

**Summary of External Review Comments on the March 8 Revised Draft Final
Reasonable Progress Statutory Factors Technical Memorandum**

Prepared March 30, 2007

The Revised Draft Final of Technical Memorandum #3 under the MANE-VU Reasonable Progress project was completed by MACTEC on March 8th. It is entitled, “*Assessing Reasonable Progress for Regional Haze in the Mid-Atlantic North Easter Class I Areas.*” MARAMA sent out an Opportunity to Comment Notice to other RPOs, states, outside of MANE-VU, and stakeholders on March 19th and requested comments by March 30th.

Three non-MANE-VU states, one RPO, the Ozone Transport Commission (OTC) and two stakeholders have commented on the document and their comments are summarized here. MANE-VU acknowledges and appreciates the comments received from the following: American Electric Power (AEP) via John Lang, Alpine Geophysics as the Technical Advisor to Emission Inventories for VISTAS via Gregory Stella, VISTAS via Pat Brewer, the State of Tennessee via Julie Aslinger, the Commonwealth of Virginia via Thomas Ballou, Duke Energy Indiana via Dan Weiss, OTC via Doug Austin, and the State of West Virginia via Laura Crowder.

The following comments will be addressed insofar as possible in preparing the draft final report. Some comments (including those about whether specific sources are BART sources) do not have relevance to this report. Cost estimates from IPM are being reviewed. IPM is an accepted method for sector wide costs and is not intended to be used to assess costs from specific facilities.

General Comments

The State of West Virginia expressed their agreement with the Commonwealth of Virginia on numerous comments.

Chapter 1. Introduction

Virginia stated that on Page 1-2, the final paragraph describes how the top sources that impact Class I areas were selected, however, actual impacts on each Class I area are not provided and this information would be informative. Virginia requested that this information be added to the document in a table. West Virginia agrees with this comment.

Virginia also requested that more information regarding the modeling that was used to select the sources be provided. West Virginia agrees with this comment.

VISTAS stated that a complication that could result from the selection of key sources is that sources were ranked by maximum daily impact on any day of the year. The result of this analysis is that a single day can qualify a distant source as being a “major contributor” when closer sources with several individual units modeled separately are not

considered. Conclusions might differ if 20% worst days and total facility emissions had been considered.

VISTAS stated that they used a different approach to identify key sources for Class I areas. A predominant Area of Influence was defined for each Class I area based on trajectories for 20% worst days in 2000-2004, and then sources within that area of influence were weighted by emissions, distance from the Class I area, and residence time. The differences between MANE-VU and VISTAS analytical methods may or may not lead to different conclusions about reasonable controls as the consultation discussions proceed.

Chapter 2. Source Category Analysis: EGUs

On Page 2-1 of paragraph 3, the report discussed the percentages of coal fired utilities having SCR and scrubbing add on controls in 2004. Virginia stated that retrofits have taken place since 2004 and requested the use of more recent data, from CAMD inventories for instance. West Virginia agreed with this comment.

On Page 2-3 under “Fuel Switching,” Virginia noted that switching to different fuel types may require a unit to be examined for major NSR permitting requirements since changes could possibly trigger the definition of “significant modification.” Virginia requested that a note about this effect be added to the “Fuel Switching” section. West Virginia agreed with this comment.

On Page 2-4, Virginia requested that the information about switching to natural gas being impractical, be presented at the start of the paragraph.

Page 2-7, Table 2.2, Virginia noted the marginal costs of emission reductions from IPM based on CAIR plus runs. Virginia stated that it would be informative to include what levels of NO_x caps, NO_x rates, SO₂ caps, and SO₂ rates were represented in the CAIR plus run. West Virginia agrees with this comment.

Virginia stated that much of the cost information under “cost of compliance” uses IPM data and conversations with several industry representatives indicate that installation costs are higher than those represented in the IPM data. Virginia stated that using CUECOST, assuming sulfur contents in coals that are representative of Title IV influences, and adjusting labor rates as well as other inputs may provide a more realistic cost of controls. West Virginia agreed with this comment.

Virginia stated that on Page 2-8, under the “cost of compliance” section the first paragraph notes that for boilers that typically use bituminous coal, switching to PRB coal without boiler retrofits would cause poor boiler performance. Such retrofits should be reviewed in light of current PSD permitting regulations. West Virginia agreed with this comment.

Virginia stated that on Page 2-11, under the “Energy and non-Air Impacts” section that information about the potential increase in mercury emissions when switching from bituminous coal (with more sulfur content) to a subbituminous coal (with a lower sulfur and chlorine content) should be provided in the document. There is data in Table 1 that indicate that a significant increase in mercury emissions can be expected when a utility boiler controlled by a cold sided ESP and burning bituminous coal switches to subbituminous coal. In areas where there are mercury related fish consumption advisors, this information may be important. West Virginia agreed with this comment.

VISTAS stated that one key environmental effect of FGD that should be added to the discussion of Energy and Non-Air Impacts on Page 2-12, are the carbon tradeoffs. When limestone reacts with SO₂, CaSO₄ is formed and CO₂ is released as a byproduct.

Chapter 3. Point Source Analysis: EGUs

VISTAS recommends that the methods used to identify the most important sources for each Class I area be briefly summarized at the beginning of Chapters 3 and 5 because the methods used influence the sources that were considered. VISTAS recommends that the summarization specify that the CALPUFF model was the basis of the impact analysis and the model was run for all days in 2002, using 2002 emissions from EPA NEI. VISTAS also recommends that the summarization clarify that runs considered both maximum 24 hour emissions and annual average 24 hour emissions from each source.

AEP stated that the 2002 SO₂ emissions listed in Table 3.1, for Conesville Unit 4, John E. Amos Unit 3, and Cardinal Plant Unit 1 are in excess of the biased emission totals they filed for these units in the 2002 CEMS emissions with EPA. AEP stated that the emissions for the Muskingum River Unit 3, John E. Amos Plant Unit 2, and Mitchell Plant Unit 2 may also be higher than those filed, however, they are unable to check the emissions for these units as they are in a common stack group at the facility and apportionment can vary the numbers somewhat. AEP suspects that the bias adjustment factors may have been applied to the emission values that already contained the bias adjustment factors resulting in the erroneously increased values shown in Table 3.1.

AEP stated that in Table 3.1, under “additional controls” Cardinal Plant Unit 1 is listed as having a scrubber by 2012. However, in 2005 AEP reported that Cardinal Plant Units 1 and 2 would be receiving FGD systems that would be on line by 2009. These systems were included in the 2005 RPO IPM runs as firm FGD equipped capacity. These systems are currently under construction and scheduled to be started up in December 2007 (Unit 2) and February 2008 (Unit 1).

AEP stated that in Table 3.1, under “additional controls” the John E. Amos Plant is listed as having a scrubber. However, in 2005 AEP reported that all three units at the Amos Plant would received FGD systems that would be online by 2009. These systems were included in the 2005 RPO IPM runs as firm FGD equipped capacity. These systems are currently at various stages of construction and will be operational by 2009.

AEP stated that in Table 3.1, under “additional controls” Conesville Unit 4 is listed as “SCR and Scrubber by 2009” however, the SCR and scrubber are under construction and were included in the 2005 reports to the RPO IPM process.

AEP stated that in Table 3.1, Mitchell Plant Unit 2 has an FGD system that was placed in service on January 26, 2007. The FGD on Unit 1 will be placed in service over the next couple of months. The SCR systems on both units will be operated beginning this Ozone Control Period (May 1).

AEP stated that they are not sure why the Muskingum River Plant Unit 3 was included on the analysis. They stated that the Muskingum River Plant Units 1-4 use a common stack with a common fuel handling system. The location of the units makes the control of a single unit technically challenging without foreclosing the ability to retrofit controls to some or all of the remaining units. Also AEP is not sure why only one of the units of the four on this stack could be identified as impacting visibility without there being a significant error in stack parameters for that single unit. In the past AEP has been made aware of emission inventory problems for individual units at this plant where the same stack parameters were not used for each unit, when they should be identical (i.e. exit velocity, flow rate, temperature, exit diameter) since all units emit from a common stack with a single common flue.

Alpine Geophysics, questions the process that was used to determine which EGUs are the top 30 that impact MANE-VU’s Class I areas.

Alpine Geophysics stated that individual sources within the CALPUFF framework were identified as emission release points (stacks) so that individual stacks with multiple units feeding to its effluent would have a higher impact as a source than the same number of sources feeding individual stacks, although they may be co-located at a single location. For example, in Table 3.1 the Johnsonville, Tennessee facility has ten units all exhausting to a single stack. As noted in Table 3.3, these ten units emit a total of approximately 102,000 tons per year of SO₂ in 2002. Further down the list, however, the Hatfield’s Ferry facility in Pennsylvania has an emission level of 55,600 tons per year of SO₂ in 2002. These emissions are for unit 1 only which emits to a single stack. However, there are three stacks located at this facility, each with sources emitting over 50,000 tons of SO₂ in 2002 for a total of 158,700 tons per year of SO₂ in 2002 for the facility as a whole (based on recent MANE-VU emission inventories). Alpine Geophysics is not sure why the Hatfield’s Ferry facility would not show up either more than once (each stack represented by itself as in the Fort Martin, West Virginia situation) or that the aggregate contribution of the facility would not be counted with 158,000+ tons of SO₂.

VISTAS recommended the list of top facilities that impact MANE-VU Class I areas should be revisited to be sure that the total facility is considered and not just an individual unit.

Alpine Geophysics state that if the Top 30 list of EGUs is intended to represent the Top 30 emission reduction opportunities (based on MANE-VU CAIR plus modeling), then

the title of the tables and the text of the document should be modified to reflect this fact. As currently written, the documents appears to state that the Top 30 list includes EGUs with highest contribution to visibility impairment within the MANE-VU domain, but does not appear to include other sources which have higher contributions (total facility-basis) than some of those on the list. Alpine Geophysics has created a list of the top facilities based on most recent RPO based 2002 inventories, see attached MS Excel spreadsheet entitled, "top50_egu_by_facility_total_so2_alpine_033007". This list contains facilities and their total SO₂ emissions (from all units/stacks at the facility) ranked in descending order of emissions for EGUs in the eastern U.S. with total emissions exceeding 50,000 tons per year SO₂ in 2002.

Alpine Geophysics also stated that the spreadsheet (but not the text of the memorandum) appears to indicate that this list is the union of a set of sources taken from multiple "Top 15" lists relative to the Class I areas MOOS, ACAD, GRGU, LYBR, BRIG, and SHEN. Alpine Geophysics recommended that this should also be clearly noted in the memorandum.

Tennessee stated that on Page 3-8, in Table 3.3, the document should indicate that at the Johnsonville Fossil Plant the combustion of low-sulfur fuel has been implemented since 2002. Tennessee stated that this should be included under the column heading "Proposed/Planned Controls." Additionally, the VISTAS Base G modeling indicates 2018 SO₂ emissions will be approximately 51,000 TPY. Tennessee stated that this should be added under the column heading "Additional Information."

West Virginia stated that on Pages 3-9 through 3-11, Table 3.3, lists the following West Virginia EGUs: Ft. Martin Units 1 and 2, John E. Amos Units 2 and 3, and Mitchell Unit 2. West Virginia stated that it is unclear why Amos Unit 2 and Mitchell Unit 1 were not included because these units are basically identical to Amos Unit 1 and Mitchell Unit 2, respectively, with similar emissions and vent through common stacks at the facility level. See the attached table, entitled, "WV corrections to Table 3.3" for the correct information for all the units at Amos, Mitchell and Ft. Martin.

Page 3-12, in Table 3.12, Virginia stated that the Chesterfield Power Station in Virginia, will be retrofitted with a polishing baghouse.

Duke Energy stated that Wabash River 5 is not a BART-eligible source. Duke Energy also does not think that Wabash River 5 should have been listed as an EGU having a significant impact upon visibility in MANE-VU Class I areas, they stated that the document failed to demonstrate that Wabash River 5 individually affects visibility in any Class I area in the MANE-VU states.

Duke Energy stated that the document misapplied the Regional Haze Rule by concluding that Wabash River 5 is subject to BART without applying the five-factor control technology analysis to Wabash River 5 specifically.

Duke Energy stated that the document incorrectly based its control technology analysis on “CAIR Plus,” which is not a promulgated rule and which assumes a need for control measures more stringent than CAIR without a scientific or legal foundation.

Duke Energy stated that MANE-VU incorrectly applied the four-factor test for reasonable progress toward visibility goals to the analysis of BART for EGUs.

Duke Energy stated that the document asserted positions inconsistent with Indiana’s proposed BART State Implementation Plan, which exempts Wabash River 5 from BART because it is subject to the more stringent control requirements of CAIR.

Duke Energy stated that the document understated the presumed costs of the control technologies recommended for EGUs, including Wabash River.

Duke Energy stated that the document is based on accelerated compliance dates inconsistent with Indiana Department of Environmental Management’s and EPA’s five-year compliance period.

Chapter 4. Source Category Analysis: Industrial, Commercial, and Industrial Boilers

Page 4-3, in the third paragraph, Virginia requested that it should be stated that physical or operation changes to a furnace or boiler may require that the unit be examined for applicability under the PSD permitting program. West Virginia agreed with this comment.

On Page 4-3, OTC recommended including more information about the energy and non-air impacts of wastewater from FGD.

VISTAS stated that for both EGU and ICI boilers, the costs in \$/ton that MACTEC reported are lower than the costs prepared for VISTAS for these sectors, based on AirControlNET. VISTAS is confident that the EGU costs being used by VISTAS reflect actual costs, however, they have less certainty on the costs for ICI boilers.

Chapter 5. Point Source Analysis: Industrial, Commercial, and Industrial Boilers

VISTAS recommends that the methods used to identify the most important sources for each Class I area be briefly summarized at the beginning of Chapters 3 and 5 because the methods used influence the sources that were considered. VISTAS recommends that the summarization specify that the CALPUFF model was the basis of the impact analysis and the model was run for all days in 2002, using 2002 emissions from EPA NEI. VISTAS also recommends that the summarization clarify that runs considered both maximum 24 hour emissions and annual average 24 hour emissions from each source.

Tennessee stated that on Page 5-5, in Table 5.1, the document should indicate that for the Eastman Chemical Company, units #11-17 have been removed from Powerhouse B-83-1,

and a permit modification is currently in process. Tennessee stated that this should be reflected under the column heading “Additional Information.”

Tennessee stated that the VISTAS information (from AirControlNET) provided for the Johnsonville Fossil Plant indicated that the marginal cost of SO₂ emissions reductions is in the range of \$4,300 - \$6,600 per ton, which is significantly higher than the values reported in Table 3.2.

On Page 5-6, Table 5.1, under PPG Industries Inc., West Virginia requested that the following information be added:

- Unit 1 - 496 MMBtu/hr installed in 1952, equipped with an ESP and LNB/OFA, not BART eligible
- Unit 2 - 243 MMBtu/hr installed in 1943, equipped with Baghouse and LNB/OFA, not BART eligible
- Unit 3 - 878 MMBtu/hr installed in 1966, equipped with ESP and LNB/OFA, BART subject

On Page 5-7, in Table 5.1, Virginia stated that under “additional information” it should be stated that the MeadWestvaco Packaging Resource Group’s boiler #9 is a BART eligible unit.

On Page 5-9, in Table 5.1, Virginia stated that under “Existing Controls” it should be stated that the Stone Container Corp uses a multi cyclone followed by an ESP.

On Page 5-12, Table 5.2, under PPG Industries Inc., West Virginia stated that the cost effectiveness (\$/ton) identified are significantly lower than the cost effectiveness values calculated by the VISTAS contractor, which calculated a cost effectiveness for FGD of \$6,187/ton for Unit 1, \$10,580/ton for Unit 2, and \$3,354/ton for Unit 3.

On Page 5-14, Table 5.2, Virginia stated that it is unclear why control options were listed because these options do not make sense in light of the federal consent order requiring the installation of a scrubber for 85% removal of SO₂.

Chapter 8. Heating Oil

Virginia stated that climate and seasonality play important roles in the use of home heating oil and therefore the emissions resulting from this area source category. However, there is no mention of the fact that southern states, such as Virginia, may not necessarily have this category as a significant emissions source, especially compared to northern states such as New York. West Virginia agreed with this comment.

West Virginia stated that while home heating may account for 54% of distillate fuel oil demand in the Northeast, it accounts for only 3-4% of demand in West Virginia (based on EIA data for 2002-2003).

Virginia stated that this chapter would be clearer if the overall haze impact of this source category for each Class I area, for each state, were provided in a table. West Virginia agreed with this comment.

Chapter 9. Residential Wood Combustion

VISTAS requested that an introductory explanation about why the sections on Residential Wood Combustion and Open Burning were included should be added to the document. This explanation should also describe how frequently smoke from residential combustion or open burning impacts the Class I areas.

Virginia said that in places it is noted that SO₂ emissions are the major contributor to haze. Therefore, it is unclear why sources such as residential wood combustion, outdoor wood fired boilers, and open burning are included in this document. Virginia would like to know what the visibility impacts of these categories are. West Virginia agreed with this comment.

As with home heating oil, climate and seasonality play important roles in actual emissions from wood stoves and home boilers. Virginia requested that these factors and their impacts be mentioned in this section. West Virginia and VISTAS agreed with this comment.

On Page 9-11, in Table 9.4, Virginia stated that the costs provided are in terms of particulate matter. Virginia requested that these costs be converted to PM_{2.5}. Virginia also stated that it is unclear why VOC costs were provided. West Virginia agreed with this comment.

On Page 9-13, Virginia stated that the fact that families who would bear the burden of a required wood stove change out program would be those least able to bear the burden of the additional costs should be considered. West Virginia agreed with this comment.

Chapter 10. Open Burning

Virginia stated that in general the concept of mandating a prescribed fire policy, smoke management plan, or burning program to the federal land managers for use in Class I or other park areas seemed unnecessary. Since land managers are the agents most concerned about the Class I areas and have authority over the actions of the agencies responsible for these areas, if a unified program is needed, then they can surely implement such a program without state environmental agencies. West Virginia agreed with this comment.

Page 10-10, under Attachment 1, in the Virginia section, Virginia requested that a change be made so that the open burning program entry read; 9 VAC 5 Chapter 40 Article 40,

“Emissions Standards for Open Burning.” Virginia requested that the following link be added: <http://www.deq.virginia.gov/air/pdf/airregs/440.pdf>. Also under types of open burning permitted, Virginia requested that the following sentences replace the current text: “Limitations on construction debris, trash, lawn debris, depending on season and locality. Other limitations as noted in the regulation.”

On Page 10-10, Attachment 1, under the West Virginia section, West Virginia requested that the open burning program section be changed so that it reads 45CSR6 – “To Prevent and Control Air Pollution from Combustion of Refuse.” It is also requested that the following link be added: http://www.dep.state.wv.us/Docs/705_45-06.pdf.