United States Department of the Interior

NATIONAL PARK SERVICE
Air Resources Division
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AUG 2008 Received Air Quality

August 11, 2008

N3615 (2350)

Tom Bachman, P.E.
Senior Environmental Engineer
Division of Air Quality
North Dakota Department of Health
Environmental Health Section
Gold Seal Center, 918 E. Divide Ave.
Bismarck, North Dakota 58501-1947

Dear Mr. Bachman:

Thank you for inviting us to provide comments on the Best Available Retrofit Technology (BART) analyses and draft permits provided by the North Dakota Department of Health (ND DOH) for Coal Creek Station Units #1 & #2, Leland Olds Station Units #1 & #2, Milton R. Young Station Units #1 & #2, and Stanton Station Unit #1. Our interest in this action stems from our obligation to protect visibility at Theodore Roosevelt National Park (NP) and Lostwood National Wildlife Refuge (NWR). We commend ND DOH for the progress your proposals represent toward reducing emissions from these facilities. We have enclosed our station-specific comments and provide general comments below that apply to all or several of these facilities.

By its nature, lignite is a very low-rank fuel that is relatively high in sulfur compared to its heating value. For this reason, it is also relatively inexpensive. We believe that the economic benefits derived by sources burning this fuel should be considered in determining what level of emission control can reasonably be expected from the standpoint of a level, industry-wide playing field.

For several units, ND DOH is proposing alternative sulfur dioxide (SO_2) limits that are similar to the presumptive BART limits because they allow a source to choose between a limit in terms of pounds of emissions per million Btu of heat input, or percent reduction of that pollutant. While EPA presented its BART Guidelines for SO_2 in that format, we do not believe that it was EPA's intention to allow the source to choose the more favorable limit. By definition, BART represents the highest degree of control that meets the five-factor test. Where ND DOH has determined that a lb/mmBtu limit is reasonable, it should require that that limit be met. Similarly, where ND DOH has determined that a percent reduction limit is reasonable, it should require that that limit be met. If both limits are determined to be reasonable, then to allow the source to choose only

one clearly does not represent the most stringent reasonable degree of control. Therefore, where ND DOH has proposed alternative limits, both should be required.

There is also a fundamental problem with setting only a percent-reduction limit on SO_2 emissions. If fuel sulfur content increases, emissions can increase correspondingly. Unless sulfur content is limited, or a cap is placed on mass emissions (e.g., lb/hr, tons/yr), the actual amount of SO_2 emitted is unlimited.

We also have some general comments that apply to all of the Particulate Matter (PM) analyses. We believe that the BART analyses are deficient in that they neither address upgrades to the existing Electrostatic Precipitators (ESPs) or propose limits that realistically reflect the capabilities of those existing ESPs, as well as the proposed new baghouses, to control filterable PM. EPA's BART Guidelines (Guidelines) advise:

- "...it is important to include control options that involve improvements to existing controls and not to limit the control options only to those measures that involve a complete replacement of control equipment."
- "...for retrofitting existing sources in addressing BART, you should consider ways to improve the performance of existing control devises, particularly when a control device is not achieving the level of control that other similar sources are achieving in practice with the same device. For example, you should consider requiring those sources with electrostatic precipitators (ESPs) performing below currently achievable levels to improve their performance."

Although all of these sources have ESPs in place, none of them except Stanton Unit #1 is currently achieving a level of performance equivalent to the 0.015 lb/mmBtu proposed for ESPs at sources such as Peabody's Thoroughbred and LG&E's Trimble County projects in Kentucky. Furthermore, EPA has recently issued a permit limiting the Desert Rock facility to 0.010 lb/mmBtu filterable PM_{10}, new baghouses are being permitted at 0.009 – 0.012 lb/mmBtu in Virginia (Virginia Hybrid Energy Center) and Wyoming (Dry Fork, WYGEN 3), and ND DOH proposed to permit the Gascoyne project at 0.012 lb/mmBtu.

In addition to an absence of any evaluation of upgrading the existing PM control equipment, it appears that ND DOH is not following EPA guidance to consider more stringent emission rates in setting permit limits:

> "If you find that a BART source has controls already in place which are the most stringent controls available (note that this means all possible improvements to any control devices have been made), then it is not necessary to comprehensively complete each following step of the BART analysis in this section. As long as these most stringent controls available are made federally enforceable for the purpose of implementing BART for that source, you may skip the remaining analyses in this section."

We recommend that ND DOH establish permit limits that reflect the capabilities of the BART technology to control filterable PM.

Cost-Effectiveness Metrics

When generating cost-effectiveness numbers, it is very important to put those numbers into the proper perspective. Although ND DOH presented average cost-effectiveness of a given control strategy in terms of cost-per-ton-of-pollutant-removed ($/ton), we have a concern with the way in which the incremental cost analysis is used by ND DOH. According to EPA's BART Guidelines, "You should consider the incremental cost effectiveness **in combination with the average cost effectiveness** [*emphasis added*] when considering whether to eliminate a control

option...You should exercise caution not to misuse these [average and incremental cost effectiveness] techniques... [but consider them in situations where an option shows]...slightly greater emission reductions..." Reviewing agencies are quite familiar with the concept of total average cost and expect to see costs in the $2,000 – $12,000 per ton range. However, incremental costs are rarely estimated and evaluated, so the much higher numbers that result appear quite high at first glance. For this reason, rigid use of incremental cost effectiveness will always result in the choice of the cheapest option if carried to the extreme. (For example, if only incremental costs were used to evaluate PM controls, it is likely that all controls more expensive than a multiple cyclone would be rejected.) To use incremental costs properly, they must be compared to incremental costs for similar situations. Despite the EPA guidance, ND DOH appears to base its determinations primarily on the incremental cost-effectiveness.

Furthermore, the simple $/ton test does not address the issue of proximity to one or more Class I areas. We believe that the cost/deciview ($/dv) metric can also be an appropriate tool to evaluate the costs and benefits of reducing emissions from a source that is relatively close to one or more Class I areas. For example, we calculated that the cost-effectiveness for SO_2 controls at Great River Energy's Stanton #1 would be $12 - 15 million/dv of visibility improvement at Theodore Roosevelt NP. As can be seen, $/dv is typically much higher (by orders of magnitude) than $/ton.

Finally, BART is not necessarily the most cost-effective solution. Instead, it represents a broad consideration of technical, economic, energy, and environmental (including visibility improvement) factors.

Visibility Improvement Metrics

We believe that it is appropriate to consider both the degree of visibility improvement in a given Class I area as well as the cumulative—not average—effects of improving visibility across all of the Class I areas affected. It simply does not make sense to use the same metric to evaluate the effects of reducing emissions from a BART source that impacts only one Class I area as for a BART source that impacts multiple Class I areas.

The BART Guidelines represent an attempt to create a workable approach to estimating visibility impairment. As such, they require several assumptions, simplifications, and shortcuts about when visibility is impaired in a Class I area, and how much impairment is occurring. The Guidelines do not attempt to address the geographic extent of the impairment, but assume that all Class I areas are created equal, and that there is no difference between widespread impacts in a Class I area and isolated impacts in a Class I area. To address the problem of geographic extent, we have been looking at the cumulative impacts of a source on all Class I areas affected, as well as the cumulative benefits from reducing emissions. While there are certainly more sophisticated approaches to this problem, we believe that this is the most practical, especially when considering the modeling techniques and information available. Therefore, until we can develop a second-level, more refined analysis, we continue to believe that our "simple summing" approach fills a void left by ND DOH in cases of power plants having significant impacts upon two Class I areas.

As an extension of our Stanton #1 example (above), we also calculated that the cumulative cost-effectiveness for SO_2 controls would be $6 - 7 million/dv of visibility improvement at Theodore Roosevelt NP and Lostwood NWR. Such a cumulative approach can dramatically alter the way in which the cost-effectiveness of an alternative is evaluated.

Once again, we commend ND DOH for the significant progress its proposals represent. We look forward to working with ND DOH and EPA as this process advances. We believe that good communication and sharing of information will help expedite this process, and suggest that you contact Don Shepherd--NPS (don_shepherd@nps.gov, 303-969-2075), or Meredith Bond--FWS (meredith_bond@fws.gov, 303-914-3808) if you have any questions or comments.

Sincerely,

John Bunyak
Chief, Policy, Planning and Permit Review Branch
National Park Service

Sincerely,

Sandra V. Silva
Chief, Branch of Air Quality
U.S. Fish and Wildlife Service

Enclosures

National Park Service (NPS) and U.S. Fish and Wildlife Service (FWS) Source-Specific Comments on North Dakota Department of Health (ND DOH) Proposed BART Permits
August 11, 2008

Great River Energy (GRE) Coal Creek Units #1 & #2

Great River Energy (GRE) operates Coal Creek Units #1 & #2 near Underwood, North Dakota. Both units are tangentially-fired with lignite from an adjacent mine and are rated at 550 MW (gross) output. Current emission control equipment consists of wet limestone scrubbers, Low-NO_x Burners (LNB) and Separated Overfire Air (SOFA), and Electrostatic Precipitators (ESPs). Although each unit has a capacity greater than 200 MW at a facility with a total capacity greater than 750 MW, presumptive BART limits only apply for nitrogen oxide (NO_x) because there are existing sulfur dioxide (SO_2) controls on both units at the facility.

SO_2: GRE has proposed to upgrade the existing wet scrubbers to meet 0.15 lb/mmBtu.[1] ND DOH has proposed that Coal Creek meet either 0.15 lb/mmBtu or demonstrate 94% SO_2 control.
While we agree with the proposed scrubber upgrade, we believe that the chosen approach could be implemented more effectively. Although control-effectiveness information presented in Table 5-2 of GRE's August 2006 submittal estimates SO_2 control efficiency at 93.9% - 96% for the scrubber upgrade, it appears that ND DOH is assuming that it is not possible to upgrade the existing scrubbers to achieve better than 94% control. Furthermore, GRE has estimated in Table A-8 of that submittal that it can achieve 96% control at a cost of $330/ton. Please note that the GRE estimated cost to achieve 96% control is less than the $576/ton cost deemed "reasonable" by ND DOH to achieve 94% control.

It also appears that, not only is the ND DOH assuming that a 0.263 dv improvement is "negligible", it is using information—the relative differences in impacts among the control alternatives—that are not available to us. ND DOH should explain how it determined that upgrading the scrubbers to achieve 96% control is not economically reasonable, why a 0.263 dv improvement is "negligible", and where the modeling results cited in the ND DOH report are.

NO_x: Although GRE has proposed to meet the presumptive BART limits[2] with the existing controls LNB + SOFA, the Guidelines advise:

> "...the presumption does not limit the states' ability to consider whether a different level of control is appropriate in a particular case. If, upon examination of an individual EGU, a State determines that a different emission limit is appropriate based upon its analysis of the five factors, then the state may apply a more or less stringent limit."

Additional NO_x reductions could yield substantial benefits to the environment.

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[1] The presumptive BART limits are 0.15 lb/mmBtu or 95% SO_2 reduction on a 30-day rolling average basis.
[2] The presumptive BART limit for these tangentially-fired boilers burning North Dakota lignite is 0.17 lb/mmBtu on a 30-day rolling average basis.

GRE has assumed that Selective Non-Catalytic Reduction (SNCR) could reduce NO_x emissions by 50% (2,678 tpy) at an annual cost of $23 million or $8,551/ton. However, GRE has assumed that residual ammonia in the fly ash would render the ash, which it currently sells, unsalable. On that assumption, GRE included "sunk costs" for its ash handling infrastructure, and annual costs that represent lost ash sales revenue. While it is inappropriate to include sunk costs in future decision-making, elimination of those sunk costs would only reduce the annual cost by about $1 million. However, the loss of ash sale revenue was counted as a $16 million cost out of the total annual operating cost of $21 million, so this issue must be resolved.

Great River Energy (GRE) Stanton Unit #1

Great River Energy (GRE) operates Stanton Unit #1 in Stanton, ND. Unit #1 is wall-fired with lignite and PRB sub-bituminous coal, and is rated at 188 MW (gross) output. Current emission control equipment consists of LNB and an ESP. Presumptive BART limits do not apply.

SO_2: ND DOH is proposing to limit emissions to 0.24 lb/mmBtu on a 30-day rolling average basis when the unit is burning lignite, and to 0.16 lb/mmBtu when burning Powder River Basin (PRB) sub-bituminous coal. ND DOH has determined that the incremental cost of installing and operating a 95%-efficient wet scrubber is excessive when compared to the cost of a 90%-efficient spray dryer. ND DOH also cites additional environmental impacts on water consumption and wastewater generation, plus the potential for pollution of the adjacent Missouri River. ND DOH contends that the additional benefits of greater SO_2 removal are more than offset by the additional costs and other environmental impacts.

ND DOH's SO_2 BART analyses in general, and its analysis of installing a new wet scrubber in particular, is of concern because it failed to evaluate any of the control options under the conditions upon which it based its final BART determination. Specifically, ND DOH based all of its cost and benefit calculations on current fuels—lignite with uncontrolled SO_2 emissions of 1.81 lb/mmBtu and PRB coal with uncontrolled emissions of 0.64 – 1.2 lb/mmBtu.[3] ND DOH determined that it is cost-effective to control SO_2 at $1,330 per ton when burning lignite and $2,006 per ton when burning PRB coal. However, in setting its proposed BART limits, it assumed that future uncontrolled SO_2 emissions would rise to 2.4 lb/mmBtu for lignite and 1.6 lb/mmBtu for PRB coal. A summary of the ND DOH analysis is presented below:

Summary of Stanton Unit #1 Spray Dryer Costs and Benefits as estimated by ND DOH

Fuel	ND lignite	PRB	Units	Notes
Uncontrolled SO2	1.81	1.20	lb/mmBtu	1
Uncontrolled SO2	9,376	6,216	tpy	1
Control efficiency	90%	90%		1
Controlled emissions	0.18	0.12	lb/mmBtu	1
Controlled emissions	938	622	tpy	1
Emissions Reduction	8,438	5,594	tpy	1
Annualized Cost	$ 11,220,000	$ 11,220,000	per year	1

[3] It appears that the actual BART determination was based upon the scenario with uncontrolled emissions at 1.2 lb/mmBtu.

Cost Effectiveness	$ 1,330	$ 2,006	per ton	1
Visibility Improvement (dv at Max Class I)	0.772		dv	2
Cost-Effectiveness ($/98th % dv at Max Class I)	$ 14,533,679		$/dv	3
Visibility Improvement (dv at Summed Class I)	1.511		dv	4
Cost-Effectiveness ($/98th % dv at Summed Class I)	$ 7,427,184		$/dv	5

(1) from ND DOH BART determination report
(2) Average 8th high visibility improvement at Theodore Roosevelt NP
(3) calculated
(4) Sum of average 8th high visibility improvements at Theodore Roosevelt NP and Lostwood NWR
(5) calculated

Because it is typically more cost-effective to control dirtier gas streams, we adjusted the cost analysis information provided by ND DOH and GRE to estimate the costs and benefits of scrubbing the higher sulfur fuels for which the BART limits were actually proposed.[4]

Summary of Stanton Unit #1 Wet Scrubber Costs and Benefits

Fuel	ND lignite	PRB	Units	Notes
Uncontrolled SO2	2.40	1.60	lb/mmBtu	1
Uncontrolled SO2	12,432	8,288	Tpy	2
Control efficiency	95%	95%		3
Controlled emissions	0.12	0.08	lb/mmBtu	4
Controlled emissions	622	414	Tpy	5
Emissions Reduction	11,811	7,874	Tpy	6
Annualized Cost	$ 13,911,294	$ 13,911,294	per year	7
Cost Effectiveness	$ 1,178	$ 1,767	per ton	8
Visibility Improvement (dv at Max Class I)	1.135	0.757	Dv	9
Cost-Effectiveness ($/98th % dv at Max Class I)	$ 12,256,349	$ 18,384,915	$/dv	10
Visibility Improvement (dv at Summed Class I)	2.114	1.410	Dv	11
Cost-Effectiveness ($/98th % dv at Summed Class I)	$ 6,579,077	$ 9,868,826	$/dv	12

(1) from ND DOH BART determination report
(2) Uncontrolled emissions from ND DOH BART determination report extrapolated for higher sulfur content
(3) from ND DOH BART determination report
(4) calculated
(5) calculated
(6) calculated
(7) Extra annual variable O&M cost from GRE report extrapolated for higher tons removed and added to Annualized Cost from ND DOH report
(8) calculated
(9) Average 8th high visibility improvement at Theodore Roosevelt NP plus additional visibility improvement extrapolated from GRE report for higher tons removed
(10) calculated
(11) Sum of average 8th high visibility improvements at Theodore Roosevelt NP and Lostwood NWR plus additional visibility improvement extrapolated from GRE report for higher tons removed
(12) calculated

It is cost-effective to achieve 95% control of SO_2 at $1,178/ton when burning lignite and $1,767/ton when burning PRB coal. On a $/ton basis, the 95% scrubbing option is more cost-effective than the less-efficient spray dryer alternative proposed by ND DOH.

[4] Electronic files containing our calculations are attached.

The fifth required element of a proper BART analysis is an evaluation of the impact of the options considered on visibility. Based upon data provided by GRE in Table 7-4 of its report, we have compiled a table showing the current average eighth-highest impacts on visibility at Theodore Roosevelt NP and Lostwood NWR.[5]

Stanton #1	**Baseline**	**Data from GRE Table 7-4**		
	2000	2001	2002	2000 - 2002
	8th High	8th High	8th High	Average 8th
Class I Area	(delta dv)	(delta dv)	(delta dv)	(delta dv)
TRNP	0.947	1.205	1.675	**1.276**
Lostwood	0.991	1.351	1.150	**1.164**
Total	1.938	2.556	2.825	**2.440**

Based upon data provided by ND DOH, we have compiled a table showing the average eighth-highest impacts on visibility at Theodore Roosevelt NP and Lostwood NWR, and the corresponding visibility improvements, when SO_2 emissions are reduced by 90%

Stanton #1	**90% Dry Scrubber**		Data from ND DOH BART proposal	
	2000	2001	2002	2000 - 2002
	8th High	8th High	8th High	Average 8th
Class I Area	(delta dv)	(delta dv)	(delta dv)	(delta dv)
TRNP	0.458	0.385	0.668	0.504
Lostwood	0.340	0.526	0.410	0.425
Total	0.798	0.911	1.078	0.929

Change	2000	2001	2002	2000 - 2002
	8th High	8th High	8th High	Average 8th
Class I Area	(delta dv)	(delta dv)	(delta dv)	(delta dv)
TRNP	0.489	0.820	1.007	**0.772**
Lostwood	0.651	0.825	0.740	**0.739**
Total	1.140	1.645	1.747	**1.511**

and by 95%.

Stanton #1	**95% Wet Scrubber**		Data from ND DOH BART proposal	
	2000	2001	2002	2000 - 2002
	8th High	8th High	8th High	Average 8th
Class I Area	(delta dv)	(delta dv)	(delta dv)	(delta dv)
TRNP	0.369	0.334	0.556	0.420
Lostwood	0.340	0.526	0.410	0.425
Total	0.709	0.860	0.966	0.845

Change	2000	2001	2002	2000 - 2002
	8th High	8th High	8th High	Average 8th
Class I Area	(delta dv)	(delta dv)	(delta dv)	(delta dv)
TRNP	0.578	0.871	1.119	**0.856**
Lostwood	0.651	0.825	0.740	**0.739**
Total	1.229	1.696	1.859	**1.595**

[5] Because neither GRE nor ND DOH evaluated visibility impacts when burning PRB coal, only the lignite-firing results are available.

At 90% SO_2 control of the baseline condition, as proposed by ND DOH, visibility would improve by more than 0.7 dv at each Class I area, and by over 1.5 dv cumulatively. The cost of these improvements is about $15 million/dv at Theodore Roosevelt NP, and about $7 million/dv cumulatively.

At 95% SO_2 control of the baseline condition, as we have proposed, and with adjustments for the higher sulfur contents used by ND DOH in its BART determination, visibility would improve by about 1.0 dv at each Class I area, and by over 2.0 dv cumulatively.

Stanton #1	**95% Wet Scrubber on future higher sulfur lignite**			
Change	2000	2001	2002	2000 - 2002
	8th High	8th High	8th High	Average 8th
Class I Area	(delta dv)	(delta dv)	(delta dv)	(delta dv)
TRNP	0.766	1.155	1.484	**1.135**
Lostwood	0.863	1.094	0.981	**0.979**
Total	1.630	2.249	2.465	**2.114**

The cost of these improvements is about $12 million/dv at Theodore Roosevelt NP, and less than $7 million/dv cumulatively.

On a cost/ton and cost/deciview basis, wet scrubbing at 95% control is more cost-effective than the spray dryer at 90% control. While ND DOH cites the added environmental impacts of wet scrubbing, any costs associated with additional water use and wastewater treatment have been reflected in GRE's cost analyses, and thus have already been accounted. The concern about polluting the Missouri River, while valid, can be alleviated by proper design, operation, and maintenance by GRE.[6] Unless the local water supply is inadequate to support a wet scrubber, or unless there is some other insurmountable environmental factor that cannot be incorporated objectively into the analysis, we conclude that wet scrubbing at 95% control (or greater) is BART for Stanton #1.

NO_x: ND DOH has proposed that Stanton #1 meet the presumptive BART limits[7] with a combination of the existing LNB plus addition of Overfire Air and Selective Non-Catalytic Reduction (SNCR). While we continue to believe that Selective Catalytic Reduction (SCR) may also be a viable alternative, we commend ND DOH for the proposed reduction in NO_x emissions.

Basin Electric (Basin) Leland Olds Station

Basin Electric (Basin) operates Leland Olds Station (LOS) Units #1 & #2 in Stanton, ND. Both units are fired with ND lignite and PRB sub-bituminous coal. Unit #1 is wall-fired and is rated at 216 MW (gross) output; current emission control equipment consists of LNB and an ESP. Unit #2 is a cyclone furnace and is rated at 440 MW (gross) output; current emission control equipment consists of an ESP. Presumptive BART limits do not apply.

[6] This concern was not raised with respect to the proposed wet scrubbers at the Leland Olds Station, which is also located on the Missouri River.

[7] The presumptive BART limit for these wall-fired boilers is 0.29 lb/mmBtu when burning North Dakota lignite, and 0.23 lb/mmBtu when burning PRB sub-bituminous coal, on a 30-day rolling average basis.

Basin Electric (Basin) Leland Olds Unit #1

SO_2: ND DOH is proposing to limit SO_2 emissions to 0.15 lb/mmBtu **or** 95% reduction on a 30-day rolling average basis. We recommend 0.15 lb/mmBtu **and** 95% reduction on a 30-day rolling average basis because both of these levels are reasonable.

NO_x: ND DOH is proposing SNCR plus basic SOFA to limit NO_x emissions to 0.19 lb/mmBtu on a 30-day rolling average basis.[8] This is well below the 0.29 lb/mmBtu presumptive BART limit for this boiler. However, ND DOH has eliminated SCR from the five-factor analysis on the basis that it is technically infeasible when the unit is burning ND lignite. Based upon EPA's comments to ND DOH regarding the technical feasibility of applying SCR to lignite-fired boilers, ND DOH should proceed with the five-factor BART analysis.

Basin Electric (Basin) Leland Olds Unit #2

SO_2: ND DOH is proposing to limit SO_2 emissions to 0.15 lb/mmBtu or 95% removal on a 30-day rolling average basis. ND DOH has determined that, because the "most efficient control option" was selected for SO_2, no evaluation of costs or visibility impacts is necessary. We agree with EPA[9] that this approach does not meet the BART Guideline requirements for analysis and that a full five-factor analysis may find that even stricter controls would be cost-effective and/or provide greater visibility benefits.

NO_x: ND DOH is proposing application of SNCR and Advanced SOFA to limit NO_x emissions to 0.35 lb/mmBtu on a 30-day rolling average basis.

Presumptive BART for this large cyclone furnace is based upon application of SCR to achieve 0.10 lb/mmBtu on a 30-day rolling average basis. According to the BART Guidelines, "The use of SCRs at cyclone units burning bituminous coal, sub-bituminous coal, and ***lignite*** [emphasis added] should enable these units to cost-effectively meet NO_x rates of 0.10 lb/mmBtu."

ND DOH contends that SCR is not technically feasible for a boiler burning ND lignite. EPA has recently submitted expert testimony to ND DOH on the technical feasibility of SCR at Minnkota Power's Milton R. Young facility. We believe that EPA's analysis is valid and support EPA's conclusion that SCR is technically feasible. Because of the similarities among the cyclone furnaces at Milton R. Young and Leland Olds, we believe that the EPA conclusion is also applicable at LOS #2. ND DOH should evaluate SCR according to the remaining BART factors.

To provide a preliminary indication as to the possible economic feasibility of SCR, we applied the procedures described in Section 4, Chapter 2 of the OAQPS Control Cost Manual to the LOS #2 boiler. Using Basin's boiler and fuel information, we estimated an

[8] In its August 4, 2008, comments to ND DOH, EPA noted a discrepancy in the proposed NO_x limit that should be corrected.
[9] August 4, 2008, EPA comments to ND DOH.

Annualized Cost of $9.3 million, and produced a cost-effectiveness estimate of $854 per ton.[10]

Basin Electric Power--Leland Olds #2

Unit	#2	
Boiler Type	cyclone	ND DOH report
Fuel	ND lignite & PRB	ND DOH report
Rating (MW Gross) each	440	ND DOH report
Rating (mmBtu/hr)	5,130	ND DOH report
Current Emissions (tpy)	10,422	ND DOH report
Current Emissions (lb/mmBtu)	0.61	ND DOH report
NPS Cost-benefit Analysis		
Overall Control Efficiency	84%	calculated
Controlled emissions (tpy)	2,976	calculated
Controlled emissions (lb/mmBtu)	0.10	NPS analysis
Emission Reductions (tpy)	10,935	NPS analysis
Capital Cost	$ 43,869,929	NPS analysis
Capital Cost ($/kW)	$ 100	calculated
O&M Cost	$ 3,502,149	NPS analysis
Annualized Cost	$ 9,336,522	NPS analysis
Cost-Effectiveness ($/ton)	$ 854	NPS analysis

While these estimates do not include measures that may be required to address issues peculiar to the boiler and its fuels, they give an indication that application of SCR may be economically feasible and that ND DOH should proceed with the five-factor analysis for SCR at LOS #2.

Milton R. Young

Minnkota Power Cooperative (Minnkota) operates the Milton R. Young Station (MRYS) near Center, ND. According to ND DOH, Unit #1 is a cyclone furnace boiler fired with ND lignite from an adjacent mine and has a capacity[11] of 257 MW. Current emission control equipment consists of an Electrostatic Precipitator (ESP); Unit #2 is similar, but with a 477 MW capacity and a wet scrubber and ESP.

On April 24, 2006, EPA, DOJ, ND DOH, and Minnkota reached a settlement (Consent Decree = CD) of a New Source Review enforcement action. As a result, limits were set for Units #1 & #2 at MRYS for filterable PM and SO_2. A Best Available Control Technology (BACT) analysis for NO_x was required to be submitted by Minnkota within the following six months. That analysis was submitted along with the BART analysis and the BACT analysis became the basis for Minnkota's BART analysis. On August 4, 2008, EPA rejected that BACT analysis on the basis that Minnkota had not demonstrated that SCR was technically infeasible.

[10] Electronic files containing our calculations are attached.

[11] We understand that the actual capacity of both units at MRYS may still be unresolved and may bear upon the applicability of the presumptive BART limits.

We understand that EPA addressed a similar situation with respect to potential conflicts between BART and a CD at the Craig power plant in northwestern Colorado when it advised Colorado Air Pollution Control Division (APCD) that "We do not agree that the 2001 settlement and our approval of the settlement relieve APCD from meeting the requirements of our BART guidelines."[12] We understand that BART requirements must be satisfied independently of any existing CD.

Milton R. Young Unit #1

SO_2: Although Minnkota proposed addition of a wet scrubber at MRYS #1 to meet both 95% control and 0.15 lb/mmBtu on a 30-day rolling average basis, ND DOH has proposed only a 30-day average limit of 95% reduction. We believe that both limits are appropriate. ND DOH has determined that, because the "most efficient control option" was selected for SO_2, no evaluation of costs or visibility impacts is necessary. While this is a commendable level of additional control, we believe that this approach does not meet the BART Guidelines for proper analysis, and that a full five-factor analysis may find that even stricter controls would be cost-effective and/or provide greater visibility benefits.

PM: Because Minnkota is proposing a new wet scrubber for SO_2, ND DOH has also proposed to allow MRYS #1 to meet the 0.030 lb/mmBtu filterable PM limit set by the CD. We believe that a modern ESP should be capable of lower emissions, and that upgrading of the existing ESP deserves more attention.

NO_x: ND DOH proposes to reduce NO_x by applying SNCR+Advanced SOFA at 0.36 lb/mmBtu.

Presumptive BART for this large cyclone furnace is based upon application of SCR to achieve 0.10 lb/mmBtu on a 30-day rolling average basis. According to the BART Guidelines, "The use of SCRs at cyclone units burning bituminous coal, sub-bituminous coal, and ***lignite*** [emphasis added] should enable these units to cost-effectively meet NO_x rates of 0.10 lb/mmBtu."

ND DOH contends that SCR is not technically feasible for a boiler burning ND lignite. EPA has recently submitted expert testimony to ND DOH on the technical feasibility of SCR at MRYS. We believe that EPA's analysis is valid and support EPA's conclusion that SCR is technically feasible. ND DOH should evaluate SCR according to the remaining BART factors.

To provide a preliminary indication as to the possible economic feasibility of SCR, we applied the procedures described in Section 4, Chapter 2 of the OAQPS Control Cost Manual to the MRYS #1 boiler. Using Minnkota's boiler and fuel information, we estimated an Annualized Cost of $6.7 million, and produced a cost-effectiveness estimate of $839 per ton.[13]

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[12] July 19, 2007, letter from Callie Videtich, EPA Region 8, to Paul Tourangeau, CO APCD.
[13] Electronic files containing our calculations are attached.

Minnkota Power--MR Young #1 & #2 **rejected SCR**

Unit	#1	#2	
Boiler Type	cyclone	cyclone	ND DOH report
Fuel	ND lignite	ND lignite	ND DOH report
Rating (MW Gross) each	257	477	ND DOH report
Rating (mmBtu/hr)	3,200	6,300	ND DOH report
Current Emissions (tpy)	8,665	14,705	ND DOH report
Current Emissions (lb/mmBtu)	0.81	0.81	ND DOH report
NPS Cost-benefit Analysis			
Control Efficiency	87.7%	87.7%	calculated
Controlled emissions (tpy)	1,631	3,294	calculated
Controlled emissions (lb/mmBtu)	0.10	0.100	NPS analysis
Emission Reductions (tpy)	7,971	11,757	NPS analysis
Capital Cost	$ 23,925,181	$42,273,746	NPS analysis
Capital Cost ($/kW)	$ 93	$ 89	calculated
O&M Cost	$ 3,500,668	$ 5,456,674	NPS analysis
Annualized Cost	$ 6,688,370	$11,087,866	NPS analysis
Cost-Effectiveness ($/ton)	$ 839	$ 943	NPS analysis

While these estimates do not include measure that may be required to address issues peculiar to the boiler and its fuels, they give an indication that application of SCR may be economically feasible and that ND DOH should proceed with the five-factor analysis for SCR at MRYS#1.

Milton R. Young Unit #2

SO_2: ND DOH has proposed upgrading the existing wet scrubber to meet a 30-day average limit of 90% reduction and 0.15 lb/mmBtu, or achieve 95% reduction on a 30-day rolling average basis. We recommend that, because ND DOH has determined that both limits are reasonably achievable, MRYS #2 meet 95% reduction and 0.15 lb/mmBtu.

PM: The CD requires the existing ESP to meet a limit on filterable PM of 0.030 lb/mmBtu. We understand that, in spite of the CD, PM control is still an open issue with respect to both BACT and BART. We recommend that an evaluation of upgrading the existing ESP to meet 0.015 lb/mmBtu is therefore appropriate.

NO_x: ND DOH proposes to reduce NO_x by applying SNCR+Advanced SOFA at 0.35 lb/mmBtu. Our comments stated above for MRYS Unit #1 also apply to the NO_x BART determination for MRYS Unit #2. Once again, to provide a preliminary indication as to the possible economic feasibility of SCR, we applied the procedures described in the OAQPS Control Cost Manual to the MRYS #2 boiler. Using Minnkota's boiler and fuel information, we estimated an Annualized Cost of $11.1 million, and produced a cost-effectiveness estimate of $943 per ton. Because SCR may be economically feasible, ND DOH should proceed with the five-factor analysis for SCR at MRYS#2.