

In accordance with the Regional Haze Rule (40 CFR 51.308(i)(3)), the Pennsylvania Department of Environmental Protection (DEP) is making available the comments received by the Federal Land Managers on the draft proposed Regional Haze (RH) State Implementation Plan (SIP) revision, and the DEP's responses to those comments. The following is a reproduction of a comment letter received by the Department from the United States Fish and Wildlife Service (FWS) and the National Park Service (NPS), with DEP's responses inserted:

**U.S. Fish and Wildlife Service and National Park Service Comments
Pennsylvania Draft Regional Haze Rule State Implementation Plan
August 2, 2010**

On April 22, 2008, the Commonwealth of Pennsylvania (PA) submitted a draft Regional Haze Rule State implementation plan (SIP), 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 National Park Service (NPS). Shortly after receiving the draft SIP, the FWS and NPS Air Quality staff discussed concerns with the draft document during a telephone conference attended by PA Department of Environmental Protection (PADEP) staff. Subsequently, PA decided that the FWS and NPS concerns would be considered and another draft document would be sent to FWS and NPS at a future date.

We received the new draft on June 2, 2010. The FWS Branch of Air Quality and the NPS Air Resources Division staffs have conducted a substantive review of this most recent draft and our comments follow.

We look forward to the PADEP response as per section 40 CFR 51.308(i)(3), and as always, we are willing to work with the PADEP staff towards resolving the issues discussed below. For further information, please contact Tim Allen (FWS) at (303) 914-3802 or Pat Brewer (NPS) at (303) 969-2153.

Overall Comments

1. Comment: We commend PA for working with us to revise its April 2008 draft SIP to address many of the original concerns identified by previous consultation with the FWS and NPS. There is significant improvement in this revised draft in comparison to the previous document.

DEP Response: The Department appreciates the reviewer's assessment that the Department made significant improvement in developing the revised draft proposed Regional Haze (RH) State Implementation Plan (SIP) revision.

2. Comment: We continue to have concern over PA’s approach towards meeting the controls identified by the Mid Atlantic Northeast Visibility Union (MANE-VU) Ask (“Ask”). Although we appreciate the Commonwealth’s need to thoroughly review the effects of adopting additional major air quality controls, MANE-VU-generated progress goals are dependent on successful adoption and implementation of these controls. We believe that the Commonwealth’s contribution to the success of the “Ask” is critical to achieving success in the region.

DEP Response: The Department intends to pursue the control strategies identified in the MANE-VU “Ask” in accordance with Pennsylvania law. Page 95 of the proposed RH SIP revision contains the following paragraph: “MANE-VU identified emissions from 167 stacks at EGU facilities as having visibility impacts in MANE-VU Class I areas that make controlling emissions from those stacks crucial to improving visibility at MANE-VU Class I areas. MANE-VU’s agreed regional approach for this source sector is to pursue a 90 percent control level on SO₂ emissions from these 167 stacks by 2018 as appropriate and necessary. MANE-VU has concluded that pursuing this level of sulfur reduction is both reasonable and cost-effective. Table 10.4.4-1 below lists the EGU stacks in Pennsylvania identified on the list of 167 stacks in all of MANE-VU, with their current and anticipated controls, the permit status of the SO₂ controls, and the anticipated SO₂ emissions reductions achieved by 2018.”

Additionally, page 97 of the proposed RH SIP revision states the following: “Based on the controls proposed, constructed and under construction in Pennsylvania, the Department has concluded that at this time, the Department’s CAIR regulation constitutes a reasonable measure for EGUs in Pennsylvania. Therefore, consistent with the MANE-VU ‘Ask’ Statement, the Department projects a 94.5% reduction in SO₂ emissions from the EGUs listed above in Table 10.4.4-1 (or from alternative measures, as appropriate and necessary).” Also, page 120 of the proposed RH SIP revision states the Department has developed a proposed low-sulfur heating and distillate oil regulation, in response to the MANE-VU ‘Ask’ low-sulfur fuel oil strategy. The Environmental Quality Board (EQB) adopted the Department’s proposed low-sulfur fuel oil regulation at its July 13, 2010, meeting. The public comment period began on September 25th and ends on November 29th, 2010. Additionally, the Department has revised the proposed RH SIP to address the status of the regulation development that pertains to the source categories considered in the Mactec Report (Appendix O). (Please see page 83 of the proposed RH SIP). These examples clearly indicate the Commonwealth’s dedication to pursue the goals of the “Ask” in order to achieve success in the region.

3. Comment: PA’s Reasonable Progress consists of “pursuing, as appropriate and necessary, the four goals of the “Ask” Statement”. We are concerned that commitments are only to “pursue” emission reductions, and there is no commitment to an enforceable mechanism that would ensure that the Commonwealth achieves these emission reductions.

DEP Response: It is not the Department's practice to commit to adopting measures that must go through the notice and comment process under the Pennsylvania Air Pollution Control Act (APCA). Furthermore, the EQB has the statutory authority to adopt regulations, not the Department. In addition to plan approvals, regulations undergo the review of several advisory committees before EQB action, and undergo consideration by the Independent Regulatory Review Commission (IRRC) as well as the standing committees of the General Assembly after EQB consideration. A commitment to adopt could nullify the value of a public comment and board review process. The Department intends to pursue these goals through the regulatory process in accordance with Pennsylvania law.

4. Comment: We complement PADEP's discussion of the five factors in the Best Available Retrofit Technology (BART) analyses. However, it was not clear how PADEP applied the results of those five steps in making its final BART determination because all of the BART determinations led to conclusions that no additional controls represented BART, even when the five factor analysis led to results that have been accepted as BART by many other states. No indications were given, nor could any be derived from the information presented, as to what level of cost and benefit, if any, would be acceptable as BART by PADEP.

DEP Response: In making BART determinations for the sources subject to BART in Pennsylvania, the Department did not establish or utilize bright line thresholds for cost or for visibility improvement. Instead, the Department employed an approach that considered the multiple BART Guideline factors. As a result, sources with a higher degree of potential visibility improvement from control would justify higher cost controls. Conversely, only low cost controls would be justified for sources with a lower degree of potential visibility improvement. The BART determinations are consistent with the BART Guidelines.

5. Comment: PA does not specifically identify the inconsistency of using MANE-VU based Reasonable Progress Goal calculations. These final runs are based on Clean Air Interstate Rule (CAIR) and MANE-VU "Ask" control assumptions. These controls are presently not realized, nor are there commitments with implementation plans specified to accomplish these controls in the SIP. Therefore, more information should supplement the document that fully describes the uncertainty and whether the Commonwealth or the Regional Planning Organization has any efforts planned (or in progress) to minimize these uncertainties. Specifically addressing these future estimates with more specific projections in the Commonwealth's 2013 mid-term review is imperative.

DEP Response: Plan approvals for controls at a permitted source are subject to the notice and comment provisions under the APCA. A commitment to adopt controls could nullify the value of a public comment and board review process. As stated in a previous response above, it is not the Department's practice to commit to adopting

measures that must go through a public comment process. The EQB has the statutory authority to adopt regulations, not the Department. In addition to plan approvals, regulations undergo the review of several advisory committees before EQB action, and undergo consideration by the IRRC as well as the standing committees of the General Assembly after EQB consideration. The Department intends to re-evaluate the projections of SO₂ reductions due to CAIR and the “Ask” control assumptions at the time of Pennsylvania’s first periodic report to determine whether the predicted reductions are realized. The reasonable progress report will evaluate the progress made toward the reasonable progress goal for each Class I area located outside Pennsylvania that may be affected by emissions from within Pennsylvania.

Specific Comments

Section 5.0, Baseline and Natural Conditions

Section 6.0, Monitoring Strategy

6. Comment: PA does not have Class I areas, but does list Class I areas in the MANE-VU and Visibility and Tribal Association of the Southeast (VISTAS) States to which air pollution emissions from PA’s sources contribute towards visibility impairment. It would be helpful to include a brief summary of IMPROVE data for the Class I areas that PA influences for the 20% worst and 20% best days. These data are available at the VIEWS website (<http://views.cira.colostate.edu/web/>). It is not clear if these data are present in section 6.2 that was omitted to reduce file size. It is also not clear if Section 6.4 is intended to meet the requirement to commit to future monitoring.

DEP Response: Pages 23-24 of the proposed RH SIP revision include summary tables that display the IMPROVE data that shows baseline visibility for the 20% worst and the 20% best visibility days based on the five-year average for 2000-2004, natural background visibility for the 20% worst and the 20% best visibility days, and the difference between baseline and natural visibility conditions for each MANE-VU Class I area and for nearby Class I areas. The Department considers the IMPROVE monitors located at Class I areas in MANE-VU to be representative of those Class I areas and the monitoring data from those monitors to be a reasonable basis for assessing progress toward the regional haze program goals. Section 6.2 that was omitted to reduce file size contains photographic information about the MANE-VU Class I area IMPROVE monitors, and will be inserted back into the proposed RH SIP revision for the public comment period. Section 6.4 describes additional monitoring information the Department plans to use to improve its understanding of visibility impairment and to assess visibility and fine particle pollution in the region. Because there are no Class I areas located in Pennsylvania, a monitoring plan is not required under 40 CFR § 51.308(d)(4).

Section 8.0, BART

7. Comment: Due to the number of BART Sources in PA, the reviews were divided among the separate NPS and FWS Air Quality Offices. Please refer to Attachment 1 for the NPS BART review and Attachment 2 for the BART review of the sources done by FWS. As noted above, it was not clear to us how PADEP concluded what emission controls were feasible and cost-effective, and those that were not.

DEP Response: The Department did not establish or utilize bright line thresholds for cost or for visibility improvement in making BART determinations for the sources subject to BART. The Department considered all of the BART Guideline factors, and determined that a BART source analysis resulting in significant visibility improvement from controls would consequently justify higher cost controls. The Department maintains that a low \$/ton control cost should not supersede an excessively high cost of visibility improvement. The Department does not believe that requiring additional controls on a BART source based solely on a high cost of visibility improvement for very small visibility improvement, albeit a low \$/ton control cost, is justified or appropriate.

Section 9.0, Reasonable Progress Goals

8. Comment: PA and other MANE-VU states are using the modeled results for the “Ask” to set reasonable progress goals for 2018. It would be preferable to set reasonable progress goals based on the On the Books (OTB)/On the Way (OTW) assumptions. The MANE-VU scenario is problematic because it includes several control assumptions that are not reasonably OTW to implementation in the MANE-VU, MWRPO (Midwest Regional Planning Organization), and VISTAS states. Most problematic is MANE-VU’s choice to unilaterally increase Electric Generating Unit (EGU) emissions in MRPO and VISTAS States without consideration of legally enforceable controls already in place in those States. Also of concern are the assumptions that MANE-VU States will reduce SO₂ from non-EGU sectors through low sulfur fuel requirements by 2018 and that MWRPO and VISTAS States will reduce SO₂ from their non-EGU sectors by comparable amounts. These reductions are not in progress. PA needs to address this discrepancy in its discussion of Reasonable Progress, and it is good to read that PA will also be addressing the differences between reality and reasonable progress goals at the mid-course review. The discussion PA supplied regarding the differences between the MANE-VU and VISTAS control assumptions used in setting 2018 reasonable progress goals was helpful. PA should discuss how uncertainty in the federal CAIR program could affect the reasonable progress goals for the affected Class I areas. Please clarify whether PA’s CAIR rule requires specific SO₂ and NO_x reductions independent of the status of the federal CAIR rule.

DEP Response: The MANE-VU “Ask” modeling scenario ensures that the modeled results are indicative of the agreed upon strategy by the MANE-VU states that is reflected in the “Ask” statement. MANE-VU accounted for emission controls already in place and emission controls that are not yet finalized but likely to achieve additional

reductions by 2018 in the “Ask” (beyond on the way) emissions modeling inventory for 2018. The Department relied on technical analyses, including the modeling scenario, developed by MANE-VU to demonstrate that Pennsylvania’s emission reductions, when coordinated with those of other states and tribes, are sufficient to achieve the reasonable progress goals in Class I areas affected by Pennsylvania’s emissions. The Department believes these modeled results are reasonable to achieve the reasonable progress goals in Class I areas affected by Pennsylvania’s emissions. The Department has developed a proposed low-sulfur heating and distillate oil regulation, in response to the MANE-VU “Ask” low-sulfur fuel oil strategy. Pennsylvania has proposed a single strategy for the state. Pennsylvania is pursuing a strategy that is not less stringent than the outer zone strategy and one that would meet the sulfur content emission limits listed above by 2018. Please see the modifications to page 120 in the proposed RH SIP revision for the updated status of this low sulfur fuel oil regulation. CAIR has been remanded, but not vacated and remains in place until replaced. Pennsylvania’s CAIR regulation will require emissions reductions prior to implementation of EPA’s Transport Rule (TR), when final. The proposed TR is the replacement rule to the remanded federal CAIR rule. EPA is expected to finalize the TR in mid 2011; EPA also anticipates promulgating a second TR at the same time and finalizing it in mid-2012.

Section 10.0, Long Term Strategy

9. Comment: The Long Term Strategy Section is well written in that it defines the MANE-VU “Ask” and the major contributions to visibility impairment. There is a good discussion of related regulations and enforcement actions that will result in substantive emissions reductions in the Commonwealth. Although PA has committed to address this in the mid-course review, this SIP should still discuss the Commonwealth’s efforts to implement the low sulfur fuel strategy of the MANE-VU “Ask”. We concur with PA’s assessment that prescribed fire is a comparatively small contributor to visibility impairment in its geographic region and that residential wood smoke is the more important contributor. Does PA have plans to address residential wood smoke?

DEP Response: The Department has developed a proposed low-sulfur heating and distillate oil regulation, in response to the MANE-VU ‘Ask’ low-sulfur fuel oil strategy. Pennsylvania has proposed a single strategy for the state. Pennsylvania is pursuing a strategy that is not less stringent than the outer zone strategy and one that would meet the sulfur content emission limits listed above by 2018. Consideration of the regulation is anticipated to proceed on a schedule in accordance with the Pennsylvania Regulatory Review Act, the Pennsylvania Air Pollution Control Act, the Commonwealth Documents Law, the Commonwealth Attorneys’ Act and the procedures established by the Commonwealth’s Environmental Quality Board and by the Department. The proposed RH SIP revision has been modified on page 120 to include the following: “The EQB adopted the Department’s proposed low-sulfur fuel oil regulation at its July 13, 2010, meeting. The public comment period began on September 25th and ends on November 29th, 2010. The proposed regulation would

reduce the allowable sulfur content limits of commercial fuel oil to 15 parts per million (ppm) for Number (No.) 2 and lighter commercial fuel oils and to 0.25% sulfur content by weight for No. 4 commercial fuel oil, and 0.5% sulfur content by weight for No. 5, 6 and heavier commercial fuel oils beginning May 1, 2012.” This statement will be updated at the time of final SIP submittal to account for further progress.

Regarding residential wood smoke, the proposed RH SIP revision has been modified on page 83 to include the following: “New indoor wood stoves in Pennsylvania are regulated by EPA’s Residential Woodstoves NSPS. The NSPS for residential woodstoves was part of the area source inventory developed by MANE-VU to model the 2018 inventory for area sources (see page 106 of this SIP revision). A final-form outdoor wood boiler (OWB) regulation was approved by the Commonwealth’s Independent Regulatory Review Commission (IRRC) on August 19, 2010. The Department’s final-form regulation would require EPA’s Phase 2 emission standards, including the particulate matter standard of 0.32 lb/MMBtu, for all new OWBs in the Commonwealth manufactured after June 1, 2011.” This statement will be updated at the time of final SIP submittal to indicate publication date of the OWB regulation as a final regulation.

Attachment 1
To FWS/NPS Comments – Pennsylvania Draft Regional Haze SIP

NPS Best Available Retrofit Technology Comments

General Comments

10. Comment: We complement PA DEP for the clarity of its discussions of how it applied the five factors in the BART analyses in making its BART determinations. However, it was not clear how PA DEP applied the results of those five steps in making its final BART determinations because all of the BART determinations led to conclusions that no additional controls represented BART, even when the five factor analysis led to results that have been accepted as BART by many other states. No indications were given, nor could any be derived from the information presented, as to what level of cost and benefit, if any, would be acceptable as BART by PA DEP.

DEP Response: The Department did not establish or utilize bright line thresholds for cost or for visibility improvement in making BART determinations for the sources subject to BART. The Department considered all of the BART Guideline factors, and determined that a BART source analysis resulting in significant visibility improvement from controls would consequently justify higher cost controls. The Department maintains that for a BART determination, a low \$/ton control cost should not supersede an excessively high cost of very low visibility improvement.

11. Comment: The core purpose of the BART program is to improve visibility in federal Class I areas, and BART is not necessarily the most cost-effective solution. Instead, BART represents a broad consideration of technical, economic, energy, and environmental (including visibility improvement) factors. We believe that it is essential to consider both the degree of visibility improvement in a given Class I area as well as the cumulative benefits of improving visibility across all of the Class I areas affected.

There are several Class I areas impacted by Pennsylvania's BART sources. 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 effects of improving visibility across all of the Class I areas affected. The same metric should not be used 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. Also, evaluating impacts at one Class I area, while ignoring others that are similarly significantly impaired, should not be done. Emissions savings from a source are benefits that will be spread well beyond only the most-impacted Class I area, and should be considered. While Pennsylvania presented data describing improvements to visibility at a specific Class I area that would result from the various control scenarios it investigated, the Commonwealth has

not explained how it incorporated this information about impacts upon all Class I areas into its BART decision.

For example, Wyoming evaluated cumulative visibility improvement for both its BART and reasonable progress determinations—following are excerpts from those Wyoming determinations (with emphasis added):

- Visibility impacts were addressed in a comprehensive visibility analysis covering all three visibility impairing pollutants and associated control options. The cumulative 3-year averaged visibility improvement from the baseline **summed across the three Class I areas** achieved with LNB with separated OFA, upgraded wet FGD, and FGC for enhanced ESP (Post-Control Scenario A) was 1.070 _dv from Unit 1, 0.199 _dv from Unit 2, 1.068 _dv from Unit 3, and 0.892 _dv from Unit 4.¹
- Visibility impacts were addressed in a comprehensive visibility analysis covering all three visibility impairing pollutants and associated control options. The cumulative 3-year averaged 98th percentile visibility improvement from the baseline **summed across all four Class I areas** achieved with LNB with advanced OFA, dry FGD, and a new fullscale fabric filter, Post-Control Scenario A for each unit, was 3.558 _dv from Unit 3 and 1.963 _dv from Unit 4.²
- Visibility impacts were addressed in a comprehensive visibility analysis covering three visibility impairing pollutants and the associated control options. The **cumulative visibility improvement as compared to the baseline across Wind Cave NP and Badlands NP** achieved with new LNB with OFA at the 30-day limit of 0.23 lb/MMBtu (based on the 98th percentile modeled results) was 0.14 _dv from each of the three units. The expected visibility improvement over the course of a full annual period would be even greater due to the annual BART limit that is based on 0.19 lb/MMBtu.³
- Visibility impacts were addressed in a comprehensive visibility analysis covering all three visibility impairing pollutants and associated control options. The cumulative 3-year averaged 98th percentile visibility improvement from the baseline **summed across both Class I areas** achieved with LNB with advanced OFA, wet FGD, and existing ESP with FGC (Post-Control Scenario A) was 1.716 _dv from Unit 1 and 1.934 _dv from Unit 2.⁴
- Visibility impacts were addressed in a comprehensive visibility analysis covering all three visibility impairing pollutants and associated control options. The cumulative 3-year averaged 98th percentile visibility improvement from the baseline **summed across both Class I areas** achieved with LNB with advanced OFA, upgrading the existing dry FGD, and a new full-scale fabric filter, Post-Control Scenario A for Unit 1, was 0.996 _dv.⁵

Oregon considered cumulative benefits for the Boardman Power Plant SCR addition for reasonable progress:

Table 22: Visibility Modeling Results (percent improvement)

Total visibility impacts (sum of 98th percentile for all Class I areas)

The BART guidelines recommend analyzing visibility improvement for the highest impacted Class I area with the assumption that any improvement in the worst impacted area would result in improvement in the lesser impacted areas. **However, since the Boardman Plant significantly impacts 14 Class I Areas within 300 kilometers, the Department tried to include other parameters that would assess the significance of the improvements for all Class I areas impacted. Therefore, the Department added the number of Class I areas with impacts greater than 1.0 delta deciview, the total delta deciviews for all Class I areas (98th percentile), and the average delta deciview for all Class I areas (98th percentile).** As can be seen in Table 21, any one of the parameters is fairly representative of the other parameters perhaps with the exception of WFGD. Given these results, the Department does not believe that adding additional parameters, such as total deciview days, would result in any other conclusions and would probably just add confusion to the analysis (e.g., more days of impacts than are in a year). Using the results of the visibility modeling, the cost effectiveness of the control technologies is recalculated by relating the costs to deciview improvement (**Mt. Hood and all Class I areas**) as shown in the following 2 tables.⁶

Pennsylvania has ignored the other Class I areas where a given BART source is also causing or contributing to visibility impairment. The dollar cost per increment of visibility improvement would be substantially lower if full consideration is given to all affected Class I areas that would benefit from emission reductions. While we recognize that EPA has provided no guidance on this issue of assessing visibility benefits that would result in multiple Class I areas when emissions are reduced from a given BART source, we commend Wyoming and Oregon for their initiative in addressing the issue. We also recognize that there is no “perfect” method for addressing cumulative benefits, but we firmly believe that Pennsylvania must show how it considered the cumulative impact of the BART sources on the affected Class I areas. We have suggested an approach to Pennsylvania that is consistent with available information and with the approach used by Wyoming and Oregon, and again request that Pennsylvania show how it has considered the cumulative benefits of potential BART reductions.

DEP Response: The EPA’s *Guidelines for BART Determinations, Final Rule* (40 CFR Part 51, July 6, 2005) does not stipulate a requirement for a “cumulative” impact analysis from one BART source on multiple Class I areas. Therefore, and as stated by the commentator, since EPA has provided no guidance on the issue of assessing visibility benefits that may result in multiple Class I areas when emissions are reduced from a given BART source, the Department maintains that such an analysis is unwarranted.

The Department also maintains that requiring additional controls on a BART source to provide very small visibility improvements at multiple Class I areas due to an apparent low \$/deciview visibility improvement cost is neither justified or appropriate. The summation of very small delta deciviews serves the mathematical purpose of increasing the delta deciview value with respect to the \$/delta deciview equation and thereby

lowering the apparent cost of controls per delta deciview, while not providing any significant visibility improvement to any of the affected Class I areas. The examples of BART source impacts described in the comment are examples of large deciview visibility impacts at many Class I Areas within 300 kilometers of the Wyoming and Oregon BART sources. Very small delta deciview values from a BART source should not be summed to determine the cumulative effect on all lesser affected Class I areas. EPA's BART guidelines recommend analyzing visibility improvement for the highest impacted Class I area, with the assumption that any improvement in the worse impacted area would result in improvement in the lesser impacted areas. The Department applied the guidelines for the determination of BART for the affected sources.

12. Comment: Based upon our reviews of BART analyses across the U.S., we believe that cost-per-deciview (\$/dv) of visibility improvement is the most-common and most-useful parameter for assessing the cost-effectiveness of strategies to improve visibility in Class I areas. Our compilation⁷ of BART analyses across the U.S. reveals that the **average cost/dv proposed by either a state or a BART source is \$13 - \$20 million**,⁸ with a maximum of almost \$50 million/dv proposed by Colorado at the Martin Drake power plant in Colorado Springs.

DEP Response: The Department agrees that the cost per-deciview of visibility improvement is the most-common and most-useful parameter for assessing the cost-effectiveness of strategies to improve visibility in Class I areas, because the Regional Haze program was designed to improve visibility in Class I areas, which is measured in deciviews. However, the Department did not establish or utilize bright line thresholds for cost or for visibility improvement in making BART determinations. The Department considered all of the BART Guideline factors, and determined that a BART source analysis resulting in *significant visibility improvement* from controls would consequently justify higher cost controls. It should also be noted that the \$/deciview cost in the example provided in the comment is an incremental cost effectiveness rather than the average cost effectiveness.

13. Comment: Comments on the BART determinations for individual facilities that are subject to BART follow. We are focusing our comments on the BART determinations for the cement and paper facilities because they have larger impacts than the other BART sources. (Also, Pennsylvania is the only state that has not proposed Selective Non-Catalytic Reduction (SNCR), or any additional controls, for all of its BART cement kilns.) We are also providing comments on some of the other BART sources. More detailed comments regarding our BART reviews follow.

DEP Response: The Department notes that the baseline visibility impacts from the cement kilns in other states are significantly higher than those from kilns in Pennsylvania. The total maximum 24-hour visibility impacts, due to all pollutants for all BART sources at a facility, from the cement kilns in Pennsylvania range from 0.0008dv to 0.608dv. For each individual BART stack, the maximum 24-hour

visibility impact due to NO₃ (nitrates) range from 0.03dv to 0.39dv. Therefore it was appropriate to require SNCR control systems as BART for the cement kilns in other states.

14. Comment: AK Steel Corporation, Butler Works

BART 5 Factor Analysis:

STEP – 1: Identify All Available Retrofit Control Technologies

PA DEP: Ultra low NOx burners is the available retrofit control option with the practical potential for application to the miscellaneous natural gas burners for the control of NOx.

NPS: PA DEP should have included SCR in its analysis for the annealing furnace.⁹

STEP – 4: Evaluate Impacts and Document the Results

PA DEP: Cost of Compliance: Ultra Low NOx Burner \$12,800/ton, the Annualized Cost is \$520,000. These calculations are based upon information obtained from EPA’s AP42 Manual. The potential emissions reduction for this control was estimated to be 41 tons.

NPS: PA DEP should better explain these estimates.

DEP Response: Based on NESCAUM modeling results on A.K Steel facility’s NOx emissions, the following are the visibility impacts on the Class 1 areas:

Class I area	Visibility Impact due to all sources	Visibility Impact due to EAF	Visibility Impact due to remaining sources
Shenandoah	0.041 dv	0.034 dv	0.007 dv
Dolly Sods	0.035 dv	0.024 dv	0.011 dv
Otter Creek	0.047 dv	0.036 dv	0.011 dv
Total Visibility Impacts	0.123 dv	0.094 dv	0.029 dv

As acknowledged in the comment, there is no feasible NOx control technology for EAFs.

As per AK Steel's submittal, the facility recently installed ULNB on two process furnaces. For the six processes that could utilize similar ULNBs the average cost would be \$3.2 million dollars as per the AK Steel submittal to replace all of the burners. The NOx reduction from the installation of ULNBs at a 65% reduction would be 41 tons per year as per the AK Steel submittal. AK Steel arrived at the 65% reduction factor by comparing the uncontrolled and ULNB emission factors depicted in AP-42, Chapter 1, Natural Gas Combustion. AK Steel provided an explanation of their recent costs and the averaging process that they used to estimate their possible future costs on page 3 of their January 12, 2007 submittal. AK Steel provided the NESCAUM modeling results in Table 1 of their submittal. AK Steel provided the necessary source information for all of their sources in Table 2 of their submittal. AK Steel provided a cost summary estimation in Table 3 of their submittal. The Department concurs with the technical and cost analysis that AK Steel provided. When summed the total existing deciview effect for the three Class 1 areas from AK Steel's remaining controllable sources is 0.029 deciviews. However, the Department does not believe that the thousandths of a deciview improvement that could be achieved at any

individual Class 1 area would provide true visibility relief, and that a summation is not warranted.

AK Steel did not evaluate SCR as an option. SCR may be technically feasible, but it is not economically feasible. It is the Department's experience that SCR will typically cost more than ULNB, usually at least 50% more. The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

15. Comment: Allegheny Ludlum Corporation, Brackenridge Facility

STEP – 4: Evaluate Impacts and Document the Results

PA DEP: Cost of Compliance: (2) Ultra Low NO_x Burner (for Loftus Soaking Pits): \$12,800/ton, the Annualized Cost is \$182,000. These calculations are based upon information obtained from EPA's AP42 Manual. The potential emissions reduction for this control was estimated to be 14 tons.

NPS: PA DEP should better explain these estimates.

DEP Response: In its May 4, 2009, "Review Memo for BART Application for the Allegheny Ludlum Corporation Brackenridge Facility", the Allegheny County Health Department (ACHD) conducted an engineering analysis under the BART determination process of 40 CFR 51.308(e) for each source subject to BART at Allegheny Ludlum Brackenridge. The review memo was submitted to the Department as part of its BART submittal for Pennsylvania. The \$12,800/ton estimated cost of Ultra Low NO_x Burners is based on the costs associated with the recent installation of ULNB at a similar facility in Pennsylvania, the AK Steel Corporation, Butler Works, which recently installed ULNB on two process furnaces. A 65% emission reduction factor for ULNBs was used in the ACHD calculation. This same number was used in the BART analysis by the similar facility in Pennsylvania noted above. As indicated by the PA DEP in its submittal for that facility, the number was derived from AP-42, Chapter 1, Natural Gas Combustion. ACHD used the 65% reduction effectiveness figure to be consistent with the PA DEP use of that value in its AK Steel BART analysis. The \$182,000 "Annualized Cost" is arrived at as follows: The value of the 2002 NO_x emission inventory used in NESCAUM modeling for the Loftus Soaking Pits Numbers 9 through 23, and Numbers 43 through 46, is 21.9 tons per year. The NO_x reduction from the installation of the ULNB s is figured at 65% reduction factor, resulting in emissions reductions of 14.2 tpy. 14.2 tpy, at \$12,800 per ton NO_x removed, results in the \$182,000 annualized cost (\$181,760).

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would

consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

16. Comment: Appleton Papers Inc. /Spring Mill

BART 5 Factor Analysis:

STEP – 1: Identify All Available Retrofit Control Technologies

NPS: PA DEP is incorrect in omitting Flue Gas Recirculation as a NO_x control option.¹⁰

STEP – 2: Eliminate Technically Infeasible Options

NPS: PA DEP is incorrect in stating that wet scrubbing is technically infeasible due to the size of Power Boiler #3. While the size of the boiler, and its emissions, will affect the economic feasibility of installing a wet scrubber, it will not affect the technical feasibility. Georgia Pacific is installing a wet scrubber on Power Boiler #4 at its Big Island, Virginia, paper mill. Mead Westvaco is upgrading the wet scrubber on the power boilers at its Covington, Virginia, paper mill.

STEP – 4: Evaluate Impacts and Document the Results

PA DEP: It was determined that the cost of control for this device was not cost effective considering the commensurate visibility improvement.

Power Boiler #3 (SO₂) Cost Effectiveness (\$/ton) Cost of Visibility Improvement (\$/dv) \$3,487/ton \$51,200,000/dv

NPS: PA DEP should better explain these estimates.

STEP – 5: Evaluate Visibility Impacts

PA DEP: The total deciview impact of this facility, including all BART eligible units, was modeled to be 0.089 dv. The cost in terms of dollars per deciview for installing a dry flue gas desulfurization system at this facility was calculated to be \$51,200,000/dv. Several control options were considered for SO₂ control for the power boiler. The most cost effective means of control considered was an SDA system. The resulting average cost effectiveness for installing the SDA system based on 2002 emissions was calculated to be \$3,487/ton. The corresponding visibility improvement based on the installation of this technology over the baseline was estimated to be 0.048 dv. The cost of this control equipment in terms of visibility improvement was determined to be \$51,200,000/dv.

NPS: PA DEP should better explain these estimates.

DEP Response: The Department received updated data from NESCAUM that modeled a 0.087 total deciview effect from Appleton's power boiler, 0.051 deciview from SO₂ and 0.057 from NO_x, with these numbers not adding up do to non-linearity of CALPUFF modeling. In Appendix A of Appleton's August 2007 BART submittal they cited "Sargent and Lundy Dry Flue Gas Desulfurization; Costs for retrofit Units. Project 11311-000. 9/26/02." The levelized annual costs in Appleton's submittal came out to be \$865,779. The Department calculates that at 100 % efficiency the \$865,779 / 0.051 deciview = \$16,976,450 per delta deciview. The actual delta deciview will be significantly lower than 100% depicted here. Appleton's power boiler burns a

combination of coal, bark and sludge as does the No. 5 boiler at the Big Island, Virginia Georgia Pacific facility that is referenced in this comment. BART control for this multi-fuel boiler was determined to be limits on the % sulfur content of the coal and limits on the percentage of coal versus the total amount of other fuel burned. The effectiveness of FGD was deemed to be questionable because of the multiple fuels. The No. 4 Georgia Pacific boiler that installed wet FGD burns only coal. The No. 4 boiler is a 280 MMBtu/hr boiler where wet FGD is typically used. The Appleton boiler is 180 MMBtu/hr where wet FGD is typically not used. The required BART efficiency on the Georgia Pacific boiler FGD is 90% which may be achieved by dry FGD as Appleton proposed for this evaluation. The Department concurs that FGR may be a technically feasible control option for a stoker boiler. However, the Department expects that a NOx cost analysis divided by some fraction of the total 0.057 deciview effect will yield similar results as the SOx calculations shown here. The Appleton boiler already has over fired air for NOx control and through material balance has indicated an approximate 40% existing SO2 control rate. The Appleton facility has agreed to reduce their permitted allowable SO2 emission rate from 4.0 to 3.2 lbs/MMBtu. The Department proposes that these requirements represent BART for the Appleton Facility especially when the fact that only a few hundredths of a delta deciview improvement could be achieved.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

17. Comment: Essroc Cement Corporation

Step 2 – Eliminate Technically Infeasible Options.

PA DEP: For Selective Non-Catalytic Reduction (SNCR), ammonia or urea would be injected into the rotating kiln at a location where the gas is within the temperature range of 1600 to 2000 Deg. F. On long kilns, this temperature may move along the axis of the kiln with time, causing injection to take place outside of the temperature range. SNCR has not been used full time on long wet or long dry kiln systems.

NPS: PA DEP is incorrect. As noted in our e-mail of 9/07/07 to PA DEP, Ash Grove Cement has installed a full-scale SNCR system on one of its Midlothian, Texas, kilns and, according to Ash Grove, “is achieving a 35% - 40% NOx reduction on a consistent basis.”¹¹

Step 3 – Evaluate Control Effectiveness of Remaining Control Technologies.

PA DEP: Removal efficiencies of the technically feasible NOx control technologies range from 18% to 35%.

NPS: PA DEP is incorrect. Both Colorado and Washington have proposed 40% NOx reductions for SNCR.

Step 4 – Evaluate Impacts and Document the Results.

PA DEP: The estimated cost of SNCR is \$1,014 per ton of NO_x removed.

NPS: PA DEP should better explain this estimate.

Step 5 – Evaluate Visibility Impacts.

PA DEP: The maximum visibility improvement due to the most effective NO_x control in the most affected Class I area (Shenandoah National Park) was 0.076 dv. The minimum cost of improvement was \$7,494,026 annually per deciview. Therefore, PA DEP does not recommend any additional control of NO_x as a result of the BART analysis. The current operating permit limitation for NO_x emissions from Clinker Kiln Number 5 is 476 pounds per hour.

5. Conclusion: The estimated visibility improvement is too low and the cost of additional air emission control too high to warrant additional emission control to meet the BART requirements. Thus, this reviewer concludes that no additional emission control equipment for BART is warranted at this location. Therefore, the existing permit limits will meet the requirements for BART.

NPS: PA DEP is the only state to date to conclude that SNCR is not BART for a cement kiln. The results for the four other cement kiln BART analyses that we have reviewed are summarized below:

- Ash Grove has proposed to add SNCR at 35% control to its wet kiln in Montana City, MT.
- Holcim has proposed to add SNCR at 30% control to its wet kiln in Trident, MT.
- Colorado has proposed that CEMEX add SNCR at 40% control to its kiln near Lyons, CO.
- Washington Ecology has proposed that LeFarge add SNCR at 40% control to its wet kiln near Seattle, WA.

PA DEP has underestimated the effectiveness of SNCR and has provided no information on how it arrived at its cost estimates. Finally, even with these shortcomings, the \$1,014 per ton is lower than the \$4,200/ton cost at Lefarge (WA) and the \$7.5 million per deciview cost is below the national average of \$13 million/dv for NO_x BART.

DEP Response: The Department has recently finalized a statewide amended NO_x control regulation for Portland cement kilns which is viewable here:

<http://www.pacode.com/secure/data/025/chapter145/subchapCtoc.html>

The Department projects that Essroc's NO_x emissions from kiln #4 will be reduced approximately 20% by 2013 as a result of the amended Portland cement kiln regulation.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

18. Comment: Lehigh Cement/York Operations

Step 1 – Identify All Available Retrofit Control Technologies.

PA DEP: Table 3 lists all available control technologies on the Lehigh\York White Cement Kiln for control of SO₂ and NO_x. Lehigh Cement conducted ambient modeling and visibility analysis for the period 2001 through 2003 at Class 1 areas affected by this facility. Visibility improvement is based on the company analysis.

NPS: PA DEP's Table 3 is incomplete and does not include all of the eight NO_x control technologies identified by Lehigh in its January 2006 BART analysis. We are especially concerned that PA DEP omitted SNCR, which has been proposed as BART by every cement plant outside of PA that is subject to BART. PA DEP should explain why it omitted this critical technology.

Step 2 – Eliminate Technically Infeasible Options.

PA DEP: SNCR has not been used full time on long wet or long dry kiln systems.

NPS: PA DEP is incorrect. As noted in our e-mail of 9/07/07 to PA DEP, Ash Grove Cement has installed a full-scale SNCR system on one of its Midlothian, Texas, kilns and, according to Ash Grove, "is achieving a 35% - 40% NO_x reduction on a consistent basis."¹²

PA DEP: It has been reported that SNCR has been proposed for NO_x control as BART on a long cement kiln in the US. While there several technical issues associated with the installation of SNCR for long kilns, economic and impact analyses were performed for this control option. A NO_x reduction of 35% was used for SNCR on long kilns based on the July 2006 ERG report to the Texas Commission on Environmental Quality. They used this reduction since SNCR control on long kilns is considered innovative and available data is limited.

NPS: PA DEP is incorrect. Both Colorado and Washington have proposed 40% NO_x reductions for SNCR.

Step 4 – Evaluate Impacts and Document the Results.

PA DEP: The estimated cost of a Cadence fan combined with a SNCR system is \$ 2,623 per ton of NO_x removed and also determined to be Economically Infeasible. The estimated cost of a Cadence fan system is \$ 1,118 per ton of NO_x removed.

NPS: PA DEP failed to evaluate addition of SNCR without the Cadence fan system.

Conclusion:

PA DEP: The estimated visibility improvement is too low and the cost of additional air emission control too high to warrant additional emission control to meet the BART requirements. Thus, this reviewer concludes that no additional emission control equipment for BART is warranted at this location. Therefore, the existing permit limits will meet the requirements for BART.

Step 5 – Evaluate Visibility Impacts.

PA DEP: The maximum visibility improvement due to the most effective NO_x control in the most affected Class I area (Shenandoah National Park) was 0.017 dv. The minimum cost of improvement was \$ 10,606,000 annually per deciview, for lesser improvement. Therefore, I do not recommend any additional control of NO_x as a result of the BART analysis. The current operating permit limitation for NO_x emissions from the kiln is 8.2 pounds per ton of cement clinker produced.

Conclusion:

The estimated visibility improvement is too low and the cost of additional air emission control too high to warrant additional emission control to meet the BART requirements. Thus, this reviewer concludes that no additional emission control equipment for BART is warranted at this location. Therefore, the existing permit limits will meet the requirements for BART.

NPS: PA DEP is the only state to date to conclude that SNCR is not BART for a cement kiln.

The results for the four other cement kiln BART analyses that we have reviewed are summarized below:

- Ash Grove has proposed to add SNCR at 35% control to its wet kiln in Montana City, MT.
- Holcim has proposed to add SNCR at 30% control to its wet kiln in Trident, MT.
- Colorado has proposed that CEMEX add SNCR at 40% control to its kiln near Lyons, CO.
- Washington Ecology has proposed that LeFarge add SNCR at 40% control to its wet kiln near Seattle, WA.

PA DEP has not evaluated SNCR and has provided no information on how it arrived at its cost estimates. Finally, even with these short-comings, the \$10.1 million per deciview cost for the Cadence fan plus SNCR is below the national average of \$13 million/dv for NO_x BART.

DEP Response: The Department has recently finalized a statewide NO_x control regulation for portland cement kilns which is viewable here:

<http://www.pacode.com/secure/data/025/chapter145/subchapCtoc.html>

The Department projects that Lehigh Cement/York's NO_x emissions from their white cement kiln will be reduced approximately 30% by 2013 as a result of the amended Portland cement kiln regulation.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

19. Comment: P.H. Glatfelter Company

STEP – 4: Evaluate Impacts and Document the Results

PA DEP: Based on a series of inquiries this reviewer made about the basis of their BART analysis, P.H. Glatfelter provided two revisions to their cost data and the basis

of their cost calculations. Their most current cost analysis breakdown for the wet scrubber is in Table 4 of the third version of their cost analysis.

NPS: The third version revisions cited above were not received by NPS until they were requested on 7/28/10. Our review of those revisions has determined that PA DEP has overestimated the costs of wet scrubbing SO₂ from Power Boiler #1. The over-estimation results from several deviations from the OAQPS Control Cost Manual approach:

- PA DEP did not follow the Cost Manual in estimating installation costs. The Cost manual recommends multiplying the Purchased Equipment Cost (PEC) by 0.85 to estimate the Direct Installation Cost. Instead, PA DEP multiplied the PEC by a factor of 1.65.
- PA DEP assumed a 10% interest rate instead of the 7% rate recommended by the Cost Manual.
- PA DEP estimated operating labor time at 3 hours/shift versus the 0.5 hours/shift estimated by the Cost Manual.
- PA DEP estimated maintenance labor time at 1 hour/shift versus the 0.5 hours/shift estimated by the Cost Manual.
- The solid waste generation rate used by PA DEP is double the 8/17/2007 vendor estimate.

As a result of these deviations from the Cost Manual, PA DEP estimated a Total Annual Cost (TAC) of \$5.4 million and cost-effectiveness = \$1,667/ton of SO₂ removed. Our application of the Cost Manual (see electronic attachment) yielded a TAC = \$3.6 million and cost-effectiveness = \$1,127/ton of SO₂ removed.

STEP – 5: Evaluate Visibility Impacts

PA DEP: The 98th percentile deciview improvement expected by the installation of a wet scrubber system on the Number 1 Power Boiler was found to be 0.219 dv. The cost in terms of dollars per deciview at this facility for the installation of the wet scrubber was calculated to be \$24,545,196/dv. The 98th percentile deciview improvement expected by operating the Number One Power Boiler existing OEC year round was found to be 0.010 dv. The cost in terms of dollar per deciview for this control approach was calculated to be \$41,629,300/dv.

NPS: In addition to improving visibility at Shenandoah National Park (the Class I areas used by PA DEP), a similar visibility improvement was modeled at Brigantine Wildlife Refuge. PA DEP did not model additional visibility improvements at Dolly Sods and Otter Creek Wilderness Areas which had visibility impacts about half of those at Shenandoah and Brigantine.) The cumulative benefits of reducing SO₂ from Power Boiler #1 would be 0.44 dv at Shenandoah and Brigantine, with additional benefits at Dolly Sods and Otter Creek.

Conclusion:

PA DEP: The cost effectiveness of installing a wet scrubber system for SO₂ control on Number 1 Power Boiler, taking into account visibility improvement, was \$24,545,196/dv. The cost effectiveness of operating the OEC system year-round for NO_x control on the Number 1 Power Boiler, taking into account visibility improvement,

was \$41,629,300/dv. This data, in addition to cost effectiveness values for emissions reduced and modeled visibility impacts, are shown in Table III.

NPS: Using the Cost Manual approach to estimate the cost of adding a 90% efficient wet scrubber to Power Boiler #1, the resulting cost-effectiveness at Shenandoah National Park is \$17 million/dv which is lower than the \$20 million/dv average cost-effectiveness for all of the SO₂ controls we have seen proposed as BART nationwide. When one considers the cumulative benefits of improving visibility at the four Class I areas modeled by PA DEP, the cost-effectiveness drops below \$9 million/dv, which is less than half of the \$20 million/dv average cost-effectiveness for all of the SO₂ controls we have seen proposed as BART nationwide. We conclude that addition of a 90% efficient wet scrubber to Power Boiler #1 is BART.

DEP Response: The Department explained on page seven of the BART review memo that a wall would have to be demolished and an addition would have to be built. Additionally, an asbestos abatement program would be required to allow for the installation of FGD. The facility added these costs to the Direct Installation calculation by using a factor of 1.65 instead of 0.85. The Department visited the facility and agrees that these additional costs will be incurred and should be accounted for as additional direct installation costs.

Attachment 1 Footnotes

¹ DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION BART Application Analysis AP-6040 May 28, 2009 NAME OF FIRM: PacifiCorp NAME OF FACILITY: Jim Bridger Power Plant

² DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION BART Application Analysis AP-6041 May 28, 2009 NAME OF FIRM: PacifiCorp NAME OF FACILITY: Dave Johnston Plant

³ DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION BART Application Analysis AP-6047 May 28, 2009 NAME OF FIRM: Basin Electric Power Cooperative NAME OF FACILITY: Laramie River Station

⁴ DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION BART Application Analysis AP-6042 May 28, 2009 NAME OF FIRM: PacifiCorp NAME OF FACILITY: Naughton Power Plant

⁵ DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION BART Application Analysis AP-6043 May 28, 2009 NAME OF FIRM: PacifiCorp NAME OF FACILITY: Wyodak Plant
⁶ DEQ BART Report for the Boardman Power Plant Updated December 19, 2008

⁷ See <http://www.wrapair.org/forums/ssjf/bart.html>

⁸ For example, PacifiCorp has stated in its BART analysis for its Bridger Unit #2 that “The incremental cost effectiveness for Scenario 1 compared with the baseline for the Bridger WA, for example, is reasonable at \$580,000 per day and \$18.5 million per deciview.”

⁹ **EPA ALTERNATIVE CONTROLTECHNIQUES DOCUMENT -- NO_x EMISSIONS FROM IRON AND STEEL MILLS** At iron and steel mills, there are 2 SCR units in the U.S. An SCR unit is being used to control NO_x emissions from a gas-fired, radiant tube, continuous annealing furnace at a steel mini-mill in the United States. This furnace also has LNB's. Controlled emissions from this unit are about 33 ppm at 3 percent O₂. A second SCR unit, currently under construction, will be used to control NO_x emissions from an annealing furnace at an integrated steel plant in the United States. This furnace does not have LNB's. The unit has a guaranteed NO reduction of 90 percent.

¹⁰ **BEST AVAILABLE RETROFIT TECHNOLOGY AT NON-EGU FACILITIES, April 19, 2010 WISCONSIN DEPARTMENT OF NATURAL RESOURCES** The Georgia Pacific Green Bay facility has a system of six boilers supplying power and electricity used in the manufacturing of consumer paper products. **Boiler B26 is a spreader stoker-fired unit manufactured by Babcock and Wilcox installed in 1962.** It is a two drum, balanced draft furnace, with a maximum rated heat input capacity of 350 mmBtu/hr. Boiler B26 burns washed coal (eastern high and low fusion and western coals) and petroleum coke. After reviewing these potential options, the NO_x control approach with the largest emission reduction potential for each boiler is a **combination of flue gas recirculation and over-fire air (FGR/OFA) for boiler B26** and over-fire air (OFA) for boiler B27 followed by a full-sized selective catalytic reduction (SCR) system for treating the combined flue gas of both boilers. [emphasis added]

¹¹ Overland Park, Kan., October 27, 2008, Ash Grove Cement Company Earns Working for Cleaner Air Award from North Texas Clean Air Coalition, Ash Grove Is First Texas Cement Manufacturer to Receive Award.

12 Overland Park, Kan., October 27, 2008, Ash Grove Cement Company Earns Working for Cleaner Air Award from North Texas Clean Air Coalition, Ash Grove Is First Texas Cement Manufacturer to Receive Award Recognizing Businesses That Do Their Share for Cleaner Air. Ash Grove's Midlothian plant is the first Texas cement manufacturer recognized in the five-year history of the program and received the award for the company's successful efforts to control nitrogen oxide (NOx) emissions. Ash Grove's Midlothian facility was one of the first wet process cement plants in the world to install Selective Non-Catalytic Reduction (SNCR) technology to successfully control ozone forming emissions.

ATTACHMENT 2
To NPS/FWS Comments – Pennsylvania Draft Regional Haze SIP
FWS Comments on Best Available Retrofit Technology (Section 8)

General Comments

20. Comment: No draft BART determination performed by the Pennsylvania Department of Environmental Protection (PADEP) resulted in a recommendation that BART controls be implemented on any emission unit. PADEP stated in Section 8.5.2 of the Proposed Revision to the State Implementation Plan for Regional Haze (June 2010) that, “The Department did not establish or utilize bright line thresholds for cost or for visibility improvement. Instead, the Department employed an approach that considered the multiple BART Guideline factors. As a result, sources with a higher degree of potential visibility improvement from control would justify higher cost controls. Conversely, only low cost controls would be justified for sources with a lower degree of potential visibility improvement.” It seems that PADEP did not establish *any* objective criteria for determining the acceptability of a given control technology’s cost effectiveness or cost of visibility improvement. The above PADEP statement would seem to imply that in the absence of *absolute* bright line thresholds, given all the BART sources in the State, visibility improvement at the *relatively* lowest cost facilities would result in BART controls at some subset of the BART-eligible units. Using that premise, it would seem reasonable that, at a minimum, the following facilities would qualify as the *relatively* lowest cost facilities for BART controls, in order of preference:

Lehigh Cement –Evansville Kilns #1 and #2 SNCR
CEMEX – Wampum Kiln #3 SNCR
Carmeuse Lime Kiln #5 SNCR
Carmeuse Lime Kiln #5 LNB
Sunoco Philadelphia Refinery Process Heater 2H-3 ULNB
CEMEX – Wampum Kiln #3 Water Injection
Sunoco Philadelphia Refinery Process Heater 2H-5 ULNB

It is interesting that in Pennsylvania (PA), NO_x controls on cement plants came out high in the BART cost rankings. Nationwide, many cement plants are controlling NO_x from their kilns in their BART determinations, so in this sense if PA were to control NO_x from its cement plant kilns, the Commonwealth would be consistent with the rest of the nation. Given the proximity of Class I areas to PA BART sources, many BART determinations showed the cost-effectiveness of visibility improvement was relatively expensive, even though the cost per ton of NO_x or SO₂ controlled was, in our opinion, very reasonable. In judging cost-effectiveness of a given control technology as defined under the EPA BART Guidelines¹ in Step 4 (cost per ton of NO_x, SO₂ or particulate matter) and Step 5 (cost per deciview improvement), it is the position of the Federal

Land Managers that if *either* of the cost-effective measures are reasonable then there is sufficient justification for implementing the control technology.

DEP Response: The Department does not agree. The Department considered all of the BART Guideline factors, and determined that a BART source analysis resulting in significant visibility improvement from controls would consequently justify higher cost controls. The Department maintains that for a BART determination, a low \$/ton control cost should not supersede an excessively high cost of very low visibility improvement.

21. Comment: It's important to note that two facilities in PA (Lehigh Cement Company/Evansville and Glatfelter Pulp & Paper Mill) each have visibility impact on Brigantine National Wildlife Refuge and Shenandoah National Park of about 0.6 deciviews. Though PADEP concluded that cost per deciview of visibility improvement at one or the other Class 1 area exceeded what it considered reasonable for a single facility, deference should be given to the total impact on multiple Class 1 areas by a facility. In this particular case the additive cost per deciview improvement could bring a control technology within acceptable cost range, since cost per ton was already reasonable for several particular control technologies at these facilities.

DEP Response: The EPA's *Guidelines for BART Determinations, Final Rule* (40 CFR Part 51, July 6, 2005) does not stipulate a requirement for a "cumulative" impact analysis from one BART source on multiple Class I areas. Therefore, and as stated by the commentator, since EPA has provided no guidance on the issue of assessing visibility benefits that may result in multiple Class I areas when emissions are reduced from a given BART source, the Department maintains that such an analysis is unwarranted.

The Department also maintains that requiring additional controls on a BART source to provide very small visibility improvements at multiple Class I areas due to an apparent low \$/deciview visibility improvement cost is neither justified or appropriate. The summation of insignificant delta deciviews serves the mathematical purpose of increasing the delta deciview value with respect to the \$/delta deciview equation and thereby lowering the apparent cost of controls per delta deciview, while not providing any significant visibility improvement to any of the affected Class I areas. Very small delta deciview values from a BART source should not be summed to determine the cumulative effect on all lesser affected Class 1 areas. EPA's BART guidelines recommend analyzing visibility improvement for the highest impacted Class I area, with the assumption that any improvement in the worse impacted area would result in improvement in the lesser impacted areas. The Department applied the guidelines for the determination of BART for the affected sources.

22. Comment: Appendix J contains all of the PADEP Review Memos, but the original company BART determinations should also be in the record. Please make these available in an Appendix.

DEP Response: The Department is making the original company BART submittals available to the public upon request during the public comment period.

23. Comment: Please provide a discussion of how the five factors were used in making the BART determinations. Since there are so many sources, a summary based on source category may be sufficient with detailed information that could be included as an appendix.

DEP Response: Summaries of BART determinations by source categories do not convey the technical and detailed analyses the Department performed to make the BART determinations for each individual BART unit. The BART analysis review memos convey all the information the Department relied on to make its determinations of BART, including how the five factors were used in making the BART determinations. The Department's review memos are included in Appendix J (relating to Pennsylvania's BART analysis review memos) of the proposed Regional Haze (RH) State Implementation Plan (SIP) revision.

24. Comment: On page 42, section 8.6, a large table lists BART eligible sources and their corresponding emission levels. It is not clear if these controls document existing levels or are implemented for BART. Please add a column that indicates whether these constitute new BART or existing controls.

DEP Response: The Department modified the proposed RH SIP revision on page 58 (relating to BART determinations, control levels and schedules) by including this statement: "The Department proposes to determine that existing controls satisfy BART for the BART sources listed below in Table 8.6."

Refineries

PADEP has declared in the RH SIP that the Refinery consent decree controls represent state-of-the-art-control and that this level of control constitutes BART.

25. Comment: Sunoco Marcus Hook Refinery

It is noted that the 2.197 deciview impact at the Brigantine Wilderness Class I area (using the MM5 modeling platform) by this refinery is the largest visibility impact of any facility in PA on a Class I area. The visibility improvement due to installation of the controls to be installed as part of the Environmental Protection Agency (EPA) Consent Decree (which is claimed to be BART) is not quantified. Please quantify this visibility improvement. The installation of Selective Catalytic Reduction (SCR) on the

Fluidized Catalytic Cracking Unit (FCCU) under the Consent Decree should provide for excellent visibility improvement.

In comparing the Review Memo dated September 25, 2007, to the Review Memo dated June 10, 2008, the control efficiency assumption for using Ultra Low NO_x Burners (ULNB) on the process heaters went from 68% to 73%, respectively. However, the cost per ton and cost per deciview improvement shown under STEP 4 on page 8 did not change. A pro-rata calculation reflecting this change would show \$8,532,138 per deciview improvement. This is not an unreasonable cost of visibility improvement. Also, the uncorrected \$4,791 per ton of NO_x control seems to be about double the amount of some other such installations.

DEP Response: The Department agrees that the dollar/ton estimate should be adjusted to \$4,462.00/ton for installation of ULNB. The annual cost will remain at \$316,919 / year. Sunoco conducted modeling that predicted an approximate 0.035 delta deciview improvement from the installation of ULNB, maximum daily impact scenario. $\$316,919 / 0.035 \text{ dv} = \$9,054,828.571/\text{dv}$. In concurrence with the commentator, the Department maintains that compliance with the consent decree will achieve a significant visibility improvement and further analysis at this facility for BART is not warranted at this time.

26. Comment: United Refining Company

In comparing the Review Memo dated September 25, 2007, to the Review Memo dated June 11, 2008, the only difference is that the latter added a Table 3 showing the visibility impact at the Presidential Range to be about twice the impact at the Mingo Wilderness. However, cost per deciview improvement calculations went unchanged. It is, however, recognized that even a 2x reduction in the cost per deciview improvement would still result in very high values and would not change the conclusion.

The cost effectiveness figures for NO_x control via Ultra Low NO_x Burners at the Crude Heater are \$3,266 per ton (PADEP 6/11/08 analysis). This seems high when compared with the \$750 - \$1,110 per ton costs developed in Table 3-6 in the MARAMA Assessment of Control Technology Options For Petroleum Refineries in the Mid-Atlantic Region (January 2007). The reason for such a discrepancy should be explained.

The Flue Gas Recirculation (FGR) alternative at \$2,200 per ton of NO_x reduction might be considered to be reasonable if PADEP would consider the cost per ton to supersede consideration of a high cost per deciview improvement, as discussed in the General Comments section above.

DEP Response: The Department concluded in the review memo that if the 2 best feasible technologies were employed that a delta deciview of $0.00525 + 0.0046 = 0.00985$ would be achieved at the worst affected Class 1 area. The Department concludes that this best achievable improvement would not be cost-effective. The

BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

27. Comment: Sunoco, Inc. – Philadelphia Refinery

Ultra Low NO_x burners on Heaters 2H-3 and 2H-5 seem reasonable on a cost per ton basis (\$1,775 and 2,148, respectively) and the cost per deciview (\$7.0MM and \$8.5MM, respectively) is not considered as excessive. These controls should be implemented as BART.

DEP Response: The Department concluded in the review memo that the impact benefit from Ultra Low NO_x Burners at the worst Class 1 area would be a delta deciview of 0.0135 for the 2H-3 Heater and 0.0149 for the 2H-5 Heater. The Department concludes that this best available achievement would be minimal. Additionally, the Department concluded in the review memo that compliance with a federally enforceable consent decree satisfies BART for the facility. This consent decree requires over 2,000 tons per year of NO_x reductions from a 2001-2002 baseline from boilers and heaters at the facility through the installation of controls or shut downs. The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

28. Comment: ConocoPhillips Trainer Refinery

The Review Memo dated June 10, 2008 makes two references on pages 3 and 8 to setting a NO_x emission limit for the FCCU by May 2009. Since this date is past, the actual emission limit should be inserted or another date should be set.

DEP Response: The Department agrees with the commentator. The BART table on page 58 and the discussion regarding consent decrees on page 103 in the proposed RH SIP revision have been modified to correctly describe the proposed final NO_x limits for the FCCU from the enhanced SNCR installed in 2006. EPA proposed final NO_x limits for the Trainer FCC unit pursuant to paragraphs 50 and 51 of the referenced Consent Decree on January 5, 2010. Subsequently, ConocoPhillips (COPC) accepted EPA's limits on August 5, 2010. Based on COPC's acceptance of the NO_x limits on August 5, 2010, COPC will act to incorporate the limits into a federally enforceable permit

pursuant to paragraph 257 of the referenced Consent Decree by November 2010. The final FCC NO_x limits are: 121.1 ppmvd (365-day) and 155.3 ppmvd (7-day).

Electric Generating Units

Pursuant to earlier comments by the Federal Land Managers, PADEP performed an additional BART analysis on behalf of most of the Electric Generating Units (EGU). This additional BART analysis considered an Electrostatic Precipitator enhancement alternative, along with an objective visibility improvement analysis of cost per deciview, rather than relying on the subjective argument of “imperceptibility to the human eye” of any visibility improvement. The PADEP analysis lacked backup data/information and references for arriving at the conclusions, but it could be argued that relatively small adjustments to the supporting data would likely not result in a different overall outcome.

29. Comment: The PADEP Review Memos for the EGUs (except for the Cheswick Plant) generally did not contain a final ‘Conclusion’ section as many other Review Memos did. We interpret the ‘Conclusion’ section as being a confirmation by PADEP management that the staff reviewer’s recommendation was accepted as PADEP findings and conclusions. A more definitive statement by PADEP in Section 8.0 of the Proposed Revision to the State Implementation Plan for Regional Haze that all Review Memos are confirmed as PADEP conclusions could address this comment.

DEP Response: The Department agrees with the commentator. A ‘Conclusion’ section is a confirmation by the Department that the staff reviewer’s recommendation was accepted as the Department’s findings and conclusions. A statement was added to the BART Section 8.6 (relating to BART determinations, control levels and schedules) on page 57 of the proposed RH SIP revision to indicate that all review memos are confirmed as the Department’s conclusions.

30. Comment: Reliant Energy/Portland Generating Station

The Company conclusion is that BART is the existing electrostatic precipitator. BART for NO_x and SO₂ is complying with requirements of the Clean Air Interstate Rule (CAIR). An assertion is made on page 1-1 that CAIR will also reduce emissions of sulfates/inorganic condensable PM₁₀ emissions. CAIR does not regulate sulfates and no further reductions will occur at this plant anyway.

DEP Response: While the Department concurs that CAIR does not directly regulate sulfates, the SO₂ reductions due to CAIR would reduce emissions of sulfates.

31. Comment: Allegheny Energy Supply/Hatfield Station Units 1, 2, and 3

The Company conclusion is that BART is existing control equipment, which is an electrostatic precipitator (ESP) and an under-construction Flue-gas desulfurization

(FGD) system. BART for NO_x and SO₂ is CAIR. We commend Allegheny Energy Supply and its environmental consultant, EnviroMet for developing a *complete* BART determination with dominant alternatives and a least-cost envelope. It follows Appendix Y to Part 51 – Guidelines for BART Determinations Under the Regional Haze Rule – better than any other analysis that we have reviewed for PA.

The ESP Upgrade alternative of replacing T-R Sets and Controls looks to be a reasonable selection for BART given the \$1,734 cost per ton figure. The \$39 million cost per deciview at Otter Creek Wilderness may be high, but if visibility improvement at multiple Class 1 areas (i.e., Dolly Sods Wilderness, Shenandoah National Park and James River Face Wilderness) is considered, the cost of overall visibility improvement warrants further consideration.

DEP Response: The Department has concluded that a maximum of 0.006 delta deciview improvement due to an ESP upgrade at any one Class 1 area would not be cost-effective. Even with a cumulative maximum delta deciviews for all four Class 1 areas of 0.018 delta deciviews, ESP upgrade would be cost prohibitive for a BART determination,

32. Comment: PPL Generation LLC/Martins Creek SES Units 3 & 4

The Company conclusion is that BART is the use of existing #6 Fuel Oils. BART for NO_x and SO₂ is CAIR. Low annual capacity factors of units (21% & 15%, respectively) result in large control costs on a per ton basis when examining ESP and venturi scrubber technology. PADEP should develop emission limits commensurate with the low capacity use, given that the lower emissions were used, in part, to evade emission controls. The assumption of only 80% control efficiency for an ESP could be challenged with a more realistic 98% control efficiency, even though the Company made an argument for 80%. Nevertheless, it would not change the final conclusion that controls would be too expensive for the benefit. Neither the PPL Generation BART determination nor the PADEP BART determination indicates that the facility is closed. However, PADEP indicated on the FLM BART consultation conference call that the facility was closed. This should be documented in the BART determinations and in the permit limits for this facility.

DEP Response: The Department meant to convey during the BART conference call the information that the coal fired boilers at Martin's Creek, Units 1 & 2, are permanently shut down. The oil fired boilers, Units 3 & 4, are still in operation and are operated at the limited capacities as noted.

33. Comment: Orion Power – Cheswick Plant

The PADEP Review Memo did not consider an upgrade to the existing ESP, but considered only the cost of a new baghouse. The EPA BART Guidelines¹ state that, “. . . you should consider ways to improve the performance of existing control devices, 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.”

DEP Response: The Department has concluded that removal of a small percentage of the maximum 0.03 deciview impact due to particulate matter at any one Class 1 area would not be cost-effective.

34. Comment: Allegheny Energy – Mitchell Power Station

The reviewers did not locate a Company BART determination in the record. The PADEP Review Memo addressed the excessive cost of an ESP upgrade alternative.

DEP Response: The Department has concluded that a most maximum 0.001 delta deciview improvement at any one Class 1 area would not be cost-effective. A copy of Allegheny Energy's Mitchell Power Station BART submittal will be made available. The Mitchell Station has one 288 MW boiler that is subject to BART requirements.

35. Comment: Exelon Power – Eddystone Generating Station

The Exelon Power BART Evaluation document in section 5.5.1, and again on pages 9 and 10 of Appendix E, seemed to indicate that only one year of meteorological data was used in the meteorological modeling. Section 3 of PADEP’s Review Memo seems to determine the visibility impact costs on a 98th percentile basis. If only one year of meteorological data was used, visibility impact costs should be based on the maximum 24-hour impact, rather than the 98th percentile value. We realize that the \$141 million cost per deciview of improvement, even if modified by the above comment, would likely still be excessive. Nonetheless, it should still be corrected.

DEP Response: The Department concurs that the facility did use one year's worth of meteorological data, and revised the BART review memo to reflect the visibility impact costs based on the maximum 24-hour impact.

Cement Companies

36. Comment: Lehigh Cement Company/Evansville Pennsylvania Facility

PADEP’s conclusion is that BART for particulate matter is the existing control equipment, which is a fabric filter meeting the National Emissions Standards for Hazardous Air Pollutants requirements (commonly referred to as “MACT” standards). PADEP concludes that no additional control equipment is justified for NO_x or SO₂ control.

A Selective Non-Catalytic Reduction (SNCR) system for the combined NO_x emissions from long dry preheater Kilns #1 and #2 should be given more consideration as being cost-effective. Certainly, the \$627 per ton of NO_x removal is reasonable. The

\$14,267,800 per deciview improvement as shown in Table 3a and 3b of the PADEP Review Memo for BART Application is not unreasonable in the context of visibility improvement costs undertaken by some other BART determinations that have been made. Our most extensive information about the visibility costs of NO_x control for BART come from electric generation units. There are many instances of company-proposed BART NO_x controls costing between \$12 million and \$35 million per deciview for visibility improvement at a single Class I area. In addition, as discussed in the General Comments above, a cost of \$14,267,800 per deciview of visibility improvement and \$627 per ton of NO_x control using SNCR for the Lehigh Cement – Evansville plant is one of the lowest costs-per-ton and visibility costs encountered among all of the BART determinations in PA. Therefore, if any BART controls are to be undertaken in the State, SNCR at this plant should be one of them.

An additional point should be made regarding visibility impact as measured by the calculation of cost per deciview. 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. In this case, the visibility improvement of deploying SNCR on Kiln #1 and Kiln #2 should be aggregated over both Shenandoah National Park and Brigantine Wilderness Area. Using Table 3-5 of Lehigh Cement Company’s original BART determination (January 2006), the visibility improvement (in 98th Percentile deciviews) of SNCR deployment was shown as follows:

	Shenandoah	Brigantine
Kiln #1	0.02	0.04
Kiln #2	0.02	0.04

The result is a cumulative 98th Percentile deciview impact due to the deployment of a common SNCR on both units of 0.12 deciviews. If the \$971,310 annual cost of SNCR is divided by the 0.12 deciviews of visibility improvement, the result is \$8,094,250 per deciview. This is well within a range deemed to be reasonable.

DEP Response: The Department has recently finalized a statewide NO_x control regulation for portland cement kilns which is viewable here:

<http://www.pacode.com/secure/data/025/chapter145/subchapCtoc.html>

The Department projects that Lehigh Cement/Evansville’s NO_x emissions from kilns #1 and #2 will be reduced approximately 40% by 2013 as a result of the amended Portland cement kiln regulation.

37. Comment: Lafarge Corporation/Whitehall Plant

PADEP's conclusion is that BART for particulate matter is the existing control equipment, which is a fabric filter meeting MACT, and that no additional control equipment is justified for NO_x or SO₂ control.

A Selective Non-Catalytic Reduction (SNCR) system for NO_x emissions from the dry preheater Kiln #2 should be given more consideration as being cost-effective. A cost of \$1,804 per ton of NO_x removal might be considered to be reasonable. The \$27,177,065 per deciview improvement as shown in the PADEP Review Memo for BART Application is somewhat high, but in consideration of the discussion in the General Comment section above, a reasonable cost per ton might be cause to recommend that the technology be deployed as BART, regardless of the cost per deciview.

DEP Response: The Department has recently finalized a statewide NO_x control regulation for portland cement kilns which is viewable here:

<http://www.pacode.com/secure/data/025/chapter145/subchapCtoc.html>

The Department does not believe that requiring additional controls on a BART source based on a very small visibility improvement, albeit a low \$/ton control cost, is justified or appropriate.

The Department projects that Lafarge's NO_x emissions from kiln-3 will be reduced approximately 25% by 2013 as a result of the amended Portland cement kiln regulation.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

38. Comment: Cemex/Wampum Cement Plant Kiln #3

Cemex determined that it could commit to water injection and process controls for 7% NO_x control and an as-yet undetermined technology for a 10% reduction in SO₂. The Company admitted that this is not a "typical" BART analysis and that CALPUFF modeling was not performed. In the absence of a full-company BART determination, PADEP performed a BART determination. PADEP concluded that SNCR at \$1,014/ton NO_x reduction and \$4,678,401 per deciview of visibility improvement is too expensive and no additional control of NO_x is warranted. The conclusion is incorrect. Both the \$/ton and \$/deciview are within an acceptable range for BART and should not be dismissed – especially in the absence of any state-defined guideline as to what cost ranges are considered acceptable for BART, per our discussion in the General Comments Section above. In addition, it seems that at a minimum, PADEP should

accept the company's BART offer to install the water injection technology for a 7% NO_x reduction and an "as yet" determined 10% SO₂ control strategy, rather than concluding that no control technology is necessary.

DEP Response: The Department has recently finalized a statewide NO_x control regulation for portland cement kilns which is viewable here:

<http://www.pacode.com/secure/data/025/chapter145/subchapCtoc.html>

The Department projects that Cemex's NO_x emissions from each of their three kilns will be reduced approximately 20% by 2013 as a result of the amended Portland cement kiln regulation.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

39. Comment: Keystone Cement Company – Bath Facility

It was stated in the Keystone BART Proposal (page 2-5) that the anticipated shutdown of Kiln 2 was to occur no later than 2009. This shutdown is a result of a newpreheater/precalciner kiln that Keystone is constructing. However, PADEP listed proposed emission limits for Keystone Kiln 2 in the listing of proposed emission limits for each BART facility. Please confirm whether or not Kiln 2 has been shutdown, and, if so, the emission limits for Keystone Kiln 2 should be zero.

The following discussion of SNCR for Keystone Kiln 2 may be moot if it is to be replaced by a new kiln before the five year BART deadline. A Selective Non-Catalytic Reduction (SNCR) system for NO_x emissions from Kiln 2 should be given more consideration as being cost-effective. A cost of \$1,014 per ton of NO_x removal might be considered to be reasonable. The \$23,431,248 per deciview improvement as shown in the PADEP Review Memo for BART Application is somewhat high, but in consideration of the discussion in the General Comment section above, a reasonable cost per ton might be cause to recommend that the technology be deployed as BART, regardless of the cost per deciview.

DEP Response: The Department has recently finalized a statewide NO_x control regulation for portland cement kilns which is viewable here:

<http://www.pacode.com/secure/data/025/chapter145/subchapCtoc.html>

The Department does not believe that requiring additional controls on a BART source based on a very small visibility improvement, albeit a low \$/ton control cost, is justified or appropriate.

The Department projects that Keystone's NO_x emissions from kilns #1 will be reduced approximately 40% by 2013 as a result of the amended Portland cement kiln regulation.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

Other Facilities

40. Comment: Trigen-Philadelphia Energy Corp./Edison Boiler #3 & #4 & Schuylkill Boiler #26

Trigen used a PADEP Reasonably Achievable Control Technology (RACT) benchmark limit of \$1,500 per ton of NO_x as a bright line determination for judging the acceptability of BART control technologies in section 2.2.2. This is contrary to a statement in section 8.5.2 of the draft Pennsylvania Regional Haze SIP which states, "The Department did not establish or utilize bright line thresholds for cost or for visibility improvement." The \$1,500 per ton cost would be within BART cost limits observed in national experience. The control effectiveness costs (\$/ton) for various NO_x control alternatives are well developed, but seem consistently higher than commensurate values shown in EPA AirControlNET. Please discuss any differences or better document the references used to arrive at the stated costs. Lower, more reasonable costs could cause the Flue Gas Recirculation alternative to be a viable BART control. Trigen did not further consider wet scrubber systems for SO₂ control as a BART alternative because it was not demonstrated in practice. Actually, wet scrubbing is successfully deployed on oil-fired boilers being operated in Japan, Cyprus and Korea. This should provide reason enough to perform cost analysis on this alternative.

DEP Response: The Department did not use the \$1,500 per ton of NO_x proposed by Trigen as a bright line determination. The Department concluded in the review memo that the impact benefit from all controls for these units at the worst Class 1 area would be less than a delta deciview of 0.01 for NO_x and less than or equal to 0.0123 for switching to ultra low sulfur diesel fuel for Boiler #26 and assuming 99% SO₂ reduction. A wet gas scrubber would not have impact benefits that exceeded these levels. The Department concludes that the best available achievements would be minimal.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

41. Comment: Carmeuse Lime, Inc./Annville Operation Lime Kiln #5

PADEP proposed that no additional equipment be installed on Lime Kiln #5 for NO_x control, even though both low NO_x burners (LNB) and Selective Non-catalytic Reduction (SNCR) are technically feasible and cost-effective NO_x control alternatives for a long dry kiln. The Lafarge Cement Plant in Alpena, MI has proposed to install both technologies on five long dry kilns. Very recently, the literature has begun to accept that SNCR is a technically feasible alternative for NO_x control in long dry kilns. The most effective NO_x control is SNCR at a cost of \$1,014 per ton of NO_x removed and \$6,398,357 per deciview improvement at Dolly Sods Wilderness Area. LNB was shown to cost \$1,318 per ton of NO_x removed and \$8,315,000 annually per deciview improvement. All of the above figures are within reasonable cost per ton and cost per deciview improvement ranges for BART. Therefore, these control technologies should be considered.

The Portland Cement Association² noted that a relatively inexpensive, but effective NO_x control technique, is a 'high pressure air injection system' (also called a mixing air system) that can be installed on the kiln. Mixing air systems have shown significant emissions reduction up to 48% on the 13 kilns operating with this technology. This should have been considered among the BART NO_x control alternatives.

The proposed NO_x emission limit of 6.0 lb NO_x/ton of lime should be reconsidered if a NO_x control technology is accepted as BART.

DEP Response: The Department has stated in the review memo that a maximum delta deciview improvement of 0.016 dv is all that would be achieved from the original 0.059 deciview impact at the worst case Class 1 area. The Department does not agree that such a minimal improvement would be cost-effective.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

42. Comment: United States Steel/Clairton Coke Works

Section 4 of the Review Memo stated that ACHD performed a BART analysis and the results are presented in that document. However, the record does not contain the detailed BART determination performed by ACHD on behalf of the Clairton Coke Works. Please provide this documentation in the record. Step 4 of the Review Memo states that annualized cost information was obtained from EPA's AP42 Manual. 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. The *Control Cost Manual* addresses most control technologies in sufficient detail for a BART analysis."³ You should assure that the cost estimates that were developed are accurate. Nevertheless, the cost per ton is very high, so minor changes in the costs will not likely change the final conclusions. In terms of cost per deciview improvement, please consider the effect on multiple Class I areas, rather than just Otter Creek, to determine the overall cost per deciview improvement.

DEP Response: In its June 23, 2009 "Review Memo for BART Application for the United States Steel Corporation Clairton Works Facility", the ACHD conducted an engineering analysis under the BART determination process of 40 CFR 51.308(e) for each source subject to BART at the Clairton Coke Works. The review memo was submitted to the Department as part of its BART submittal for Pennsylvania. The details of the BART analysis consist of what was presented in Section 4 of the review memo, under the Subheading "BART 5 Factor Analysis," and the following additional details are presented in this response to the comment:

For the USS Clairton Works facility, Step 1 of the analysis identified Ultra Low NOx Burners (ULNBs) as the available retrofit control technologies for the sources identified as Boiler #2 and R1 Boiler. Steps 2 and 3 stated that ULNBs provide a 65% improvement over conventional natural gas burners. The ACHD believes instead a value of 50% is a more appropriate emission reduction factor for use with the boilers under consideration. This is based on information found in AP-42, Chapter 1.4, "Natural Gas Combustion," Table 1.4-1, which provides emission factors for Large Wall-Fired Boilers greater than 100 MMBtu/hr, for Uncontrolled (Pre-NSPS) boilers = 280 LB/10⁶ scf, and Controlled -Low NOx burners = 140 280 LB/10⁶ scf, for a reduction factor of 50%. All of the boilers are larger than 100 MMBtu/hr and are pre-NSPS.

In Step 4, the ACHD used a value of \$12,800 per ton for the cost of ULNBs, the same value used for ULNBs in the analysis for another Allegheny County source (Allegheny Ludlum). In response to the comment, ACHD reviewed the Sixth Edition of the EPA OAQPS Control Cost Manual found at <http://www.epa.gov/ttnca1/products.html#cccinfo>. However, information is only available for NOx post-combustion controls, and information related to NOx

combustion controls, including low NOx burners, is identified as “planned.” Therefore, ACHD utilized the original \$12,800 per ton figure for the cost of ULNBs. The “Annualized Cost” is arrived at as follows:

For Boiler #2: The value of the 2002 NOx emission inventory used in NESCAUM modeling for the Boiler #2 is 290 tons per year. The NOx reduction from the installation of the ULNBs is now figured at 50% instead of the previous 65% reduction factor, resulting in emissions reductions of 145 tpy. 145 tpy, at \$12,800 per ton NOx removed, results in a \$1,856,000 annualized cost for Boiler #2.

For the R1 Boiler: The value of the 2002 NOx emission inventory used in NESCAUM modeling for the R1 Boiler is 8.8 tons per year. The NOx reduction from the installation of the ULNBs is now figured at 50% instead of the previous 65% reduction factor, resulting in emissions reductions of 4.4 tpy. 4.4 tpy, at \$12,800 per ton NOx removed, results in a \$56,320 annualized cost for the R1 Boiler.

Step 5, “Evaluate Visibility Impacts” is now revisited:

As before, using the CALPUFF NWS platform computer modeling the total visibility impact of this facility, including all BART eligible units, on the Otter Creek Class 1 area was found to be 0.0897dv. The costs of possible new controls in terms of dollars per deciview for this facility were calculated to be:

The impact of Boiler #2 on Otter Creek is 0.0605 deciviews.
 $\$1,856,000/0.0605dv = \$30,677,686/dv$ (instead of the previously calculated $\$39,775,000/dv$) for the ultra low NOx Burners for Boiler #2.

The impact of the R1 Boiler on Otter Creek is 0.0017 deciviews.
 $\$56,320/0.0017 = \$33,129,412/dv$ (instead of the previously calculated $\$43,144,000/dv$) for the ultra low NOx Burners for the R1 Boiler.

The majority of the visibility impairing emissions are associated with the emissions from Boiler #2. The greatest visibility impact individually was 0.0605 dv attributed to the NOx emissions from Boiler #2.

The other emission source, the Desulfurization Plant, has existing controls. Based on a review of current emissions reduction approaches in the RACT/BACT/LAER Clearinghouse (RBLC) there does not appear to be adequate alternatives available for the Desulfurization Plant, beyond the currently installed afterburner. Thus, no cost effectiveness calculations were performed for SOx from this unit.

5. Conclusion: The conclusion is unchanged, even with the revised analysis. Based on the five-factor analysis, the impact of this facility does not warrant additional control. The Department concurred with the ACHD recommendation that compliance with the existing operating permits for this facility is BART.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source

analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

43. Comment: ISG Plate, LLC – Coatesville

Section 4 of the Review Memo stated that PADEP performed a BART analysis and the results are presented in that document. However, the record does not contain the detailed BART determination performed by the Department on behalf of the ISG Plate – Coatesville Plant. Please provide that documentation in the record. PADEP should assure that the cost estimates that were developed are accurate as discussed above for the Clairton Coke Works. The cost per ton is very high, so relatively minor changes in the costs will not likely change the final conclusions.

Wet FGD for SO₂ control was analyzed in Step 3 of the Review Memo, but in Step 5 ‘dry’ FGD is mentioned in the visibility analysis. This very possibly could be a typographical error. Wet FGD is capable of 98% removal, rather than the 90% assumed in the analysis, but again, even this change would not likely change the final conclusions.

In terms of cost per deciview improvement, please consider the effect on multiple Class I areas (i.e., Shenandoah National Park, Dolly Sods Wilderness Area and Otter Creek Wilderness Area), rather than just the Brigantine Wilderness Area, to determine the overall cost per deciview improvement.

DEP Response: The Department reviewed the NESCAUM CALPUFF data. As stated in the review memo the maximum impact at the Brigantine Wilderness Area was modeled to be 0.055 deciview. This is the worst Class 1 area case. Of this, 0.022 deciview was attributable to NO_x from the electric arc furnace. The Department concurs that there are no feasible controls for NO_x for EAFs. The Department does not concur that control of some portion of the remaining 0.033 deciview would be cost-effective.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

44. Comment: Sunoco Chemicals – Frankford Plant

The cost analysis for NO_x and SO₂ control alternatives lacked detail in constructing the basis for Total Capital Investment. This information should be provided to allow a third party to check for reasonableness of the estimates. However, relatively minor adjustments to the NO_x alternatives would not likely result in a change to the final conclusion that the alternatives are too expensive. In the case of wet FGD for SO₂ control, \$2,836 is not an unreasonable cost per ton of SO₂ removal, especially if a 98% control efficiency were used rather than the 90% figure assumed by the analysis. Again, if PADEP is willing to allow a reasonable cost per ton to supersede an excessively high cost of visibility improvement, then the wet FGD alternative could be considered.

DEP Response: The Department concluded in the review memo that the impact benefit from a wet FGD at the worst Class 1 area would be a deciview improvement of 0.0301 for the boiler. The Department concludes that this best available achievement would be minimal. Since the baseline impact for the boiler is only 0.1379 deciview, an analysis using a control efficiency of 98% would not result in a significant impact benefit.

The BART determination is consistent with the BART Guidelines. The Department considered all of the BART Guideline factors, and determined that a BART source analysis *resulting in significant visibility improvement* from controls would consequently justify higher cost controls. The maximum modeled deciview impact due to this BART source on the most impacted Class I area is considerably less than 0.5 dv, the threshold suggested in the BART Guidelines to determine if a source contributes to visibility impairment.

No comments were made on:
Dyno Nobel, Inc. Nitric Acid Plant
First Energy Generation Corp – Bruce Mansfield Plant
PPL Generation LLC – Montour
Exelon Power - Eddystone Generating Station

ATTACHMENT 2 Footnotes

¹ See 40 CFR Part 51, Appendix Y. See Section IV.D.Step 3.4.

² “Summary of Control Techniques for Nitrogen Oxide” by Zephyr Environmental Corporation for the Portland Cement Association, 2008, p. 2.

³ See 40 CFR Part 51, Appendix Y. The U.S. Environmental Protection Agency finalized its BART Guidelines on June 15, 2005, and published the preamble and final rule text in the Federal Register on July 6, 2005. The rulemaking action added Appendix Y to Part 51, titled “Guidelines for BART Determinations Under the Regional Haze Rule.” See Section IV.D.Step 4.a.5.

In accordance with the Regional Haze Rule (40 CFR 51.308(i)(3)), the Pennsylvania Department of Environmental Protection (DEP) is making available the comments received by the Federal Land Managers on the draft proposed Regional Haze (RH) State Implementation Plan (SIP) revision, and the DEP's responses to those comments. The following is a reproduction of a comment letter received by the Department from the United States Department of Agriculture (USDA) Forest Service, with DEP's responses inserted:

**USDA Forest Service Comments Regarding
Pennsylvania Draft Regional Haze Rule State Implementation Plan
7/30/2010**

On June 2, 2010, the Commonwealth of Pennsylvania submitted a draft Regional Haze Rule State implementation plan (SIP), pursuant to the requirements codified in federal rule at 40 CFR 51.308(i)(2), to the USDA Forest Service (FS). The air program staff of the FS conducted a substantive review of the Pennsylvania draft plan, and have provided the comments listed below. We look forward to the Pennsylvania Department of Environmental Protection (PADEP) response as per section 40 CFR 51.308(i)(3). For further information regarding these comments, please contact Ralph Perron at (802) 222-1444.

1. **Comment:** This draft Pennsylvania RH SIP has progressed nicely from its earlier version, however it still heavily relies on MANE-VU work without clear specifics on Pennsylvania efforts.

DEP Response: The Department appreciates the reviewer's acknowledgment of the Department's progress in developing the proposed Regional Haze (RH) State Implementation Plan (SIP). MANE-VU was formed by the Mid-Atlantic and Northeastern states, tribes, and federal agencies to coordinate regional haze planning efforts and activities for the region as a group. MANE-VU was formed to encourage a coordinated approach to meeting the requirements of EPA's Regional Haze Rule (RHR) and reducing visibility impairment in major national parks and wilderness areas in the Northeast and Mid-Atlantic. With regard to MANE-VU work and Pennsylvania efforts, the Department clearly and specifically indicates Pennsylvania's efforts throughout the proposed RH SIP as they relate to the stated goals and emission management strategies and measures pursued by the MANE-VU regional planning organization to reduce the visibility impairment in the Class I areas of the Northeast and Mid-Atlantic. For example, page 95 of the proposed RH SIP revision contains the following paragraph: "MANE-VU identified emissions from 167 stacks at EGU facilities as having visibility impacts in MANE-VU Class I areas that make controlling emissions from those stacks crucial to improving visibility at MANE-VU Class I areas. MANE-VU's agreed regional approach for this source sector is to pursue a 90 percent control level on SO₂ emissions from these 167 stacks by

2018 as appropriate and necessary. MANE-VU has concluded that pursuing this level of sulfur reduction is both reasonable and cost-effective. Table 10.4.4-1 below lists the EGU stacks in Pennsylvania identified on the list of 167 stacks in all of MANE-VU, (including for reference purposes and where applicable, the BART facility identification number associated with the stack modeled in the MANE-VU Class I area deciview impact spreadsheets contained in Appendix I) with their current and anticipated controls, the permit status of the SO₂ controls, and the anticipated SO₂ emissions reductions achieved by 2018.” As is discussed further on page 97 of the proposed RH SIP revision, the Department has concluded that at this time and based on the controls proposed, constructed and under construction in Pennsylvania, the Department’s CAIR regulation constitutes a reasonable measure for EGUs in Pennsylvania. Consistent with the MANE-VU ‘Ask’ Statement, the Department projects a 94.5% reduction in SO₂ emissions from the EGUs listed in Table 10.4.4-1 (or from alternative measures, as appropriate and necessary) by 2018. Also, page 120 of the proposed RH SIP revision contains the statement that the Department has developed a proposed low-sulfur heating and distillate oil regulation, in response to the MANE-VU ‘Ask’ low-sulfur fuel oil strategy. The Environmental Quality Board (EQB) adopted the Department’s proposed low-sulfur fuel oil regulation at its July 13, 2010, meeting. The public comment period began on September 25th and ends on November 29th, 2010. Additionally, the Department has revised the proposed RH SIP to address the status of the regulation development that pertains to the source categories considered in the Mactec Report (Appendix O). (Please see page 83 of the proposed RH SIP).

2. **Comment:** Overarching comment is that it remains very difficult to separate out how many facilities are in each category (EGU(CAIR), non-EGU BART, 167 stack) and exactly which controls are being installed vs which are modeled, with associated reductions in NO_x, SO₂ and PM. For example, page 80: “Because of the SO₂ controls installed in 2009 and 2010 ..., no additional measures will be needed to meet the reasonable progress goals.” Are these 167 stack controls operational now? Appendix I lists large deciview impacts from “RELIANT ENERGY NORTHEAS” on Dolly Sods and Otter Creek Wilderness, and while this facility is covered under the CAIR=BART umbrella, it is not clear what controls are anticipated for this facility (or other top contributors) or when they will be installed.

DEP Response: The Department modified Tables 10.4.4-1 (relating to EGU stacks in Pennsylvania and controls identified from the MANE-VU 167 stack list) and 10.4.4-2 (relating to additional EGU stacks and controls in Pennsylvania) in the proposed RH SIP in response to the comment. The modifications indicate the permit status of the SO₂ controls at the Pennsylvania EGU stacks listed in the two tables, and provide BART facility identification numbers associated with the stacks modeled in the MANE-VU Class I area deciview impact spreadsheets contained in Appendix I (relating to MANE-VU

CALPUFF modeling results for Pennsylvania BART sources), where applicable, for easy cross-reference. Table 10.4.4-1 now lists the EGU stacks in Pennsylvania that were identified on the list of 167 stacks in all of MANE-VU, with their current and anticipated controls, the permit status of the SO₂ controls, and the anticipated SO₂ emissions reductions to be achieved by 2018. Table 10.4.4-2 provides similar information for several EGU stacks in Pennsylvania not identified on the MANE-VU 167 stack list that the Department expects to be controlled as a result of the Department's CAIR regulation.

3. **Comment:** Reasonable Progress consists of "pursuing, as appropriate and necessary, the four goals of the MANE-VU 'Ask' Statement". These are not insignificant, but are commitments to pursue, not enforceable reductions, yet. Also a four factor analysis was conducted (Appendix O "the Mactec Report"), but no controls adopted beyond pursuit of "ask" even though it appears that several sources categories have reasonable cost controls available.

DEP Response: The Department is pursuing proposed regulations to address other source categories as described in Appendix O. The Department has revised the proposed RH SIP in response to the comment to address the status of the regulation development that pertains to the source categories considered in the Mactec Report (Appendix O). (See page 83 of the proposed RH SIP). It is not the Department's practice to commit to adopting measures that must go through a public comment process. Furthermore, the EQB has the statutory authority to adopt regulations, not the Department. In addition, regulations undergo the review of several advisory committees before EQB action, and undergo consideration by the Independent Regulatory Review Commission as well as the standing committees of the General Assembly after EQB consideration. Plan approvals for controls as a permitted source are also subject to a public comment period. A commitment to adopt could nullify the value of a public comment and board review process.

4. **Comment:** Tables 7.2-1 and 7.3.1-1 show projected ~700,000 tpy of SO₂ reductions under CAIR, yet there is no accounting for where these reductions will occur or if they are still projected to occur. Pennsylvania needs to ensure it has a mechanism to make the facilities operate at the required higher efficiencies, even if the market is not providing sufficient incentives.

DEP Response: Table 7.2-1 (relating to Pennsylvania's 2002 emissions in tons per year) summarizes the Pennsylvania emissions, including emissions from stationary point sources, for 2002. Table 7.3.1-1 (relating to Pennsylvania's 2018 projected emissions) summarizes the projected emissions, including emissions from stationary point sources, in 2018 for Pennsylvania sources. Comparing the SO₂ totals for stationary point sources for 2002 and 2018 shows an approximate reduction in SO₂ from all stationary point sources of 700,000 tons per year. These reductions are projections from all stationary point source

sectors, and not solely from the CAIR-affected electric generating units (EGUs) in Pennsylvania. The Department has concluded that at this time and based on the controls proposed, constructed and under construction in Pennsylvania, the Department's CAIR regulation constitutes a reasonable measure for EGUs in Pennsylvania. Consistent with the MANE-VU 'Ask' Statement, the Department projects a 94.5% reduction in SO₂ emissions from the EGUs identified from the MANE-VU 167 stack list, or from alternative measures, as appropriate and necessary, by 2018. The Department is relying on implementation of EPA's CAIR replacement rule, the proposed Transport Rule, for achieving the longer-term (2015-2018) SO₂ reductions from the EGUs. The Department intends to re-evaluate the projections of SO₂ reductions due to CAIR at the time of Pennsylvania's first periodic report to determine whether the predicted reductions are realized.

5. **Comment:** It would be helpful to include a summary of the non-EGU BART determinations as was in the previous draft.

DEP Response: The lengthy summaries of BART determinations by source categories contained in previous RH SIP drafts did not convey the technical and detailed analyses the Department performed to make the BART determinations for each individual BART unit. The BART analysis review memos convey all the information the Department relied on to make its determinations of BART, and the review memos are included in Appendix J (relating to Pennsylvania's BART analysis review memos).

6. **Comment:** There is still no demonstration that Pennsylvania is doing its share of emissions reductions at non MANE-VU class I areas.

DEP Response: The measures described in the proposed SIP revision demonstrate that the Department is pursuing the adoption and implementation of emission management strategies to obtain its share of emissions reductions at the MANE-VU Class I areas and the non-MANE-VU Class I areas. Shenandoah National Park in Virginia and the Dolly Sods/Otter Creek Wilderness Area in West Virginia are Class I areas in the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) region that are impacted by emission sources operating in Pennsylvania and other MANE-VU states. The Department consulted with the planning staff in West Virginia and Virginia when they were establishing their reasonable progress goals for the Class I areas in their states. Neither of these two States intends to request that Pennsylvania make additional reductions at emission sources located in Pennsylvania (see page 19 of the proposed SIP revision).

The most recent modeling completed by VISTAS for the Class I areas in VISTAS showed the uniform rate of progress in 2018 would be met at both

Shenandoah and Dolly Sods. VISTAS modeling results indicate that the projected level of emissions controls for Pennsylvania's sources by 2018 will allow the Shenandoah National Park and Dolly Sods Class I area to meet the reasonable progress goals established by Virginia and West Virginia, respectively, by 2018. The emissions control strategy for the MANE-VU Class I areas' reasonable progress analysis is, therefore, a reasonable emissions control strategy for the reasonable progress analysis for the Shenandoah National Park and Dolly Sods Class I areas. (Please see pages 64-66 of the proposed SIP revision for the complete discussion.)

7. **Comment:** Pennsylvania contains many stationary area sources related to oil and gas development and long term operation. This should be addressed, at a minimum, on pages 33-34 (Section 7.3.2, Stationary Area Sources) along with dry cleaners and service stations.

DEP Response: The development and operation of oil and gas reserves in Pennsylvania requires stationary area sources (mostly stationary internal combustion engines) and non-road engines located at oil and gas sites. Stationary internal combustion engines and non-road engines were part of the MANE-VU SIP Modeling Inventory, prepared in 2002, as described on pages 29-34 of the proposed RH SIP revision. In the Version 3 MANE-VU SIP Modeling Inventory, the non-road inventory was completely redone because of changes that the EPA made to the NONROAD2005 model.

The Department is presently examining and evaluating practices at oil and gas sites due to the increase in oil and gas development in Pennsylvania, to ensure that oil and gas development and operation proceed in an environmentally sound manner. When the MANE-VU SIP modeling inventory was being prepared, much of the oil and gas drilling activities in Pennsylvania had not begun. The emissions from the recent increase in oil and gas drilling, therefore, were not occurring and not part of the 2002 baseline inventory. Currently, the Department does not have adequate information to compile an accurate inventory for oil and gas exploration and production operations in future years. In accordance with Section 135.4 (relating to report format) contained in 25 Pa. Code Chapter 135 (relating to reporting of sources), the Department intends to advise owners and operators of oil and gas exploration and production operations in Pennsylvania by December 2010 that they must submit a source report for air contamination sources by March 1 of each year, and that the reports must contain sufficient information to enable the Department to complete its emissions inventory. The Department intends to examine the emissions projections at oil and gas sites at the time of Pennsylvania's first periodic regional haze progress report to determine whether they are properly characterized in all future-year modeling inventories.

The Department requires permits for the operation of the types of diesel and nonroad engines typically located at oil and gas sites. As explained on page 112

of the proposed RH SIP revision in Section 10.5.2 (Measures to Mitigate the Impacts of Construction Activities), Section 2 of both the General Plan Approval and/or General Operating Permit (BAQ-GPA/GP 9) and the General Plan Approval and/or General Operating Permit (BAQ-GPA/GP 11), states that nonroad and diesel engines must have the best available technology (BAT) installed and in operation so that the engine is in compliance with regulated emissions standards; these general permits are federally enforceable. Both general permits require the permittee to maintain accurate records of the amount of time the engine is in operation per month and the amount of fuel used. In addition, the proposed RH SIP revision has been modified to include this paragraph on page 112: “The Department also requires a General Plan Approval and/or General Operating Permit (BAQ-GPA/GP – 5) for natural gas, coal bed methane or gob gas production or recovery facilities. This General Permit authorizes construction and/or operation of a natural gas, coal bed methane or gob gas production or recovery facility. This permit authorizes the construction of internal combustion engine(s); dehydrator(s) and associated equipment that meet the best available technology (BAT) required under 25 Pa. Code §§ 127.1 and 127.12(a)(5). Once authorization to use GP – 5 is granted, construction of the natural gas, coal bed methane or gob gas production or recovery facility designated in the application may proceed.”

8. **Comment:** There are many references to Dolly Sods Wilderness Area, while there are few references to Otter Creek Wilderness Area, both of which are Class I areas in West Virginia. One example of this is on page 19, first paragraph, which seems to incorrectly imply that Dolly Sods and Otter Creek are the same Wilderness area. In paragraph 2, on the page 19, reference to Otter Creek Wilderness Area should be included, but it is missing. Another example of this is on page 60 (last paragraph), where Dolly Sods is mentioned, but Otter Creek is omitted. This is in contrast to sentences in same paragraph that state Great Gulf IMPROVE monitor is representative of Presidential Range/Dry River Wilderness and also that Moosehorn IMPROVE monitor is representative of Roosevelt Campobello International Park. A suggestion would be to say that Dolly Sods IMPROVE monitor is representative of Otter Creek. And on page 61, Table 10.2-1, add Otter Creek to Dolly Sods column.

DEP Response: The Department has corrected the references, or lack thereof, to Otter Creek Wilderness Area in response to this comment. Specifically, the Department has revised pages 19 and 76 to include the reference that the Dolly Sods IMPROVE monitor is representative of the Otter Creek Wilderness Area. The Department has also revised Table 10.2-1 (relating to percent of modeled sulfate due to emissions from listed states) on page 77 of the proposed RH SIP to include Otter Creek in the Dolly Sods column.