United States Department of the Interior
NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
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TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

September 8, 2008

N3615 (2350)

Kirsten King, Program Manager
Colorado Department of Public Health and Environment
Air Pollution Control Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Dear Ms. Kirsten King:

Thank you for inviting us to provide comments on the Best Available Retrofit Technology (BART) determinations proposed by Colorado Department of Public Health and Environment (CDPHE) for Colorado Springs Utilities (CSU)—Martin Drake (Drake) Units #5, #6 & #7.

First, we have a general comment. According to CDPHE, only Lime Spray Drying (LSD) must be evaluated for sulfur dioxide (SO_2), and "Sources do not need to consider post-combustion controls for nitrogen oxides (NO_x) purposes in the BART analysis and the Air Pollution Control Division may not require post combustion controls for NO_x purposes." This policy specifically precludes Wet Scrubbers, Selective Catalytic Reduction (SCR)[1], and Selective Non-Catalytic Reduction (SNCR) as potential BART. This is contrary to EPA's BART Guidelines which advise states to identify all available retrofit technologies, eliminate technically infeasible options, and evaluate the control effectiveness of remaining control technologies. In the Guidelines, EPA states that, in order to eliminate a control technology as technically infeasible, the state "should demonstrate that the option is either commercially unavailable, or that specific circumstance preclude its application to a particular emissions unit." We continue to believe that CDPHE must make such a demonstration.

Following are our specific comments regarding CDPHE's SO_2 and NO_x BART proposals.

[1] The Oregon Department of Environmental Quality has proposed that the Boardman power plant operated by Portland General Electric install SCR to reduce NOx to 0.07 lb/mmBtu on a 30-day rolling average basis.

SO_2

The CDPHE analysis appears to assume that meeting the presumptive BART limit of 0.15 lb/mmBtu (30-day rolling average) satisfies its obligation to conduct a thorough "top-down" analysis as recommended by the EPA guidelines. Even if one assumes that future uncontrolled SO_2 emissions will rise to the 0.90 lb/mmBtu rate used by CSU in its BART analyses, the Lime Spray Driers (LSD) proposed as BART would need to achieve only 83.3% removal efficiency to meet the proposed limit. (Based upon current uncontrolled emissions, the LSD system would need to remove only 81% of the inlet SO_2 to meet the proposed limit.)

Current LSD technology can achieve higher removal efficiencies and lower emissions than assumed by CDPHE. It is generally assumed that LSD systems can achieve at least 90% removal. As we noted in our previous comments, the WYGEN 2 & 3 projects burning low-sulfur Powder River Basin (PRB) coal in Wyoming will burn coal with more than three times the uncontrolled SO_2 as Drake and still meet 0.10 lb/mmBtu on a 30-day rolling average by removing 96.2% of the inlet SO_2. Recently, the Oregon Department of Environmental Quality (OR DEQ) proposed that the Boardman power plant operated by Portland General Electric (PGE) install a LSD system to reduce SO_2 by 90% down to 0.12 lb/mmBtu on a 30-day rolling average basis.

CDPHE estimates that LSD could control SO_2 at a cost of $2,300 - $3,700/ton (depending upon the boiler). CDPHE has determined that a cost of up to $2,765/ton[2] is reasonable.[3] We believe that additional emission reductions could be achieved by more efficient application of the LSD technology, at a lower cost per ton. For example, we have used cost information from CSU's BART report and adjusted the variable Operation and Maintenance (O&M) costs upward to reflect the additional SO_2 removed by achieving 90% SO_2 control (of the higher future uncontrolled emissions) down to 0.09 lb/mmBtu (30-day rolling average). Our results, displayed in the table below, indicate that a 90% efficient LSD operating on Units #6 & #7 would actually cost less, on a cost-per-ton basis, than the CDPHE proposal.

[2] CSU estimated cost for LSD on Unit #6.

[3] The Oregon Department of Environmental Quality has recently proposed application of LSD at the Boardman power plant to satisfy BART at a cost of $3,053/ton.

Colorado Springs Utilities--Martin Drake	new LSD	new LSD	
Unit	#6	#7	
Boiler Type	wall-fired	wall-fired	CDPHE report
Fuel	bit/sub-bit mix	bit/sub-bit mix	CSU report
Rating (MW Gross) each	85	145	CDPHE report
Rating (mmBtu/hr)	850	1,336	CDPHE report
Current Emissions (tpy)	2,682	4,355	CDPHE report
Current Emissions (lb/mmBtu)	0.80	0.81	CAM data for 2004 - 2006
Current Control Efficiency	0%	0%	CDPHE report
NPS Cost-benefit Analysis			
Overall Control Efficiency (FGD)	90%	90%	NPS estimate
Future Uncontrolled Emissions (lb/mmBtu)	0.90	0.90	CSU report
Future Uncontrolled Emissions (tpy)	2,687	4,334	CSU report
Controlled Emissions (lb/mmBtu)	0.09	0.09	CSU report
Controlled emissions (tpy)	269	433	CSU report
Emission Reductions (tpy)	2,418	3,900	CSU report
Capital Cost	$ 38,000,000	$ 44,166,000	CSU report
Capital Cost ($/kW)	$ 447	$ 305	calculated
O&M Cost	$ 992,985	$ 1,542,408	NPS estimate
Annualized Cost	$6,263,938	$8,331,677	NPS estimate
Cost-Effectiveness ($/ton)	$ 2,590	$ 2,136	NPS estimate

CDPHE has estimated that application of LSD to Units #6 & #7 at 0.15 lb/mmBtu would improve visibility at Rocky Mountain National Park by 0.124 & 0.196 deciviews (dv),[4] respectively. We adjusted the CDPHE results to reflect the additional SO_2 removed by achieving 0.09 lb/mmBtu (30-day rolling average). Our results, displayed in the table below, indicate that a 90% efficient LSD operating on Units #6 & #7 would improve visibility at Rocky Mountain National Park by 0.134 & 0.212 deciviews, respectively, and actually cost less, on a cost-per-deciview basis, than the CDPHE proposal.

NPS Visibility analyses	new LSD	new LSD	
Unit	#6	#7	
Visibility Improvement (dv at Max Class I)	0.134	0.212	Adjusted from CDPHE report
Cost-Effectiveness ($/98th % dv at Max Class I)	$ 46,754,233	$ 39,344,333	calculated
Pollutant Control Effectiveness (dv/ton)	0.00006	0.00005	calculated
Visibility Improvement (dv at Summed Class I)	0.323	0.476	Adjusted from CSU report
Cost-Effectiveness ($/98th % dv at Summed Class I)	$ 19,389,715	$ 17,499,597	calculated
Pollutant Control Effectiveness (dv/ton)	0.00013	0.00012	calculated

[4] This results in a cost-effectiveness of $42 - $50 million per deciview of improvement.

We also introduced a concept in the table above that we suggested to the OR DEQ and appears to have been used by them in their BART determination for the Boardman power plant. This is what we wrote to OR DEQ earlier this year:

> We continue to believe that it is appropriate to consider both the degree of visibility improvement in a given Class I area as well as the cumulative 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. And, it does not make sense to evaluate impacts at one Class I area, while ignoring others that are similarly significantly impaired. If emissions from Boardman are reduced, the benefits will be spread well beyond only the most impacted Class I area, and this must be accounted for—PGE has not done so.
>
> 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. In our previous comments we described how we applied this cumulative approach to the Boardman analysis and found that the cumulative impact from the baseline condition on visibility in the 14 Class I areas is 29.7 dv, with a total of 2,367 "days" of impaired visibility across the 14 Class I areas. PGE responded by arguing that this approach had been rejected by the D.C. Circuit Court of Appeals in its *Corn Growers* decision. To the contrary, the *Corn Growers* decision deals with aggregation of impacts from multiple sources, not aggregation of impacts from a given source on multiple areas.
>
> As noted in our previous comments, we recognize that our approach of just summing impacts across the Class I areas is simple. However, until we can develop a second-level, more refined analysis, we continue to believe that our "simple summing" approach fills a void left by PGE in this case of a power plant that has such an extraordinary impact upon so many Class I areas. So, to aid us in that more-refined analysis, we would appreciate it if Oregon Department of Environmental Quality (ODEQ) would provide to us the modeling files generated by PGE to produce the results it has reported. And, we invite ODEC to work with us as we develop that more-refined approach.

OR DEQ appears to have used this approach in generating its "Table 23: Visibility Improvement Cost Effectiveness for all Class I Areas (sum of 98th percentile)"[5].

When we apply this simple summing approach to Drake Units #6 & #7, we estimate cumulative benefits of 0.323 and 0.476 deciviews, and the cost-effectiveness becomes $17 and $19 million per dv, respectively, across the four affected Class I areas.[6]

NO_x

Units #5, #6 & #7 are wall-fired, dry-bottom PC boilers that burn both bituminous and sub-bituminous coals and are equipped with Low-NO_x Burners (LNB). Data from EPA's Clean Air Markets database show that these units were averaging 0.39 – 0.40 lb/mmBtu during 2004 – 2006. Presumptive BART for these boilers is 0.39 lb/mmBtu when burning bituminous coal, and 0.23 lb/mmBtu for sub-bituminous coal.

According to CSU, NO_x emissions appear to be insensitive to coal type. Despite the 20% reduction in emissions expected to result from addition of Over-Fire Air (OFA), CDPHE has

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[5] This table, as well as the OR DEQ draft BART analysis, can be found at: http://www.deq.state.or.us/aq/haze/docs/deqBartReport.pdf

[6] Rocky Mountain National Park, Great Sand Dunes National Park and Preserve, Eagle's Nest Wilderness Area, and Rawah Wilderness Area

proposed that all three units continue to meet 0.39 lb/mmBtu on a 30-day rolling average, regardless of coal type. In the absence of annual limits on NO_x emissions. CSU could increase its future potential annual emissions over current actual annual emissions. We believe that CDPHE should reduce the proposed limit to reflect the reduction from current levels that should be realized by addition of OFA, and that CDPHE should include a limit on annual emissions that reflects a real reduction in NO_x emissions.

We continue to believe that CDPHE must evaluate all feasible NO_x control technologies, including such post-combustion controls as SNCR and SCR. CDPHE has not done so. For example, the North Dakota Department of Health has proposed that the Leland Olds, Milton R. Young, and Stanton power plants install SNCR under its BART program.

We applied EPA's Cost Tool database to the Drake boilers and found that SNCR could be added to the LNB/OFA combination at a cost of $500 - $1,000 per ton of pollutant removed,[7] and $9 - $24 million per deciview at Rocky Mountain National Park, depending upon the boiler. When we apply the simple summing approach to Drake Units #5, #6 & #7, we estimate cumulative benefits of 0.095 and 0.387 deciviews, and the cost-effectiveness becomes $4 - $12 million per dv across the four affected Class I areas. The results are presented in the enclosed table, and represent lower costs on per-ton and per-deciview bases than the SO_2 controls proposed by CDPHE.

Conclusions & Recommendations

While we defer to CDPHE on the appropriateness of wet versus dry scrubbing as it relates to space considerations and impacts upon water resources, we believe that the LSD system proposed as BART can operate at a much more efficient level and produce increased visibility benefits at a lower cost per ton and per deciview. We suggest that a 30-day rolling average of 0.09 lb/mmBtu represents BART for Units #6 & #7.

CDPHE should reduce the proposed NO_x limit to reflect the reduction from current levels that should be realized by addition of OFA. CDPHE should include a limit on annual emissions that reflects a real reduction in NO_x emissions.

Not only are the costs associated with addition of SNCR within the range determined to be acceptable by EPA, they are also lower than the costs-per-ton and per-deciview determined by CDPHE for application of SO_2 controls on units #6 & #7. We believe that this demonstration justifies a more rigorous analysis of application of SNCR by CDPHE.

[7] This cost falls within the range that EPA estimated would cover 75% of the BART-eligible boiler population.

We look forward to working with CDPHE 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 (don_shepherd@nps.gov, 303-969-2075) of my staff if you have any questions or comments.

Sincerely,

John Bunyak
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Enclosure

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Colorado Springs Utilities--Martin Drake **addiiton of SNCR to OFA to existing LNB**

Unit	#5	#6	#7	
Boiler Type	wall-fired	wall-fired	wall-fired	CDPHE report
Fuel	bit/sub-bit mix	bit/sub-bit mix	bit/sub-bit mix	CSU report
Rating (MW Gross) each	55	85	145	CDPHE report
Rating (mmBtu/hr)	548	850	1,336	CDPHE report
Current Emissions (tpy)	749	1,268.3	2,277.96	CSU report
Current Emissions (lb/mmBtu)	0.41	0.40	0.39	CAM data for 2004 - 2006
Current Control Efficiency	?	?	?	
NPS Cost-benefit Analysis				
Addiitonal Control Efficiency	38%	52%	46%	calculated
Controlled Emissions (lb/mmBtu)	0.25	0.19	0.21	Cost Tool
Controlled emissions (tpy)	462	609	1,231	calculated
Emission Reductions (tpy)	631	1,665	3,111	Cost Tool
Capital Cost	$ 4,455,000	$ 1,100,000	$ 7,540,000	calculated
Capital Cost ($/kW)	$ 81.00	$ 65	$ 52	Cost Tool
O&M Cost	$ 66,550	$ 87,550	$ 175,450	calculated
Annualized Cost	$620,631	$1,109,702	$1,639,796	Cost Tool
Cost-Effectiveness ($/ton)	$ 984	$ 666	$ 527	Cost Tool
Presumptive BART limit (lb/mmBtu)	**0.39**	**0.39**	**0.39**	**BART Guidelines**
Proposed BART Limit (company)	none	none	none	CSU report
Proposed BART Limit (NPS)	**0.25**	**0.19**	**0.21**	**lb/mmBtu**
Effective Reduction from Current	38%	52%	46%	calculated
Proposed BART limit (tpy)	462	609	1,231	tpy
Effective BART Limit (tpy)	600	707	1,229	calculated
Effective Reduction from Current	149	561	1,049	tpy

NPS Visibility analyses

Unit	#5	#6	#7	
Visibility Improvement (dv at Max Class I)	0.051	0.046	0.191	CDPHE report
Cost-Effectiveness ($/98th % dv at Max Class I)	$ 12,278,199	$ 24,183,982	$ 8,576,607	calculated
Pollutant Control Effectiveness (dv/ton)	0.00008	0.00003	0.00006	calculated
Visibility Improvement (dv at Summed Class I)	0.095	0.096	0.387	CSU report
Cost-Effectiveness ($/98th % dv at Summed Class I)	$ 6,500,223	$ 11,542,355	$ 4,237,853	calculated
Pollutant Control Effectiveness (dv/ton)	0.00015	0.00006	0.00012	calculated