographical errors throughout both the response to comments (for future clarity in the SIP record) as well as the main SIP document. There are numerous errors likely due to the addition of 74:36:21:06, which changed the numbering of the subsequent chapters.

Detailed Comments:

1. Executive Summary, pp. vii-viii: Additional details are necessary to ensure that BART emission limits will be enforceable as a practical matter. The BART emission limits, compliance schedules, monitoring, recordkeeping, and compliance determining methods for Big Stone I must be specified in the text of the Regional Haze SIP or in a permit that is incorporated into the SIP. For example, in your response to our comment on this issue (#1 and #39 from Appendix D), you relied heavily on requirements of your Title V program (ARSD 74:36:05). As this program is not part of the SIP, our concerns with reliance on the Title V program in this area remain. Two examples of all the various elements of adequate language that were coordinated with the States of Wyoming and Colorado are provided in Enclosures 2 and 3 for reference.
2. Table 6-9, p. 91: Footnote 5 references a 1999 EPA Technical Bulletin on NO_x controls as justification for the 35%-90% control efficiency range for the top three options. The large range in EPA's bulletin is due to inclusion of selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR), and fuel reburning for wet-bottom boilers. It is well documented that SCR achieves the high end of the range. The EPA bulletin also lists a 30%-70% control efficiency for a group of temperature-reducing controls, including over-fire air. Therefore, the proposed BART determination of SCR plus separated over-fire air (SOFA) should be better than the 90% control efficiency of SCR alone. In your response to this comment (#31 from Appendix D), there was no discussion regarding how the addition of

SOFA would not contribute to a better than 90% control efficiency. This needs to be addressed.

3. Section 6.3.5, BART Emissions Limits for Big Stone I, pp. 99-103: In order for EPA to entertain the establishment of separate BART limits for startup and shutdown conditions, an adequate record showing that the otherwise applicable limits are not achievable and that the separate startup/shutdown limits constitute BART is required as justification. Your response to this comment (#38 from Appendix D) does not provide sufficient justification for establishing the separate startup/shutdown limits. We continue to offer to work closely with you to establish appropriate 30-day rolling average emissions limits for particulate matter, sulfur dioxide and nitrogen oxides that allow for startup/shutdown conditions to help ensure SIP approvability.
4. Section 6.4, BART Requirements, p. 103: According to your proposed revisions to the South Dakota Administrative Rules, Chapter 74:36:21:10, a permit modification will be required for your BART determination on Otter Tail's Big Stone I. Without seeing the details of such permit, it is difficult to determine whether this section of the SIP adequately addresses requirements for enforceability, including appropriate averaging times, compliance verification procedures, and recordkeeping and reporting requirements, and proper operation and maintenance procedures. As noted in comment #1 above, these requirements must be specified either in the text of the Regional Haze SIP or in a permit that is incorporated into the SIP. Your response to this comment (# 39 from Appendix D) relied heavily on your Title V program which is not part of the SIP and does not fully address this issue.
5. Section 7.2.1, Breakdown of CMAQ Modeling Results, pp. 106-107: Your response (#47 from Appendix D) addressed most of our questions with one exception. The SIP must provide the number of years necessary to reach natural conditions, as required by 40 CFR 51.308(d)(1)(ii) when the reasonable progress goal (RPG) is less than the uniform rate of progress (URP). While you state in Section 10.3 on page 127 that you believe South Dakota can still meet the reasonable progress goals and achieve natural conditions by 2064, the data, as currently presented, does not support this proposed conclusion.
6. Section 7.2.2, Four Factor Analysis, pp. 107-109: DENR's determination that a four-factor analysis is not warranted at this time is not acceptable. A four-factor analysis must be completed in establishing the RPGs for Class I areas impacted by South Dakota emissions, as well as in justifying a RPG that is less than URP. Despite your response to this comment (#49 from Appendix D) regarding minimal contribution from point sources to visibility impairment, a four-factor analysis is required to justify this conclusion. Again, we suggest looking for additional reductions from GCC Dacotah, Ben French, and Pete Lien as well as the potential from the close proximity of Rapid City to Badlands.
7. Section 8.5.6, Enforceable Emission Limits and Control Measures, p. 116: Though this section was slightly reworded per your response (#56 from Appendix D), your intention to establish the Big Stone I BART limits and control measure requirements in an air quality permit requires the permits' incorporation into the SIP. The South Dakota draft construction

permit program regulations are currently under review by our office. Until this has been approved into the SIP, it will not be appropriate to rely upon the program for your BART permits.

8. Section 10.3, Public Input, pp. 126-127: As noted in comment #5 above, the SIP must provide the public with a calculation of the number of years required to reach natural conditions if the RPG provides a slower rate of improvement than that needed to attain natural conditions by 2064 per 40 CFR 51.308(d)(1)(ii). We understand your concerns regarding assumptions for other states included in the WRAP analysis; however, this SIP must include your best estimate of number of years to reach natural conditions with the proposed RPGs. Though this section was slightly reworded per your response (#48 from Appendix D), the number of years is still lacking.
9. ARSD Chapter 74:36:21:12, Federal Land Manager Notification and Review: Your response (#65 from Appendix D) did not adequately address our concern related to FLM consultation on BART permit reviews. As required by the Regional Haze Rule, the Federal Land Managers must be provided a 60-day consultation period prior to any public hearing on the Regional Haze SIP. Since a BART permit is an integral part of the Regional Haze SIP, this 60-day consultation period must extend to FLM BART permit review as well. In addition, since any BART permit must be incorporated into the Regional Haze SIP, the 30-day public notice for the SIP needs to identify the inclusion of any BART permits.

ENCLOSURE 2

EPA Region8 – Preliminary Comments on Wyoming's Regional Haze Monitoring, Recordkeeping, and Reporting Requirements (MRR)

Please note: This document is divided into two sections. The first section provides comments on the current MRR language in the State's Regional Haze SIP. We have included comments (in italics) and in some instances suggested language. The second section of this document contains information on SIP MRR elements that need to be added to the SIP and suggested language.

I. Current SIP Language for PacifiCorp Unit

The State of Wyoming considers the control effectiveness of a control technology to be equivalent to the BART-determined permit limit as indicated in Table XX below. The State should change the preceding sentence to read "The State of Wyoming considers the BART-determined permit limit to be equivalent to the control effectiveness of a control technology." The limit is based on continuous compliance when the control equipment is well maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions. The SIP must indicate that the Source will comply with BART at all times (see note in Section IV. below)

Table XX - Unit-by-unit BART determinations for NO_x and PM/PM₁₀:

Unit	Pollutant	Control Type	lb/MMBtu	lb/hr	tpy
3	NO _x	LNB/OFA	0.28 (30-day rolling)	784 (30-day rolling)	3,434
PM/PM ₁₀ (a)	Fabric Filter	0.015	42.1		184
4	NO _x	LNB/OFA	0.15 (30-day rolling)	615 (30-day rolling)	2,694
PM/PM ₁₀ (a)	Fabric Filter	0.015	61.5		269

III. Expedient Installation and Operation of BART

The State needs to indicate in this section that the BART determination is dependent on approval by EPA. The State must also provide a date by which the source needs to install and comply with the BART limits, not just the requirement to install the equipment. Per the BART Guidelines, sources should install controls as expeditiously as practicable, but no later than five years after EPA approval of the SIP. The State of Wyoming proposes that PacifiCorp install new low NO_x burners with advanced OFA on Units 3 and 4, in accordance with the Division's BART determination, and conduct the required initial performance tests no later than December 31, 2010 and December 31, 2009, respectively. The State of Wyoming proposes that PacifiCorp install new full-scale fabric filters on Units 3 and 4, in accordance with the Division's BART determination, and conduct the initial performance tests required no later than December 31, 2010 and December 31, 2012, respectively. For performance testing, the applicable EPA test method must be specified along with the frequency of testing and other relevant information.

IV. Proper Maintenance and Operation of Control Equipment

At all times after the compliance deadline specified in [[specify section]], the owner/operator of each BART unit shall maintain, calibrate, and operate a CEMS, in full compliance with the requirements found at 40 CFR part 75, to accurately measure SO₂, NO_x, diluent (CO₂ or O₂), and stack gas volumetric flow rate from each BART unit. The CEMS shall be used to determine compliance with the SO₂ and NO_x BART emission limits for each BART unit.

In determining compliance with the SO₂ and NO_x BART limits, all periods of emissions shall be included, including startups, shutdowns, emergencies, and malfunctions.

NOTE: Per section 302(k) of the CAA, BART limits must be met continuously. The BART limits section of the SIP need to state that the BART limits apply at all times, including periods of SSM.

The State of Wyoming proposes that PacifiCorp conduct initial NO_x performance tests on Units 3 and 4 after the installation of low NO_x burners and advanced OFA, within 30 days of achieving a maximum design rate, but not later than 90 days following initial start-up. For performance testing, the applicable EPA test method must be specified along with the frequency of testing and other relevant information.

Owner/operator shall submit reports of any required performance stack tests for NO_x within 60 calendar days after completion of the test. If a maximum design rate is not achieved within 90 days of start-up, the AQD Administrator may require testing be done at the rate achieved and again when a maximum rate is achieved. *The State should replace "may" in the previous sentence with "shall".* If a maximum design rate is not achieved within 90 days of start-up, the AQD Administrator shall require testing be done at the rate achieved and again when a maximum rate is achieved. A test protocol shall be submitted for Division approval prior to testing and a written report of the test results shall be submitted to the Division. Testing required by the WAQSR Chapter 6, Section 3 operating permits or initial testing required by WAQSR Chapter 6, Section 2 or Section 4 may be submitted to satisfy the testing required. *The prior sentence is a reference to all the operating permit regulations. This needs to be replaced with a provision that will be in the SIP.*

The State of Wyoming proposes that PacifiCorp conduct initial PM/PM₁₀ performance tests on Units 3 and 4 after the installation of fabric filters within 30 days of achieving a maximum design rate, but not later than 90 days following initial start-up. For performance testing, the applicable EPA test method must be specified along with the frequency of testing and other relevant information.

If a maximum design rate is not achieved within 90 days of start-up, the AQD Administrator shall require testing be done at the rate achieved and again when a maximum rate is achieved. Owner/operator shall submit reports of any required performance stack tests for particulate matter, within 60 calendar days after completion of the test. In addition to annual stack tests, owner/operator shall monitor particulate emissions for compliance with the BART emission limits in accordance with the

applicable Compliance Assurance Monitoring (CAM) plan developed and approved in accordance with 40 CFR part 64. A test protocol shall be submitted for Division approval prior to testing and a written report of the test results shall be submitted to the Division. Testing required by the WAQSR Chapter 6, Section 3 operating permit may be submitted to satisfy the testing required. Delete the prior sentence. This is a reference to all the operating permit regulations. This needs to be replaced with a provision that will be in the SIP.

The State of Wyoming proposes performance tests and compliance with the BART limits for NO_x be determined for Units 3 and 4 using a continuous emissions monitoring system (CEMS), consistent with the provisions in this section, certified in accordance with 40 CFR part 60 and data from the CEMS shall meet the requirements of 40 CFR part 75. The State of Wyoming proposes performance tests for compliance with the BART limits for PM/PM₁₀ conducted annually following 40 CFR 60.46 and EPA Reference Test Methods 1-4 and 5. EPA suggests the use of EPA Method 5, 5B, 5D, or 17, as appropriate, in 40 CFR part 60, Appendix A
A test shall consist of three runs, with each run at least 120 minutes in duration and each run collecting a sample of 60 dry standard cubic feet. Testing required by the WAQSR Chapter 6, Section 3 operating permit may be submitted to satisfy the testing required. Delete the prior sentence. This is a reference to all the operating permit regulations. This needs to be replaced with a provision that will be in the SIP

II. SIP Elements that must be added:

- The SIP must specify the averaging time for the various emission limits, including PM.
- SIP must contain monitoring and compliance determination specifics. {See Section at the end of this analysis}
- The SIP must also contain the specific recordkeeping and reporting requirements. (See Footnote 1 for suggested language)
- The SIP must explicitly state those records the sources are required to keep to assess compliance for the time frame specified in the SIP. Records must be commensurate with regulatory requirements. Records must be available for examination upon request. (See Footnote 1 for suggested language)
- The SIP must give reporting schedules and reporting formats.
- Recordkeeping
 - The recordkeeping must be required such that failure to do so would be a separate violation.
 - Preferably, the SIP should specify that records must be kept for at least five years¹

¹ Suggested language - Owner/operator shall maintain the following records for at least five years, and they must be available on request:

1. All CEMS data, stack test data, and data collected pursuant to the CAM plan, including the date, place, and time of sampling, measurement, or testing; parameters sampled, measured, or tested and results; the company, entity, or person that performed the testing, if applicable; and any field data sheets from testing.

- The SIP should require periodic reporting.²
- The SIP should require timely deviation reporting.^{3,4}
- Include definitions for: (1) boiler operating day⁵; (2) CEMS⁶; and (3) substitute hourly emission rates⁷

Suggested language for monitoring and compliance determinations:

1. Pounds Per Hour And Tons Per Year Limits

For any hour in which fuel is combusted in the boiler, owner/operator shall calculate hourly SO₂ and NO_x emissions in pounds at the CEMS in accordance with the monitoring procedures and requirements of 40 CFR part 75. In calculating hourly mass emissions and emissions rates, owner/operator shall use the conversion procedures specified in 40 CFR part 75, Appendix F. For any hour that valid, quality assured CEMS data are unavailable, emissions shall be calculated in accordance with the missing data substitution procedures in 40 CFR part 75, subpart D. These hourly values shall then be used to determine compliance in accordance with the particular limit's averaging period, as follows:

-
2. Records of quality assurance and quality control activities for emissions measuring systems including, but not limited to, any records required by 40 CFR Part 75.
 3. Records of all major maintenance activities conducted on emission units, air pollution control equipment, and CEMS.
 4. Any other records required by 40 CFR parts 64 and 75.

² Suggested language - Owner/operator shall also submit quarterly CEMS performance reports, to include dates and duration of each period during which the CEMS was inoperative (except for zero and span adjustments and calibration checks), reason(s) why the CEMS was inoperative and steps taken to prevent recurrence, any periods for which missing data substitution procedures were used, any CEMS repairs or adjustments, and results of any CEMS performance tests required by 40 CFR part 75 (Relative Accuracy Test Audits, Relative Accuracy Audits, and Cylinder Gas Audits).

³ Suggested language - Owner/operator shall submit quarterly excess emissions reports no later than the 30th day following the end of each calendar quarter. Excess emissions means emissions that exceed the emissions limits specified in ____ above.

⁴ Suggested language - Owner/operator shall also submit quarterly reports of any exceedances or excursions under the approved CAM plan, and steps taken to correct the exceedances or excursions, in accordance with 40 CFR 64.9(a).

⁵ Define boiler operating day as "any 24-hour period between 12:00 midnight and the following midnight during which any fuel is combusted at any time at the steam generating unit." See, 40 CFR part 51, Appendix Y, section V.

⁶ Suggested language - Continuous emission monitoring system" or "CEMS" means the equipment required by [this section] to sample, analyze, measure, and provide, by means of readings recorded at least once every 15 minutes (using an automated data acquisition and handling system (DAHS)), a permanent record of SO₂ or NO_x emissions, other pollutant emissions, diluent, or stack gas volumetric flow rate.

⁷ Suggested language - "Substitute hourly emission rates" or "substitute hourly emission values" means any hourly emission rates or values calculated in accordance with the missing data substitution procedures of 40 CFR part 75, subpart D, where valid, quality assured CEMS data for that hour are unavailable.

a. Pounds Per Hour Limits. If the limit [in Table ____ (cross-ref BART limit table)] is expressed as a lb/hr limit, owner/operator shall calculate average lb/hr emissions over the appropriate averaging period, as follows:

i. Limits with a 30-day averaging period: Emissions shall be calculated on a 30-day rolling average basis. At the end of each boiler operating day, owner/operator shall calculate a new 30-day rolling average emission rate in lb/hr from the arithmetic average of all valid and substitute hourly emission values from the CEMS for the most recent 30 boiler operating days

ii. Limits with a 12-month averaging period: emissions shall be calculated on a 12-month rolling average basis. At the end of each month, owner/operator shall calculate a new 12-month rolling average emission rate in lb/hr from the arithmetic average of all valid and substitute hourly emission values from the CEMS for the most recent 12 months.

b. Tons Per Year Limits. If the limit [in Table ____ (cross-ref BART limit table)] is expressed as a tons/yr limit, rolling 12-month total, total emissions in tons/yr shall be calculated on a 12-month rolling basis. At the end of each month, owner/operator shall calculate a new 12-month emissions total, in tons/yr, using all valid and substitute hourly emission values from the CEMS for the most recent 12 months.

2. Pounds Per Million Btu Limits

For any hour in which fuel is combusted in the boiler, owner/operator shall calculate hourly average SO₂ and NO_x concentrations in pounds per million Btu at the CEMS in accordance with the requirements of 40 CFR part 75. For any hour that valid, quality assured CEMS data are unavailable, emissions shall be calculated in accordance with the missing data substitution procedures in 40 CFR part 75, subpart D. These hourly averages shall then be used to determine compliance in accordance with the particular limit's averaging period, as follows:

a. Limits with a 3-hour averaging period: emissions shall be calculated on a 3-hour rolling average basis. At the end of each hour, owner/operator shall calculate a new 3-hour average emission rate in lb/MMBtu from the arithmetic average of the valid and substitute hourly emission rates from the CEMS for the most recent three hours.

b. Limits with a 30-day averaging period: emissions shall be calculated on a 30-day rolling average basis. At the end of each boiler operating day, owner/operator shall calculate a new 30-day rolling average emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the most recent 30 boiler operating days.

c. Limits with a 90-day averaging period: emissions shall be calculated on a 90-day rolling average basis. At the end of each boiler operating day, owner/operator shall

calculate a new 90-day rolling average emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the most recent 90 boiler operating days.

d. Limits with a 12-month averaging period: emissions shall be calculated on a 12-month rolling average basis. At the end of each month, owner/operator shall calculate a new 12-month rolling average emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the most recent 12 months.

e. Limits with an annual calendar averaging period: emissions shall be calculated on a calendar year basis. At the end of each calendar year, owner/operator shall calculate a new emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the preceding year.

ENCLOSURE 3

DRAFT COMPLIANCE DETERMINATION LANGUAGE FOR COLORADO BART LIMITS

2/11/10

I. Monitoring, Recordkeeping, and Reporting

A. Definitions

“BART unit” means any unit subject to a BART emission limit in Table _____.

“Boiler operating day” means any twenty-four-hour period between midnight and the following midnight during which any fuel is combusted at any time in a BART unit.

“Continuous emission monitoring system” or “CEMS” means the equipment required by [this section] to sample, analyze, measure, and provide, by means of readings recorded at least once every 15 minutes (using an automated data acquisition and handling system (DAHS)), a permanent record of SO₂ or NO_x emissions, other pollutant emissions, diluent, or stack gas volumetric flow rate.

“Substitute hourly emission rates” or “substitute hourly emission values” means any hourly emission rates or values calculated in accordance with the missing data substitution procedures of 40 CFR part 75, subpart D, where valid, quality assured CEMS data for that hour are unavailable.

B. Monitoring/Compliance Determination: SO₂ and NO_x BART Limits

At all times after the compliance deadline specified in [[specify section]], the owner/operator of each BART unit shall maintain, calibrate, and operate a CEMS, in full compliance with the requirements found at 40 CFR part 75, to accurately measure SO₂, NO_x, diluent, and stack gas volumetric flow rate from each BART unit. The CEMS shall be used to determine compliance with the SO₂ and NO_x BART emission limits for each BART unit.

In determining compliance with the SO₂ and NO_x BART limits, all periods of emissions shall be included, including startups, shutdowns, emergencies, and malfunctions.

NOTE: Per section 302(k) of the CAA, BART limits must be met continuously. The BART limits section of the SIP and Reg. 3 need to state that the BART limits apply at all times, including periods of SSM.

1. Pounds Per Hour And Tons Per Year Limits

For any hour in which fuel is combusted in the boiler, owner/operator shall calculate hourly SO₂ and NO_x emissions in pounds at the CEMS in accordance with the monitoring procedures and requirements of 40 CFR part 75. In calculating hourly mass

emissions and emissions rates, owner/operator shall use the conversion procedures specified in 40 CFR part 75, Appendix F. For any hour that valid, quality assured CEMS data are unavailable, emissions shall be calculated in accordance with the missing data substitution procedures in 40 CFR part 75, subpart D. These hourly values shall then be used to determine compliance in accordance with the particular limit's averaging period, as follows:

a. Pounds Per Hour Limits. If the limit [in Table ____ (cross-ref BART limit table)] is expressed as a lb/hr limit, owner/operator shall calculate average lb/hr emissions over the appropriate averaging period, as follows:

i. Limits with a 30-day averaging period: Emissions shall be calculated on a 30-day rolling average basis. At the end of each boiler operating day, owner/operator shall calculate a new 30-day rolling average emission rate in lb/hr from the arithmetic average of all valid and substitute hourly emission values from the CEMS for the most recent 30 boiler operating days

ii. Limits with a 12-month averaging period: emissions shall be calculated on a 12-month rolling average basis. At the end of each month, owner/operator shall calculate a new 12-month rolling average emission rate in lb/hr from the arithmetic average of all valid and substitute hourly emission values from the CEMS for the most recent 12 months.

b. Tons Per Year Limits. If the limit [in Table ____ (cross-ref BART limit table)] is expressed as a tons/yr limit, rolling 12-month total, total emissions in tons/yr shall be calculated on a 12-month rolling basis. At the end of each month, owner/operator shall calculate a new 12-month emissions total, in tons/yr, using all valid and substitute hourly emission values from the CEMS for the most recent 12 months.

2. Pounds Per Million Btu Limits

For any hour in which fuel is combusted in the boiler, owner/operator shall calculate hourly average SO₂ and NO_x concentrations in pounds per million Btu at the CEMS in accordance with the requirements of 40 CFR part 75. For any hour that valid, quality assured CEMS data are unavailable, emissions shall be calculated in accordance with the missing data substitution procedures in 40 CFR part 75, subpart D. These hourly averages shall then be used to determine compliance in accordance with the particular limit's averaging period, as follows:

a. Limits with a 3-hour averaging period: emissions shall be calculated on a 3-hour rolling average basis. At the end of each hour, owner/operator shall calculate a new 3-hour average emission rate in lb/MMBtu from the arithmetic average of the valid and substitute hourly emission rates from the CEMS for the most recent three hours.

b. Limits with a 30-day averaging period: emissions shall be calculated on a 30-day rolling average basis. At the end of each boiler operating day, owner/operator shall

calculate a new 30-day rolling average emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the most recent 30 boiler operating days.

c. Limits with a 90-day averaging period: emissions shall be calculated on a 90-day rolling average basis. At the end of each boiler operating day, owner/operator shall calculate a new 90-day rolling average emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the most recent 90 boiler operating days.

d. Limits with a 12-month averaging period: emissions shall be calculated on a 12-month rolling average basis. At the end of each month, owner/operator shall calculate a new 12-month rolling average emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the most recent 12 months.

e. Limits with an annual calendar averaging period: emissions shall be calculated on a calendar year basis. At the end of each calendar year, owner/operator shall calculate a new emission rate in lb/MMBtu from the arithmetic average of all valid and substitute hourly emission rates from the CEMS for the preceding year. **[[Need to address bubbled units.]]**

C. Monitoring/Compliance Determination: Particulate BART Limits

1. EGU Particulate BART Limits.

Compliance with the particulate BART emission limits for each EGU BART unit shall be determined from annual performance stack tests. Within 60 days of the compliance deadline specified in _____, and on at least an annual basis thereafter, the owner/operator of each EGU BART unit shall conduct a stack test on each unit to measure particulate emissions using EPA Method 5, 5B, 5D, or 17, as appropriate, in 40 CFR part 60, Appendix A. A test shall consist of three runs, with each run at least 120 minutes in duration and each run collecting a minimum sample of 60 dry standard cubic feet.

In addition to annual stack tests, owner/operator shall monitor particulate emissions for compliance with the BART emission limits in accordance with the applicable Compliance Assurance Monitoring (CAM) plan developed and approved in accordance with 40 CFR part 64.

2. CEMEX Particulate BART Limits. **[[Need to address CEMEX particulate limits – 20% opacity and lb/ton of dry feed.]]**

D. Recordkeeping

Owner/operator shall maintain the following records for at least five years:

1. All CEMS data, stack test data, and data collected pursuant to the CAM plan, including the date, place, and time of sampling, measurement, or testing; parameters sampled, measured, or tested and results; the company, entity, or person that performed the testing, if applicable; and any field data sheets from testing.
2. Records of quality assurance and quality control activities for emissions measuring systems including, but not limited to, any records required by 40 CFR Part 75.
3. Records of all major maintenance activities conducted on emission units, air pollution control equipment, and CEMS.
4. Any other records required by 40 CFR parts 64 and 75.

E. Reporting requirements

Owner/operator shall submit quarterly excess emissions reports no later than the 30th day following the end of each calendar quarter. Excess emissions means emissions that exceed the emissions limits specified in ____ above. Owner/operator shall submit reports of any required performance stack tests for particulate matter, within 60 calendar days after completion of the test. Owner/operator shall also submit quarterly reports of any exceedances or excursions under the approved CAM plan, and steps taken to correct the exceedances or excursions, in accordance with 40 CFR 64.9(a).

Owner/operator shall also submit quarterly CEMS performance reports, to include dates and duration of each period during which the CEMS was inoperative (except for zero and span adjustments and calibration checks), reason(s) why the CEMS was inoperative and steps taken to prevent recurrence, any periods for which missing data substitution procedures were used, any CEMS repairs or adjustments, and results of any CEMS performance tests required by 40 CFR part 75 (Relative Accuracy Test Audits, Relative Accuracy Audits, and Cylinder Gas Audits).



September 14, 2010

Rick Boddicker, Environmental Senior Scientist
South Dakota Department of Environment and Natural Resources
523 East Capital, Joe Foss Building
Pierre, South Dakota 57501

Re: Comments on the South Dakota Draft Regional Haze SIP

Dear Mr. Boddicker:

Sierra Club, the National Parks Conservation Association, and Plains Justice respectfully submit the following comments on South Dakota's draft regional haze plan. South Dakota's draft plan represents a good start to a rule that will protect nearby Class I areas from haze-causing pollution. However, the state's plan could, and must, go further still to ensure the goal of natural visibility by 2064.

Best Available Retrofit Technology (BART) Determination for Big Stone Power Plant

Federal regulations mandate that states' regional haze SIPs include emission limitations representing BART for each BART-eligible source. 40 C.F.R. §51.308(e). Best available retrofit technology or BART is defined as follows:

Best Available Retrofit Technology (BART) means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by an existing stationary facility. The emission limitation must be established, on a case-by-case basis, taking into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

40 C.F.R. § 51.301.

BART is to be determined based on a five factor analysis. 40 C.F.R. Part 51, Subpart Y, Section I.F.1. EPA's five factor analysis requirements stems from statutory and regulatory requirements regarding how BART is to be determined. Specifically:

The determination of BART must be based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable for each BART-eligible source that is subject to BART within the State. In this analysis, the State must take into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

40 C.F.R. § 51.308(e)(1)(ii)(A). *See also* § 169A(g) of the Clean Air Act

South Dakota's draft regional haze plan states that, because Big Stone I has a generating capacity less than 750 MW, the state is not required to follow the BART Guidelines in 40 C.F.R. Part 51, Subpart Y. South Dakota Draft Regional Haze Plan at 82. Specifically, the South Dakota Regional Haze Plan states "...in identifying the available control technologies, DENR is not listing any of the permutations of the control levels for each identified control technology as suggested by EPA's guidance." *Id.*

While the Federal regional haze regulations mandate that BART for units of 750 MW or greater must follow the BART Guidelines, the fact that Big Stone I has a generating capacity less than 750 MW does not mean South Dakota does not have to follow a reasoned analysis in evaluating BART and setting BART emission limitations. The state's BART requirements still must comply with BART as defined at 40 C.F.R. § 51.301 and, in evaluating the "best system of continuous emission reduction," the state must include the top level of pollutant removal efficiency of the control being evaluated. This would include evaluation of emission limits required as lowest achievable emission rate (LAER) and best available control technology (BACT), and must also include the top levels of pollution control achieved at facilities anywhere including outside the United States. Thus, there is no justification for the state to ignore the fact that pollution controls can be designed and operated at varying levels of control efficiency. If the state does not consider the capabilities of the various pollution controls evaluated in the case by case BART analysis, its cost impacts analysis will be skewed in favor of the lowest capital cost equipment rather than properly evaluating cost impacts in terms of amount of pollution reduced. Thus, South Dakota must consider the varying levels of control efficiency of pollution controls in the BART analyses for Big Stone.

A. BART for Sulfur Dioxide (SO₂) Emissions at Big Stone

The BART analysis for SO₂ at Big Stone I is flawed because Otter Tail and the state failed to consider the level of control achievable with wet and dry scrubbers and because it is based on coal with higher uncontrolled SO₂ emissions than Otter Tail has historically burned at Big Stone I. Further, DENR and Otter Tail failed to consider the other environmental benefits of a wet scrubber.

1. Analysis of BART Emission Limits Achievable Must Be Based on Current Coal Characteristics.

Based on the percent removal assumed for the wet and dry scrubbers and the proposed emission limits, it is clear that Otter Tail assumed an uncontrolled SO₂ emission rate of approximately 0.86 lb/MMBtu.¹ This is what Otter Tail claimed was the highest 24-hour average rate of SO₂ emitted by Big Stone I during 2001-2003. Table 1.2-1 of Otter Tail's November 2009 BART Submittal to DENR. While the BART guidelines require use of highest daily emissions in the visibility modeling analysis, that is not an appropriate starting point for setting a BART emission limit that is supposed to reflect BART, especially given that the BART emission limits apply on a 30 day average basis.

A review of the annual average SO₂ emission rates from Big Stone I over the last 10 years from EPA's Clean Air Markets Database shows that the highest annual average SO₂ emission rate was no higher than 0.70 lb/MMBtu. This emissions rate reflects the uncontrolled SO₂ emissions from Big Stone I since it currently has no SO₂ controls. DENR should have used this emission rate, or, at worst, determined the highest 30 day average uncontrolled SO₂ emission rate, in setting the BART emission limit for Big Stone based on the control efficiency of the SO₂ controls evaluated.

2. DENR and Otter Tail Failed to Evaluate the Highest SO₂ Removal Efficiencies Achievable with a State-of-the-Art Wet Scrubber.

DENR assumed a wet scrubber would achieve 95% control from the worst case daily SO₂ emission rate at Big Stone of 0.86 lb/MMBtu. Using the highest uncontrolled SO₂ emissions from the past 10 years of 0.70 lb/MMBtu, the BART emission limit with a 95% efficient wet scrubber should be no higher than 0.035 lb/MMBtu.

Further, wet scrubbers can achieve higher removal efficiency, as high as 99%. A prime example is the Chiyoda CT-121 FGD. Vendor information for this technology indicates that this scrubber has achieved 98-99% SO₂ removal even with low sulfur coal.² For example, the Chiyoda's bubbling jet reactor has consistently achieved >99% SO₂ removal during long-term operation at the Shinko-Kobe power plant in Japan. This facility consists of two 700-MW coal-fired utility boilers. The wet FGD was designed to achieve 0.014 lb SO₂/MMBtu (9 ppmv at 3% oxygen) on an instantaneous basis and has consistently exceeded this level of control while treating gases with inlet SO₂ concentrations of 1.78 lb/MMBtu.³ This technology has been guaranteed by Chiyoda to achieve 99% SO₂ removal on three coal-fired boilers in Japan.⁴ It also has been demonstrated in the U.S. at the University of Illinois's Abbott power plant, Georgia Power's Plant Yates⁵, Dayton

¹ For example, Otter Tail's BART analysis assumed a controlled SO₂ emission rate of 0.043 lb/MMBtu with a wet scrubber at 95% control. Table 3.3-1 of Otter Tail's November 2009 BART Submittal to DENR. This reflects an uncontrolled SO₂ emission rate of 0.86 lb/MMBtu.

² See Black & Veatch vendor brochure on CT-121, Ex 1.

³ Yasuhiko Shimogama, Hirokazu Yasuda, Naohiro Kaji, Fumiaki Tanaka, and David K. Harris, Commercial Experience of the CT-121 FGD Plant for 700 MW Shinko-Kobe Electric Power Plant, Paper No. 27, presented at MEGA Symposium, Air & Waste Management Association, May 19-22, 2003, Ex.2.

⁴ CT-121 FGD Process – Jet Bubbling Reactor, <http://www.bwe.dk/fgd-ct121.html>.

⁵ Emission-control Technologies Continue to Clear the Air, Power, May/June 2002.

Power & Light's Killen Unit 2,⁶ and Plant Bowen Unit 3.⁷ It has also been licensed for installation on several additional units in the US, including the other three units at Plant Bowen in Georgia, the other units at Dayton Power & Light's Killen plant, Dayton Power & Light's Stuart plant, and AEP's Big Sandy Unit 2, Conesville Unit 4, Cardinal Units 1 and 2, and Kyger Creek, among others.⁸ Black & Veatch and Southern Company are both U.S. licensees. Further, this technology also has shown to be very effective in removing fine particulates, oxidized and elemental mercury, and acid gases, and the technology uses less energy compared to traditional wet scrubbers.

Further, Mitsubishi, a vendor of scrubber systems, reports it has guaranteed SO₂ removal efficiencies up to 99.8 percent, including for coal-fired boilers.^{9, 10, 11}

Finally, a recent Lake Michigan Air Directors Consortium ("LADCO") and the Midwest Regional Planning Organization ("MRPO") presentation indicated that advanced FGD technologies could achieve 99.5% control for \$1,240 to \$2,875 per ton of SO₂ removed and wet FGD could achieve 99% SO₂ control for \$1,881 to \$3,440 per ton of SO₂ removed. Ex. 8 These costs are well within the range that EPA normally considers cost effective in best available control technology (BACT) analyses.

In addition, the Georgia Environmental Protection Division recently issued a PSD permit for Plant Washington which will burn Powder River Basin coal as its primary coal, and this permit requires a 97.5% SO₂ removal efficiency to be achieved on a 30 day rolling average basis. A copy of that permit is attached as Exhibit 9.

An annual average was compiled of SO₂ emission rates for 2008 using data submitted to the Clean Air Markets website by similar coal-fired electric generating units. The annual average SO₂ emission rates were ranked from low to high to identify the best performing similar sources. This analysis is shown in Ex. 10. The best performing similar source in 2008 was Pleasant Prairie Units 1 and 2 in Wisconsin. The 2008 annual average achieved at Unit 1 was 0.021 lb/MMBtu and at Unit 2, 0.027 lb/MMBtu. These units are equipped with a wet limestone scrubber and burn a low sulfur Powder River Basin Coal.

⁶ See Black & Veatch, First Black&Veatch/Chiyoda Wet Flue Gas Desulfurization System in North America Successfully Goes Operational, Ex. 3.

⁷ Blankinship, Steve, Go Take a Bath, Power Engineering, October 2008, available at http://pepei.pennnet.com/display_article/342997/6/ARTCL/none/none/1/Go-Take-a-Bath/.

⁸ Chiyoda Licenses Its Flue Gas Desulfurization Technology in USA Newly for 5 Coal-Fired Generation Units, Press Release, May 2, 2005, Ex. 12; Chiyoda Licenses its Flue Gas Desulfurization Process in USA for Georgia Power Owned 4 FGD Units, January 26, 2005, Ex. 4.

⁹ Jonas S. Klingspor, Kiyoshi Okazoe, Tetsu Ushiku, and George Munson, High Efficiency Double Contact Flow Scrubber for the U.S. FGD Market, Paper No. 135 presented at MEGA Symposium, Air & Waste Management Association, May 19-22, 2003, p.8, Table 4, Ex. 5.

¹⁰ Yoshio Nakayama, Tetsu Ushiku, and Takeo Shinoda, Commercial Experience and Actual-Plant-Scale Test Facility of MHI Single Tower FGD, Ex. 6.

¹¹ Mitsubishi High SO₂ Removal Experience, Ex. 7.

Similar data for the first six months of 2009 indicate that other units are currently achieving even lower SO₂ emissions, including Iatan Unit 1 at 0.0051 lb/MMBtu; Muscatine Unit 9 at 0.013 lb/MMBtu; Hammond Unit 2 at 0.016 lb/MMBtu; Gorgas Unit 10 at 0.017 lb/MMBtu; Prairie Creek Unit 4 at 0.019 lb/MMBtu; Hopewell Power Station Units 1 and 2 at 0.020 lb/MMBtu; and Centralia Unit BW22 at 0.021 lb/MMBtu.

Thus, the Big Stone I BART Analysis should have evaluated these levels of control based on the actual uncontrolled SO₂ emissions emitted by the unit over a 30 day average basis in its evaluation of a wet scrubber for BART.

3. DENR and Otter Tail Failed to Evaluate the Highest SO₂ Removal Efficiencies Achievable with a State-of-the-Art Dry Scrubber.

DENR assumed only 90% control with a dry scrubber at Big Stone I and proposed an emission limit of 0.09 lb/MMBtu, which reflects somewhat less than 90% SO₂ removal efficiency from the worst case 24-hour SO₂ emissions of 0.86 lb/MMBtu. Using the highest uncontrolled SO₂ emissions from the past 10 years of 0.70 lb/MMBtu, the BART emission limit with a 90% efficient dry scrubber should be no higher than 0.07 lb/MMBtu. DENR and Otter Tail thus should have evaluated this SO₂ emission rate achievable with a dry scrubber in the BART analysis.

There have been several proposed coal-fired power plants burning low sulfur Powder River Basin coal that have proposed to use dry scrubbers to meet PSD requirements and that are subject to higher control efficiency requirements and/or lower SO₂ BACT limits than 0.09 lb/MMBtu. Those facilities include the Newmont Nevada TS power plant, the proposed White Pine power plant, the proposed Toquop power plant, and the Dry Fork power plant. The Newmont Nevada power plant is subject to a minimum 95% SO₂ removal efficiency requirement when burning coal with a sulfur content equal to or greater than 0.45% and is subject to a minimum 91% SO₂ removal efficiency when burning coal with sulfur content less than 0.45%.¹² This facility is currently operating in compliance with its limits. The Newmont Nevada is also subject to an SO₂ BACT limit of 0.065 lb/MMBtu when burning coal with less than 0.45% sulfur content. The proposed Toquop permit included an SO₂ BACT limit of 0.06 lb/MMBtu on a 24-hr average basis.¹³ The Dry Fork power plant in Wyoming, which is also currently under construction, will burn Powder River Basin coal, will be equipped with a dry scrubber, and is subject to an SO₂ BACT limit of 0.07 lb/MMBtu.¹⁴

Thus, the Big Stone I BART Analysis should have evaluated these levels of control based on the uncontrolled SO₂ emissions emitted by the unit over a 30 day average basis.

4. DENR's Determination of Cost Effectiveness of a Wet Scrubber is within the Range of the Costs of Other SO₂ BART Determinations.

¹² See Section V.A.2.a.8. of Newmont Nevada Permit, Ex. 11.

¹³ See Section V.A.2..a.(8) of draft Toquop permit, Ex. 12.

¹⁴ See Dry Fork PSD Permit, Ex. 13.

Even if we ignore the fact that DENR and Otter Tail failed to evaluate the control efficiencies and emission rates achievable with a wet scrubber at Big Stone I, DENR's cost effectiveness calculation of the wet scrubber at an SO₂ emission rate of 0.043 lb/MMBtu of \$1,699/ton is a reasonable cost when compared to other SO₂ BART determinations. According to a spreadsheet put together by the National Park Service with cost information for BART determinations, the average cost effectiveness of SO₂ BART controls is \$1,571 lb/ton, the mean cost effectiveness is \$1,966/ton, and the highest cost required to meet SO₂ BART was \$7,309 lb/MMBtu. Because similar facilities will have to incur similar costs to meet BART, DENR has no justification to discount installation of a wet scrubber based on costs.

5. DENR and Otter Tail Did Not Adequately Evaluate the Other Environmental Benefits of a Wet Scrubber.

DENR and Otter Tail did not fully evaluate the environmental impacts of a wet scrubber versus a dry scrubber. Specifically, the higher SO₂ removal efficiencies and very low SO₂ emission rates, on the order of single digit parts per million (ppm) concentrations, will be needed for the effective removal of carbon dioxide (CO₂) from the gas stream. Many of the amine-based CO₂ control methods currently under development are very sensitive to sulfur and thus require very low SO₂ inlet concentrations, on the order of 1 to 2 ppm.¹⁵ This will require 98-99%+ SO₂ removal or an outlet SO₂ of 0.01 lb/MMBtu. It will be more cost effective and operationally simpler to design and install controls in one retrofit program.

It is well recognized that it is not a matter of if but when Congress and/or EPA will mandate CO₂ reductions from industrial sources such as Big Stone. Thus, if an SO₂ control technology will better prepare Big Stone to be able to effectively remove CO₂ in the future, that must be taken into account in the BART analysis as another environmental benefit from a wet scrubber versus a dry scrubber. Indeed, as described above, there are wet scrubber technologies available that can remove 99+% of the SO₂. Dry scrubbers do not achieve as high levels of SO₂ emission reduction.

Another environmental benefit of wet scrubbers versus dry scrubbers is greatly improved removal of hydrogen chloride (HCl) and hydrogen fluoride (HF) as compared to a dry scrubber. Actual measurements have demonstrated that very high HCl and HF control efficiencies, 99.7% to 99.9% for HCl and 99.8% to 99.9% for HF, are being achieved at wet scrubbed plants.¹⁶ Such high levels of HCl and HF removal have not been shown for coal fired boilers controlled with dry scrubbers. Tests at the recently constructed Wygen II, an electrical generating unit burning subbituminous coal from the Powder River Basin and equipped with a spray dryer absorber, showed only 49% removal of HF and 58% removal of HCl. According to the Institute of Clean Air Companies, "wet scrubbers also provide significant removal of arsenic, beryllium, cadmium, chromium, lead, manganese, and mercury from flue gas."¹⁷

¹⁵ Chuck Dene, Lesley A. Baker, and Robert J. Keeth, FGD Performance Capability, Mega 2008, Ex. 14.

¹⁶ See 10/14/08 Letter from Alstom to Duke Energy, Exs. 15A and B.

¹⁷ See <http://www.icac.com/i4a/pages/index.cfm?pageid=3401>.

Further, lower emissions of SO₂ that are achievable with a wet scrubber also equate to lower PM_{2.5} concentrations since there will be less SO₂ in the air to contribute to sulfate formation. And studies have demonstrated that sulfate addition to sulfate-limited water bodies or wetlands can increase the transformation of mercury to its neurotoxic form, methylmercury.¹⁸ Thus, with lower SO₂ emissions from Big Stone via the use of a wet scrubber as compared to a dry scrubber, the result should be less sulfate deposition which should decrease methylization of mercury.

These environmental benefits must also be considered in evaluating the environmental benefits of the SO₂ control options for BART at Big Stone I.

B. BART for Nitrogen Oxides (NO_x) Emissions at Big Stone.

The BART analysis for NO_x at Big Stone I is flawed because Otter Tail and the state failed to consider the level of control achievable with the proposed selective catalytic reduction (SCR) at Big Stone I.

DENR has proposed a NO_x emission limit of 0.10 lb/MMBtu, on a 30 day average, based on the use of separated overfire air and installation of SCR. The Big Stone I boiler has already been modified to use overfire air as a NO_x control.¹⁹ A review of monthly average NO_x emission rate data from EPA's Clean Air Markets Database shows that the highest monthly emission rate of NO_x in 2009 was 0.71 lb/MMBtu. DENR's proposed 0.10 lb/MMBtu NO_x emission rate therefore reflects 85.9% NO_x control with the SCR. However, SCR systems can achieve 90+% reductions in NO_x. The emission limit reflective of a 90% reduction in NO_x would be 0.071 lb/MMBtu. This level of emissions has commonly been required as BACT in the last decade for numerous coal-fired boilers. In more recent years, lower levels of NO_x have been required as BACT.

A review of recent SCR retrofits definitively shows that very high levels of NO_x removal are being achieved by recent SCR retrofit installations. NO_x emission rates less than 0.05 lb/MMBtu are routinely achieved, and NO_x removal efficiencies are typically around 90%.²⁰ Permitting agencies have required lower NO_x limits in recent BACT determinations, with many proposed and required BACT limits of 0.05-0.06 lb/MMBtu and at least one NO_x BACT limit as low as 0.035 lb/MMBtu.²¹

¹⁸ See, e.g., Jeremiason, Jeff D. et al., Sulfate Addition Increases Methylmercury Production in an Experimental Wetland, *Environ. Sci. Technol.*, 2006, 40, 3800-3806, Ex. 16; Krabbenhoft, David P. et al., Unravelling the Complexities Mercury Methylation in the Everglades: The Use of Mesocosms to Test the Effects of "New" Mercury, Sulfate, Phosphate, and Dissolved Organic Carbon, available at http://sofia.usgs.gov/projects/merc_carbon/hgmeso_geer03abs.html.

¹⁹ Terry Graumann of Otter Tail testified that the overfire air system had already been installed at Big Stone I to comply with acid rain requirements in the Big Stone Title V permit contested case hearing, in testimony given August 21, 2008.

²⁰ See Erickson, Clayton A. et al., Selective Catalytic Reduction System Performance and Reliability Review, The 2006 MEGA Symposium, Paper # 121, Ex. 17.

²¹ The Plant Washington Permit has a NO_x limit of 0.050 lb/MMBtu on a 30 day rolling average

Thus, the proposed NO_x BART limit of 0.10 lb/MMBtu fails to reflect emissions level achievable with the proposed BART controls (i.e., separated overfire air and SCR). DENR must evaluate this lower level of NO_x emissions in its BART analysis for Big Stone.

C. BART for PM at Big Stone.

DENR has proposed as BART for PM an emission limit of 0.012 lb/MMBtu and the use of a fabric filter baghouse. However, baghouses can achieve much lower emission rates, and permitting authorities have required lower limits as BACT. For example, the Plant Washington permit has a filterable PM limit of 0.010lb/MMBtu. Ex. 9. Thus, DENR must lower the PM BART emission limit of 0.010 lb/MMBtu if not lower.

In addition, EPA's BART Guidelines require that, because BART limits must be met on a continuous basis, there must be adequate provisions ensuring compliance with BART on a continuous basis. Yet, DENR has only proposed an annual stack test to demonstrate compliance with its proposed PM BART limit. DENR could require a PM continuous emission monitoring system (CEMS) to ensure continuous compliance with the BART limit, such as is required by the Plant Washington permit to meet a 0.010 lb/MMBtu emission limit. Alternatively, DENR should impose an opacity limit reflective of BART, which should be a limit of no more than 10% opacity. Given that Big Stone already has continuous opacity monitoring (COMs), the opacity limit would help ensure continuous compliance with the PM BART limit.

Many coal plant permits include stringent opacity limits as part of the BACT limits for those facilities. The MidAmerican facility in Council Bluffs, Iowa, has an opacity limit of 5 percent. The Plum Point facility in Osceola, Arkansas, has a BACT limit of 10 percent opacity. The Wisconsin Department of Natural Resources set a 10 percent opacity limit as BACT for the Fort Howard (Fort James) Paper Company's 500 MW CFB boiler. The Desert Rock permit has a 10% opacity limit.

In summary, DENR must impose a PM BART limit reflective of the best system of continuous emission reduction, and limits lower than 0.012 lb/MMBtu can be met with a baghouse. DENR should require either PM CEMS or set an opacity limit reflective of BART in addition to a lb/MMBtu limit and use COMs to ensure continuous compliance with the opacity limit and use that data as an indicator of continuous compliance with the PM BART limit.

D. There Should Be No Exemptions from BART Emission Limits During Startup and Shutdown.

As EPA has said in the BART Guidelines, BART emission limitations must be met on a continuous basis pursuant to section 302(k) of the Clean Air Act. Yet, DENR has proposed to exempt Big Stone from meeting the lb/MMBtu BART emission limits during startup and shutdown. Startup and shutdown are part of the normal operations of a power plant like Big Stone, and startup and shutdown emissions impact visibility and regional

and 0.030 lb/MMBtu on a 12 month average when burning Powder River Basin coal. See Ex. 9.

haze. So DENR's proposed BART limits must include periods of startup and shutdown. Further, there is no justification to exempt Big Stone from meeting BART limits during startup and shutdown. Numerous permitting authorities have issued as stringent if not more stringent BACT limits for coal-fired boilers with no exemptions for startup and shutdown. Further, during the 2008 contested case hearing for the Big Stone II permit, Otter Tail's Terry Graumann made clear that they were not requesting exemptions from emission limits during periods of startup or shutdown, and Otter Tail's Mark Rolfes indicated the pollution controls would operate during startup and shutdown.²²

Thus, not only is continuous compliance with BART limits required under federal rules, but there is no technical justification for exemptions from BART limits during startup and shutdown. Thus, these BART exemptions must be deleted.

E. The State's Proposed BART Regulation Must Make Clear that the Emission Limitations Apply to Big Stone I.

The EPA's BART Guidelines require that the state impose BART through enforceable requirements and that the enforceable requirements require that BART be met as expeditiously as practicable but no later than 5 years from the date EPA approves the state's regional haze SIP. DENR has proposed a state regulation to make these requirements enforceable at ARSD 74:36:21:06-09. However, the regulation specifying the emission limits fails to specify that Big Stone is subject to these emission limits. The regulation must identify the source that is subject to these emission limits ensure enforceability of the BART limits.

Second, regarding the compliance timeframe, the BART regulation should require compliance with the PM BART limit now given that Big Stone has already installed a fabric filter baghouse and can comply with the BART limit now.

Given that South Dakota is not meeting its "glide path" milestones to natural visibility conditions by 2064, it is imperative that DENR require Big Stone to install the most effective BART controls and meet stringent emission limits. We appreciate your consideration of our comments.

Sincerely,

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²² See Big Stone Contested Case Hearing Transcript, August 2008, at 617-618, 679 and 602-603.

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AIR QUALITY
PROGRAM

August 31, 2010



Mr. Rick Boddicker
Senior Environmental Scientist
South Dakota Department of Environment
and Natural Resources
523 East Capitol
Joe Foss Building
Pierre, SD 57501-3181

Dear Mr. Boddicker:

Subject: Comment - Proposed Regional Haze Program
Chapter 74:36.21

The following comment is offered by Otter Tail Power Company as operating agent for Big Stone Plant. Big Stone Plant is co-owned by NorthWestern Corporation d/b/a NorthWestern Energy, Montana-Dakota Utilities Co. A Division of MDU Resources Group, Inc., and Otter Tail Power Company, a wholly owned subsidiary of Otter Tail Corporation.

Otter Tail suggests the following clarifying revision to ARSD 74:36:21:11:

74:36:21:11. Permit ~~modification~~ required for BART determination. The owner or operator of a BART-eligible source shall submit an application in accordance with § 74:36:20 ~~to modify its operations~~ to include the controls, emission limits, monitoring, recordkeeping, and reporting requirements identified in the BART determination and approved by the department ~~in accordance with § 74:36:20.~~

Thank you for your consideration of our comment.

Sincerely,

A handwritten signature in black ink, appearing to read 'Terry Graumann', is written over a horizontal line.

Terry Graumann
Manager, Environmental Services