United States Department of the Interior

FISH AND WILDLIFE SERVICE
National Wildlife Refuge System
Branch of Air Quality
7333 W. Jefferson Ave., Suite 375
Lakewood, CO 80235-2017

IN REPLY REFER TO:

FWS/ANWS-AR-AQ

December 4, 2009

Mr. Eddie Terrill
Director, Air Quality Division
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

Dear Mr. Terrill:

On October 5, 2009, the State of Oklahoma submitted a draft implementation plan describing its proposal to improve air quality regional haze impacts at mandatory Class I areas across your region. We appreciate the opportunity to work closely with the State through the initial evaluation, development, and, now, subsequent review of this plan. Cooperative efforts such as these ensure that, together, we will continue to make progress toward the Clean Air Act's goal of natural visibility conditions at all of our most pristine National Parks and Wilderness Areas for future generations.

This letter acknowledges that the U.S. Department of the Interior, U.S. Fish and Wildlife Service (FWS), in consultation with the National Park Service (NPS) has received and conducted a substantive review of your proposed Regional Haze Rule implementation plan in fulfillment of your requirements under the federal regulations 40 CFR 51.308(i)(2). Please note, however, that only the U.S. Environmental Protection Agency (EPA) can make a final determination regarding the document's completeness and, therefore, ability to receive federal approval from EPA.

As outlined in a letter to each State dated August 1, 2006, our review focused on eight basic content areas. The content areas reflect priorities for the Federal Land Manager agencies, and we have attached comments associated with these priorities. Note that we have highlighted comments in bold face that we feel warrant additional consultation prior to public release. We look forward to your response as per section 40 CFR 51.308(i)(3). For further information, please contact Tim Allen (FWS) or Bruce Polkowsky (NPS) at (303) 914-3802 and (303) 987-6944, respectively.

Again, we appreciate the opportunity to work closely with the State of Oklahoma, and compliment you on your hard work and dedication to significant improvement in our nation's air quality values and visibility.

Sincerely,

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

for Christine L. Shaver
Chief, Air Resources Division
National Park Service

Enclosure (1)

cc:

Guy Donaldson, Chief
Air Planning Section
U.S. EPA Region 6, 6PD-L
1445 Ross Avenue, Suite 1200
Dallas TX 75202-2733

Joe Kordzi
Air Planning Section
US EPA Region 6, 6PD-L
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Annette Sharp, Executive Director
CENRAP
10005 S. Pennsylvania, Ste. C
Oklahoma City, Oklahoma 73159

Chris Pease, Chief
National Wildlife Refuge System
USFWS Southwest Region
P.O. Box 1306
Albuquerque, New Mexico 87103-1306

Aaron Archibeque, Refuge Supervisor
(OK/TX)
USFWS Southwest Region
P.O. Box 1306
Albuquerque, New Mexico 87103-1306

Jeff Rupert, Refuge Manager
Wichita Mountains National Wildlife
Refuge
32 Refuge Headquarters
Indiahoma, Oklahoma 73552

Brian McManus, Deputy Chief
FWS Branch of Fire Management
National Interagency Fire Center
3833 South Development Ave.
Boise, Idaho 83705

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Boise, Idaho 83705

U.S. Fish and Wildlife Service and National Park Service Comments Regarding Oklahoma Draft Regional Haze State Implementation Plan December 4, 2009

On October 5, 2009, the State of Oklahoma submitted a Draft State Implementation Plan (SIP) Revision for the Regional Haze Program, pursuant to the requirements codified in Federal rule at 40 CFR 51.308(i)(2), to the U.S. Department of the Interior, U.S. Fish and Wildlife Service (FWS) and the National Park Service (NPS).

The air program staff of the FWS, in coordination with the NPS, has conducted a substantive review of the Oklahoma Draft SIP, and provided verbal comments on November 16, 2009. This document formalizes the FWS and NPS comments for the State's official public record. We look forward to your response as per section 40 CFR 51.308(i)(3), and we are willing to work with the Oklahoma Department of Environmental Quality (ODEQ) staff towards addressing any of the issues discussed below. For further information, please contact Tim Allen with FWS at (303) 914-3802.

General Comments:

The document appears to be well written and quite comprehensive in nature. This SIP is one of the best from the Central Regional Air Planning Association (CenRAP), and reflects a great deal of effort and forethought.

Perhaps one of the most welcome discussions that has been lacking in many SIPs was the well thought out discussion of uncertainty associated with assumptions that form the basis of much of the SIP. Even so, the State continued to present its results based upon the EPA default guidance. This is important in that it keeps SIPs comparable between States, yet acknowledges that all technical work for this long-term program is not complete.

We appreciate that uncertainties were limited to parameters that are outside of Oklahoma's control. In many cases, the State summarized well inventories or analysis that may result in different results due to excluded or late accomplished emission controls. These types of statements help the reader to understand the extent of the State's efforts to present accurate information.

The remaining comments provided below are organized according to the priorities that we presented in our August 1, 2006, letter. The items identified in **Bold Face** type are of significant importance to us.

Baseline, Natural Conditions, Uniform Rate

1. Section II.A contains a good discussion on monitoring activity and commitment to future evaluation; and, Section II.C contains a strong discussion of the new IMPROVE equation.

2. In Section II.D, the State indicates that it might consider hourly influences of moisture on visibility impacts in future revisions of the SIP. Monthly factors were recommended for SIP analysis to minimize short-term moisture events. Because the SIP deals with 5-year average baseline and future projects, short-term impacts due to moisture would not be overly beneficial.

3. In Section III, the State discusses the variables that affect the natural conditions estimates for the Wichita Mountains Wilderness Area. We acknowledge that Wichita Mountains is the easternmost IMPROVE site to be assigned the "western US" natural conditions estimates. As such, using natural conditions that lie between the revised eastern and western values is probably appropriate. It appears that uniform rate of progress values are appropriately calculated using the Regional Haze Rule specified values, and that the natural conditions estimates do not appear to materially affect control strategies in this SIP, so consideration of refining natural conditions estimates at a later date may be appropriate.

Emission Inventories

4. Table IV-2 summarizes area source emissions inventory data by subcategory and pollutant species. The bottom row of the table, labeled "Total area sources" should contain the sum of the five subcategory emissions for each pollutant. However, the data entered in this row do not reflect such sum. We expect the entries are in error, and ask ODEQ to verify the figures presented in this table.

Best Available Retrofit Technology (BART)

5. We commend ODEQ's efforts on BART determinations regarding the subject-to-BART facilities. ODEQ did a credible job in reworking and reducing certain company cost estimates in developing its BART conclusions. The bottom-line results on future visibility improvement due to the deployment of control initiatives are significant. Our comments are not meant in any way to minimize the significance of the emission reductions due to the agreed upon emission controls, but rather to suggest areas to maximize the benefits of the final products.

6. Sections VI.A through VI.C discuss the BART screening, determination, and voluntary permit limit processes and results. Little to no information is provided to summarize protocols (screening or refined) that become the basis for the results. Although we understand that BART details are provided in an appendix, summarizing processes is valuable and consistent with other sections of the SIP.

7. **The timing of BART controls must occur within five years from EPA approval of the Oklahoma Regional Haze SIP, rather than seven years after submission of the SIP to EPA. Section VI.C of the draft SIP incorrectly states that BART controls must occur by the later of five years from EPA approval of the SIP or seven years from the date of submittal of the SIP to EPA. This is contrary to Oklahoma's own regulation, 252:100-8-75(e): "The owner or operator of each BART-eligible source subject to BART shall install and operate BART no later than five years after EPA approves the Oklahoma Regional Haze SIP." The SIP wording should be changed accordingly.**

8. The discussion of Tables VI-10 and VI-11 in Section VI.C of the draft SIP states that modeling for existing electrostatic precipitators and proposed fabric filter controls shows visibility impairment well below 0.5 deciviews at all Class I areas. This is an incorrect interpretation of the use of 0.5 deciview. The 0.5 deciview threshold is used in determining whether a BART-eligible facility is to be considered subject-to-BART, but not whether a given pollutant has been controlled adequately. This is determined by the 5-factor BART process.

9. **In Section VI.D of the Oklahoma draft SIP, ODEQ allows itself time after the SIP submittal to make a final BART determination for SO_2 control of the OG&E facilities based on revised cost effectiveness calculations and the appeal by OG&E. ODEQ should make all BART determinations in the SIP before the public comment period and submittal to EPA.**

10. Please assure that all emission controls and emission limits proposed as part of the Oklahoma Regional Haze SIP are documented as being federally enforceable and are located in appendices or other referenced State documents. Specifically, the ODEQ BART determinations outlined in the SIP should reference the ODEQ Application Analysis for each facility that developed those determinations. It is not currently clear that this step has been taken.

11. The FWS has comments on certain of the ODEQ Application Analysis documents which developed the ODEQ BART determinations. Those comments are discussed in the attachment to this document.

Area of Influence

12. **Section I of the draft SIP includes identification of Class I areas that are possibly affected by Oklahoma sources' emissions. This section omits the Forest Service managed wilderness areas of Upper Buffalo and Caney Creek, both in Arkansas. However, the modeled impacts from several of Oklahoma's BART sources demonstrate impact at these Class I areas. These two Class I areas should be specifically included in the SIP.**

Reasonable Progress Goals; Long-Term Strategy

13. Sections I.B and VII.A contain good discussion of the relationship of Oklahoma's air quality permitting programs, including Prevention of Significant Deterioration review, with goals of the Regional Haze program and this SIP. This highlights the importance of addressing haze-causing pollutants from new and modifying stationary sources in the State to the long-term strategy of reducing anthropogenic degradation of visibility.

14. Section V.G – Although combined emissions from Oklahoma indicate an insignificant contribution to Class I areas outside the State, specific BART analysis shows individual impacts as being highest at Class I areas other than Wichita Mountains. Reasonable progress control evaluations are not limited to whole-State strategies, rather must be considered on the individual (or smaller group) basis when warranted.

15. The long-term strategy presented in Section VII of the draft SIP does not address construction emission controls within Oklahoma. The Regional Haze Rule, at 40 CFR 51.308(d)(3)(v)(B), identifies "Measures to mitigate the impacts of construction activities," as one of the factors each State must consider, at a minimum, in developing its long-term strategy.

Fire

16. In Section III.A.3, a statement is made regarding the benefits of fire to Oklahoma's habitat. The statement: "Consideration of fires as natural phenomena necessarily entails acceptance of slight degraded visibility at the Wichita Mountains from organic and elemental carbonaceous particulate," is short-sighted. Although it is later indicated in the SIP that Oklahoma is working on a voluntary compliance Smoke Management Plan, the State should discuss ways to minimize impacts from fire smoke at Class I areas in the same vigor as it does other sources.

17. In Section III.A.4, the State claims that, due to the increased incidence of western fires in the United States, the Trijonis estimates of natural conditions are "far too low." Natural background estimates for use with the new IMPROVE equation, though uncertain, do include influence of natural occurring fire. It may be too harsh of a statement to imply that fire resulting from years of suppression warrants such a strong statement. The statement overly implies that all fire from farmland and pastureland is natural.

18. Section IX.D.2 – We appreciate that the State is working on a Smoke Management Plan for Oklahoma. In addition to the conditions already presented, please consider defining Class I areas as sensitive receptors which requires sources to consider ways to minimize smoke intrusions.

Coordination & Consultation

19. Section X.A identifies several States with which Oklahoma consulted during the development of its draft SIP. However, the discussion there does not mention any consultation with the State of Louisiana. Earlier in the document, Table VIII-3 indicates that Louisiana's contribution to light extinction at the Wichita Mountains Class I area is both significant and increasing between the 2002 and 2018 model projection. During our conference call on November 16, 2009, ODEQ staff indicated that they had discussed these findings and their implications with their Louisiana counterparts. It is important that the results of these discussions be explained in the Oklahoma SIP.

Attachment

Comments of the US Fish & Wildlife Service (FWS) Regarding the Best Available Retrofit Technology (BART) Section of the Draft Oklahoma Regional Haze SIP and the BART Application Analysis Documents

Oklahoma Gas & Electric (OG&E) Coal-fired Muskogee (Units #4 & #5) (572 MW each) and Sooner (Units #1 and #2) (590 MW each) Generating Stations

All costs presented by OG&E for SO_2 control were excessive. This was highlighted by ODEQ when it presented more reasonable cost estimates in the Muskogee and Sooner Application Analysis documents. Citing costs higher than those cited in the EPA BART Guidelines[1] due to inflationary pressures does not remove these sources from being subject to EPA's established BART controls. To compare current OG&E cost estimates that have been inflated over several years to the EPA cost estimates in the EPA BART Guidelines and then declare excessive costs for the project is an erroneous comparison. To have a limit less stringent than EPA's established BART levels, the State would need to establish that the source would face exceptional costs, due to the source's configuration or other plant-specific features, compared to the costs of other sources subject to presumptive BART emissions limits. The current information that we have does not support this position.

Construction costs in the 2012 period will likely be lower than the rapidly increasing costs in the 2007-2008 period. All of the reasons that caused Flue Gas Desulfurization (FGD) construction costs to dramatically escalate in the 2007-2008 period are abating. Costs in the 2011-2012 period when these dry FGD units will be constructed, will likely be significantly lower than currently proposed by OG&E. Some of the variables have been shown to be the price of oil, the price of materials, a declining dollar and demand from China for equipment vendors. This justifies use of the 2007 National Lime Association Report[2] for developing a cost scenario presented below.

Insufficient cost information was provided. OG&E should supply the vendor quotations and Sargent and Lundy internal cost data that was used to substantiate OG&E estimates.
The information that was available provided a good summary on cost, but lacked detailed information supporting development of those costs. Regarding cost estimates, the EPA BART Guidelines state that, "The basis for equipment cost estimates also should be documented, either with data supplied by an equipment vendor (i.e., budget estimates or bids) or by a referenced source (such as the OAQPS Control Cost Manual). In order to maintain and improve

[1] See 40 CFR Part 51, Appendix Y, "Guidelines for BART Determinations Under the Regional Haze Rule."
[2] Flue Gas Desulfurization Technology Evaluation, Dry Lime vs. Wet Limestone FGD, Project Number 11311-001, Prepared for National Lime Association, March 2007.

consistency, cost estimates should be based on the OAQPS Control Cost Manual, where possible."[3]

In the comparison of wet FGD to dry FGD with Spray Dryer Absorption (dry FGD w/SDA) for SO_2 control, OG&E's contention is that wet FGD causes slower exit velocity, lower stack temperature and higher SO_4 emissions; thus, visibility impairment is higher for wet than dry FGD. If this contention is accepted as being true, since the bottom line of emission controls is visibility improvement in Class I areas, the dry FGD alternative is probably reasonable. However, more information should be supplied by OG&E regarding the excessive production of sulfuric acid mist with wet FGD causing visibility impairment greater than that produced by dry FGD w/SDA, because we question the validity of this contention. Pending more information on the wet FGD versus dry FGD w/SDA comparison, we will continue with the OG&E analysis pertaining to dry FGD w/SDA.

Since the Muskogee Generating Station Units #4 and #5 and the Sooner Generating Station Units #1 and #2 are very similar in their size and configuration, comments below apply to all of those units even though only Muskogee Unit #4 serves as the working example.

The revised, more reasonable cost estimates presented by ODEQ in the BART Application Analysis for both the Muskogee and Sooner Generating Stations provided an excellent analysis. The FWS would like to provide an alternative lower cost analysis taken from the 2007 Flue Gas Desulfurization Technology Evaluation, Dry Lime vs. Wet Limestone FGD, prepared for National Lime Association.[4] This analysis provides a Total Capital Requirement of $136,500,000 for a 500 MW dry FGD w/SDA, compared to the $181,896,000 - $205,348,000 used by ODEQ. This results in a capital cost per kilowatt in the range of $273, rather than ODEQ's $318 - $359 estimate. Finally, the annual operation and maintenance costs per kilowatt were found to be $17.58, rather than the ODEQ range of $43 - $47. Using the values shown above as a realistic model for Muskogee Unit #4, the cost per ton of SO_2 is developed as follows:

Annual Emissions Baseline (TPY) (Max year for 2002-2008)	9775 TPY
Baseline lb/MMBtu	.507 lb/MMBtu
Emission Rate for Dry FGD w/SDA	.065 lb/MMBtu
(reference: Application of LS Power – High Plains Plant, CO)	
Dry FGD w/SDA Capital Cost	$156,200,000
(reference: Nat'l Lime 2007 w/PRB Coal; 500 MW = $136,500,000, scaled to 572 MW)	
Annualized Capital Costs using 25 yrs @ 7% (.0858)	$13,401,960
Annual O&M Costs per Nat'l Lime 2007	$10,055,760
($17.58/kw x 572,000 kw)	
Total Annual Cost	$23,457,720
Tons Reduced *((1-(.065/.507)) x 9,775)*	8,521
Cost per Ton of SO_2 reduced *($23,457,720/8,521 tons)*	$2,753

[3] See 40 CFR Part 51, Appendix Y, "Guidelines for BART Determinations Under the Regional Haze Rule," section IV.D.4.STEP 4.a.5.

[4] Flue Gas Desulfurization Technology Evaluation, Dry Lime vs. Wet Limestone FGD, Project Number 11311-001, Prepared for National Lime Association, March 2007.

A cost per ton for SO_2 control of $2,753 is considered reasonable by the FWS, so dry FGD w/SDA is considered to be a cost-effective alternative under BART. Given the similarity of all four Muskogee and Sooner units, this conclusion should apply to all four units.

ODEQ should have considered and discussed whether dry FGD w/SDA can be applied without replacing the existing ESP with a fabric filter. An ESP, rather than a fabric filter can be used for particulate removal from a dry FGD w/SDA if the ESP is designed to handle the increased particulate loading, though it is slightly inferior to the fabric filter in efficiency. There was no discussion whether the existing ESP units with some upgrades might be able to handle the particulate loading without adding $105 million in capital and associated costs for new fabric filters for each unit. Alternatively, it may be possible to install a small baghouse (at a lower cost) downstream of the existing ESP.

In developing the fifth factor of BART analyses, the cost per deciview of improved visibility, the effect on multiple Class I areas should be taken into consideration. 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 is not appropriate 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 also is not appropriate to evaluate impacts at one Class I area, while ignoring others that are similarly significantly impaired. If emissions from the Muskogee and Sooner Generating Stations are reduced, the benefits will be spread well beyond only the most-impacted Class I areas (Caney Creek and Wichita Mountains, respectively). The State should consider all benefits when establishing BART limits. While OG&E presented data describing improvements to visibility at all four affected Class I areas (Caney Creek, Wichita Mountains, Upper Buffalo and Hercules Glades) that would result from the various control scenarios it investigated, OG&E did not explain how it incorporated this information on impacts upon all four Class I areas into its BART decision. For example, the Oregon Department of Environmental Quality (OR DEQ) has posted on its website[5] a proposal to require under the BART program that the Boardman power plant install a dry scrubber and Selective Catalytic Reduction (SCR). As part of its BART determination, OR DEQ evaluated the benefits of various control strategies on all 14 of the Class I areas within 300 km of the plant. The following is an excerpt from comments the FLMs sent to OR DEQ:

> 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. In this case, we applied

[5] http://www.deq.state.or.us/aq/haze/pge.htm

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.

We understand that OR DEQ used a similar approach in its analyses. In addition, the Wyoming Department of Environmental Quality, as well as EPA Regions 8 and 9 support this concept. In its development of cost per deciview of visibility improvement, OG&E did not consider all four Class I areas where the Muskogee and Sooner Generating Stations are causing or contributing to visibility impairment. We would be pleased to work with ODEQ to further develop this approach.

Implementation of the above multiple Class I area visibility improvement discussion is provided by example as follows: Using the average annual cost of the ODEQ cost range from Table 9 in the Muskogee BART Application Analysis for dry FGD w/SDA ($42,358,700), divided by only the maximum-improvement at a Class I area (Wichita Mountains at 1.053 dv) the cost per deciview is $40.2 million. Deciview improvement for dry FGD w/SDA at each of the nearest Class I areas (2003) is as follows: Wichita Mountains - 1.053 dv; Caney Creek - 1.490 dv; Upper Buffalo - 1.119 dv; Hercules Glades - .0744 dv. If the annual cost is divided by the sum of the deciview improvements at all four Class I areas using the 2003 year (4.406 dv), the result is $9.6 million per deciview. This is well within what is considered reasonable under BART ($10 - $19 million/dv for SO_2 controls. It should be noted that using the FWS model developed above, where the annual cost was $23.5 million, the cost per deciview even at just Wichita Mountains is $22.3 million.

Dry FGD w/SDA should be considered to attain 93% reduction efficiency, rather than the 87.5% & 88.2% assumed by OG&E for Muskogee Units #4 and #5, respectively. The following sources document at least 93% control efficiency for dry FGD w/SDA in a 500 MW unit using Powder River Basin Coal:

- Dry Flue Gas Desulfurization Technology Evaluation, Project Number 11311-000, Prepared for National Lime Association, Sept. 2002.
- Economics of Lime and Limestone for Control of Sulfur Dioxide, William DePriest and Rajendra P. Gaikwad, Sargent and Lundy LLC
- Don Shepherd of the National Park Service maintains a comprehensive listing of recent BACT determinations relating to SO_2 control. The range of control efficiency for dry FGD w/SDA is from 89.8% to 96.5%.

The OG&E assumption that an emission rate of 0.1 lb/MMBtu will be attained by dry FGD w/SDA is understated when considering 93% control effectiveness on a 0.507 lb/MMBtu baseline emission rate. Ninety three percent SO_2 reduction of a 0.507 lb/MMBtu input emission rate could *theoretically* result in a .036 lb/MMBtu emission rate. In practice NPS's compilation of recent BACT applications shows one plant (Sierra Pacific, Ely, NV) applying for an emission rate as low as 0.060 lb/MMBtu. An additional regulatory emission limit cushion might result in a permitted .065 lb/MMBtu emission rate.

The FWS agrees that something other than the maximum 24-hour emission rate over the baseline period (2002 – 2005) could be used as the baseline emission rate. However, rather than using the average annual emission rate over the 2004 – 2006 as proposed by OG&E (e.g., 9,113 tpy SO_2 for Muskogee #4), the maximum year within the baseline years (2002 – 2008) should be used

(e.g., 9,775 tpy SO_2). The reason is that the post-BART emission rate included in the OG&E permits will be a 30-day emission rate derived from a *given* annual emission rate (not an average over multiple years), so the baseline emission rate that is used should be in commensurate terms. Also, if OG&E wants to use a 90% capacity factor to calculate the annual emissions, then permits issued which may allow a given annual emission should also reflect a maximum capacity of 90%.

In Section VI.D of the Oklahoma draft SIP, ODEQ allows itself time after the SIP submittal to make a final BART determination for SO_2 control of the OG&E facilities based on revised cost effectiveness calculations and the appeal by OG&E. ODEQ should make all final BART determinations in the SIP before the public comment period and submittal to EPA.

Regarding NO_x controls using the alternative of Low NO_x Burners (LNB), Over-fire Air (OFA) and Selective Catalytic Reduction (SCR), we believe that OG&E has understated the ability of modern SCR systems to reduce NO_x emissions (0.07 lb/MMBtu for LNB/OFA/SCR) and has overestimated the costs ($30,795,600 annual cost per boiler). Our review of operating data suggests that a NO_x limit of 0.06 lb/MMBtu is appropriate for LNB/OFA/SCR for a 30-day rolling average, and 0.07 lb/MMBtu for a 24-hour limit and for modeling purposes, but a lower rate (e.g., 0.05 lb/MMBtu or lower) should be used for annual average and annual cost estimates. Multiple surveys published in recent years have documented cost per kilowatt (kW) in a general range between $83/kW - $300/kW, with the upper end of this range occurring for highly complex retrofits with severe space constraints. OG&E assumed a cost of $337.5/kW for the Muskogee units. Choosing a rate on the higher end of the range, but a more reasonable $250/kW, the resulting average annual cost might be closer to $26,500,000 rather than $30,795,600. Using the FWS estimates, the cost per ton of NO_x reduction is $2,759/ton for Unit #4 and $2,599/ton for Unit #5. These values should be considered as being reasonable for NO_x control. The cost of visibility improvement using this scenario at the four affected Class I areas results in $18.8 million per deciview.

Public Service Company of Oklahoma (PSO) Northeastern Power Station Units #3 and #4

Issues relating to the PSO Northeastern Power Station Units #3 (490 MW) and #4 (490 MW) low-sulfur coal-fired units are about the same as for the OG&E Muskogee and Sooner Plants discussed above. First, PSO's capital costs for dry FGD w/SDA were more realistically estimated by a cost range provided by ODEQ. This resulted in cost per ton of SO_2 estimates in the $2,000 range, rather than the $3,266/ton presented by PSO. Even PSO's $3,266/ton estimate was deemed as being reasonable by ODEQ. Second, insufficient cost information was provided by PSO; the company should supply the vendor quotations and cost data that were used to substantiate its cost estimates. Actually, the FWS has not seen a PSO BART analysis for the Northeastern Power Station other than a letter from PSO to ODEQ committing to meet the presumptive emission limits. If it is available, the BART analyses for these units should be provided to the FWS for review. Third, more information should be supplied by PSO regarding the excessive production of sulfuric acid mist with wet FGD causing visibility impairment greater than that produced by dry FGD w/SDA. Fourth, PSO should have considered and

discussed whether dry FGD w/SDA can be done without replacing the existing ESP with a fabric filter. Fifth, in developing the visibility improvement factor of BART analyses (i.e., the cost per deciview of improved visibility), the effect on multiple Class I areas should be taken into consideration. Sixth, dry FGD w/SDA should be considered to attain 93% reduction efficiency, rather than the 83% assumed by PSO. This factor has a significant effect on the cost per ton of SO_2 removed and it should be reflected by ODEQ in determining the permitted emission limits for the facility.

The baseline emission rate (maximum 24-hour emission rate) used in ultimately developing cost per ton of SO_2 control was not subsequently challenged by PSO as it was by OG&E, presumably because PSO committed unconditionally to meet presumptive emission limits. As a result ODEQ has proposed dry FGD w/SDA as BART without qualifying that determination as it did with the Muskogee and Sooner Generating Stations. Should ODEQ qualify the current BART determination for Northeastern Power Station Units #3 and #4 as was done in the OG&E case, considerably more information must be supplied by PSO as discussed above and all parties must be provided the opportunity to scrutinize the new data before any determination is finalized in the Oklahoma Regional Haze SIP.

ODEQ BART Application Analysis Documents for Natural Gas-Fired EGUs:
Oklahoma Gas & Electric, Seminole Station Units 1, 2, and 3 (Seminole)
Public Service Company of Oklahoma (PSO), Northeastern Power Station Unit 2 (Northeastern)
American Electric Power Southwestern Power Station Unit 3 (Southwestern)
American Electric Power Comanche Power Station Units 1 & 2 (Comanche)

ODEQ generally determined the cost of some combination of NO_x combustion controls and then determined the incremental cost of adding SCR, concluding that the incremental cost was excessive. SCR is nearly always deployed with underlying combustion controls, so the cost of the LNB/OFA/SCR alternative should be the average cost of the entire 'package' of controls. The reasonableness of this overall average cost should then be judged.

For Seminole, Unit 3, OG&E seemed to understate the efficiency of LNB/OFA/FGR/SCR as being 81.8%, whereas Units 1 and 2 were above 88%. There is a question as to why Unit 3 is somehow different from the other two units. Actually, this technology should be assumed to operate at 90% efficiency.

Section C, "BART DETERMINATION" within the ODEQ BART Application Analysis for Seminole omitted "FGR" when stating that LNB with OFA (and FGR) is determined to be BART for NO_x control for Units 1-3.

Table 8 of the Northeastern, Unit 2 document contains a subtraction error. The line, "Annual NO_x Reduction (TPY), in the column, "Option 3: LNB/OFA+SCR" should read 1,880 (2,099-219), rather than 1,027. This change would affect the average cost per ton of that alternative.

In the Comanche analysis for each of Units 1 and 2, Tables 4 and 6 seem to show two different values for the baseline NO_x emission rate (e.g., for Unit 1, Table 4 shows 0.696 lb/MMBtu and Table 6 shows 0.48 lb/MMBtu). It is not immediately clear as to why these values would differ. The same type of difference exists in the Northeastern Unit 2 analysis when comparing the baseline NO_x emission rate in Table 1 and Table 8.

The fifth factor in a BART determination is calculation of the cost of visibility improvement for each BART alternative at each of the affected Class I areas. Deciview improvement data for the Combustion Controls/SCR alternative is provided in each of the analysis documents, but the final step of presenting the cost of visibility improvement has not been performed.

The capital cost for SCR at Southwestern was reported to be $65,968,400, or $287/kW. This is at the high end of a range of SCR capital costs reported over five different studies (range $83/kW to $300/kW), where a reasonable average might be considered to be around $200/kW. The smaller size of this unit (332 MW) may account for costs tending upward, but costs in this range should only occur in the case of highly complex retrofits. No such justification was explained in the document. These costs should be reconsidered.

Generally, insufficient cost information was provided, though the OG&E BART determination for Seminole provided more detailed cost information than the others. The information that was available provided a good summary on cost, but lacked detailed information supporting development of those costs. Regarding cost estimates, the EPA BART Guidelines state that, "The basis for equipment cost estimates also should be documented, either with data supplied by an equipment vendor (i.e., budget estimates or bids) or by a referenced source (such as the OAQPS Control Cost Manual). In order to maintain and improve consistency, cost estimates should be based on the OAQPS Control Cost Manual, where possible."[6]

The FWS asks that ODEQ consider the above general comments regarding the BART determinations for the natural gas-fired EGUs and rework the materials as necessary. The adjustments may or may not result in more reasonable costs and a selection of an SCR alternative as BART in one or more cases.

[6] See 40 CFR Part 51, Appendix Y, "Guidelines for BART Determinations Under the Regional Haze Rule," section IV.D.4.STEP 4.a.5.