

Commonwealth of Pennsylvania
Comment and Response Document for the
Pittsburgh-Beaver Valley Fine Particulate Attainment Demonstration
October 2009

On September 5, 2009, the Pennsylvania Department of Environmental Protection (DEP or Department) published a notice of public hearing and commenced a 30-day written comment period on the proposed attainment demonstration and base year inventory for the Pittsburgh-Beaver Valley fine particulate (PM_{2.5}) nonattainment area (Beaver, Butler, Washington, and Westmoreland counties and portions of Allegheny, Armstrong, Greene and Lawrence counties) 39 Pa.B. 5278. The public hearing was held at the DEP's Southwest Regional Office, 400 Waterfront Drive, Pittsburgh, PA on Tuesday, October 6, at 1 p.m. The comment period closed on October 9, 2009.

This document summarizes the testimony received during the public hearing and the written comments received prior to the close of the public comment period. The list of commentators is set forth below:

COMMENTATORS:

1. natashasoroka@aol.com (no information other than email was supplied)

2. Rachel Filippini
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(oral testimony)

3. Joint letter from the following parties:

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COMMENTS AND RESPONSES

COMMENTS:

1. **COMMENT:** *While the EPA's Clean Air Fine Particle Implementation Rule gives states and localities discretion to determine if control measures for PM precursors such as VOCs should be considered, the rule also states that "[i]f information brought forward by commenters or the State in the SIP development process shows that the presumption in this rule for . . . VOC . . . is not technically justified for a particular nonattainment area, the State must conduct a technical demonstration to reverse the presumption."*

The rule lists examples of "the types of analyses that would be appropriate to use in developing such a demonstration." Included among these examples are "[s]pecialized monitoring and laboratory studies [that] assess the relative concentrations of organic compounds." In 2009, such a study analyzed air toxics in Allegheny County and found that thirteen of thirty six monitored organic air toxics exceeded the national 75th percentile at one or more monitoring sites. (The study is referenced as Allen Robinson et. al., Air Toxics in Allegheny County: Sources, Airborne Concentrations, and Human Exposure, Final Technical Report for Allegheny County Health Dept. at 3 (Mar. 2009), available at: www.achd.net/air/pubs/pdf/CMU%20Air%20Toxics%20FINAL%20REPORT%20REVIS ED%20MAR%202009.pdf)

All thirteen of the elevated compounds belong to chemical classes that have been recognized for their potential to contribute to PM_{2.5} concentrations. Most significant, seven of these thirteen chemicals are aromatic compounds, which "are considered to be the most significant anthropogenic SOA [secondary organic aerosol] precursors and have been estimated to be responsible for 50 to 70 percent of total SOA in some airsheds." Based on this data, we believe PADEP must perform a technical demonstration to determine if VOCs significantly contribute to PM_{2.5} concentrations in the nonattainment area. (3)

RESPONSE: The Department appreciates the commentator's information regarding the contribution of volatile organic compounds (VOCs) to PM_{2.5} concentrations in the Pittsburgh-Beaver Valley area.

As the commentator indicates, the U.S. Environmental Protection Agency's (EPA's) PM_{2.5} Implementation Rule establishes general presumptive policies for assessing which PM_{2.5} precursors should be evaluated for possible controls. The EPA requires states to evaluate measures for VOCs only if the state or EPA makes a technical demonstration to show VOCs significantly contribute to PM_{2.5} in that nonattainment area. EPA discusses the reasons for this position in the preamble to the final implementation regulation (*Clean Air Fine Particle Implementation Rule*, 72 Fed. Reg. 20586 (Apr. 25, 2007)). While the fact that some VOCs can form secondary organic aerosol (SOA) is not disputed, the formation of SOA, and therefore the contribution of VOCs to fine particle concentrations, is complex and also highly variable, even on short time scales. EPA recognizes that further research and standardized and approved technical tools are needed to better characterize emissions inventories for specific VOCs and determine their contribution to fine particle formation.

The Department considered the data in the report on air toxics in Allegheny County referenced by the commentator. First, the Department assessed whether emissions of the 13 air toxics found in the study at elevated concentrations comprise a large percentage of VOC emissions in Allegheny County. In 2004, Allegheny County point sources emitted a total of 314 tons of the 13 air toxics based on air toxics emissions data published in the air toxics report referenced by the commentator. According to the Allegheny County Health Department 2004 Point Source Emission Report (available at <http://www.achd.net/air/pubs/pdf/aqemissionrpt2004.pdf>), Allegheny County point sources emitted a total of 2587 tons of VOC in 2004. Based on this information, in 2004, emissions of the 13 elevated air toxics account for approximately 12% of Allegheny County's VOC emissions. DEP does not conclude that this represents adequate support to technically justify the Department or EPA developing a demonstration that VOCs should be addressed in the region's PM_{2.5} attainment plan.

DEP also assessed other available data that EPA suggests would be appropriate to consider in developing a demonstration to reverse the presumption that VOCs do not need to be included in the PM_{2.5} attainment plan for the Pittsburgh-Beaver Valley area. VOC emissions are projected to decrease by 18,036 tons per year (22%) from 80,898 tons per year in 2002 to 62,862 tons per year in 2009, primarily due to federal and state control measures being adopted for purposes of reducing ground-level ozone. VOCs are a known contributor to ozone. Despite the substantial reduction in VOCs, the modeling conducted shows a minimal reduction in PM_{2.5} concentrations. Based on the average of all Pittsburgh-Beaver Valley monitors, the calculated quarterly average relative reduction factors ranged from 0.96 – 1.03 for the organic carbon fraction of PM_{2.5} as a result of the 22% reduction in VOC. This may indicate that VOC reductions are not as vital as reductions of other precursors for attainment of the PM_{2.5} standard in the Pittsburgh-Beaver Valley area.

Overall, the Department concludes that there is too much uncertainty regarding the role of VOCs in the formation of fine particulate to reverse the presumption at this time. In the future, the Department intends to continue to work with other states and EPA to develop tools to assess the role of VOCs in the formation of fine particulate.

2. **COMMENT:** *DEP must carry out an analysis to determine if VOC controls would provide for a more timely, certain, or cost effective PM_{2.5} control strategy. (1,2)*

RESPONSE: The Department disagrees that the rule states that DEP must carry out an analysis to determine if VOC controls are necessary under the conditions the commentator describes. Section 51.1002(c)(3) states that a state is not required to address VOC as a precursor and evaluate sources of VOC emissions for control measures unless the state or EPA provides an appropriate technical demonstration.

Furthermore, the requirements for Reasonably Available Control Measure (RACM) analysis under Section 51.1010(b) are to consider measures that would advance the attainment date by one year. Since the attainment date is in less than one year, there are no additional measures that could advance the attainment date in that fashion. The criteria for improving certainty and cost-effectiveness do not appear in either section.

3. **COMMENT:** *If VOCs are a significant contributor, more timely and cost-effective PM_{2.5} reduction methods may be available in the form of VOC controls. (3)*

RESPONSE: As indicated in the response to Comment #1, the Department has concluded that too much uncertainty remains regarding the role of VOC in particulate formation to develop a demonstration that VOC significantly contributes to PM_{2.5} concentrations in the Pittsburgh-Beaver Valley area.

That said, the Pittsburgh-Beaver Valley is also a nonattainment area for ground-level ozone, for which VOCs are clearly a precursor and well understood. The Commonwealth has adopted a series of controls for VOCs to reduce ozone and is developing additional measures for adhesives, primers, sealants and solvents as well as coatings for many commercial/industrial processes. As tools improve to measure emissions and account for the formation of fine particles, the Commonwealth will be able to include the benefits of VOC controls in future State Implementation Plan (SIP) revisions to meet the more protective standards established in 2006.

4. **COMMENT:** *Modeling assumptions for projecting 2009 emissions may be overestimated. (1,2)*

RESPONSE: The assumptions used when inventories were projected and air quality modeling done were the best available at the time.

5. **COMMENT:** *Second, modeling assumptions used to project 2009 emissions may overestimate real-world air quality improvements. For instance, the automobile fleet turnover rates used to determine the age and emissions levels of US automobiles is based on annual vehicle sales in 2000. Given the current economic challenges, 2008 and 2009 auto sales are lower by roughly half than those included in the CMAQ model. (1,2)*

RESPONSE: Fleet turnover rates can have significant impacts on the benefits from federal and state vehicle control strategies and ultimately on the forecasted emission totals. Since this item significantly impacts calculations, Pennsylvania does not use MOBILE6.2 defaults in the preparation of the inventory. Instead, county-specific vehicle registration data is obtained on a triennial basis and used within the emission calculation process. Future SIP and transportation conformity submissions will utilize more recent planning assumptions as they are obtained and prepared for emission analyses. Variations in vehicle sales volumes and among the various vehicle types may occur between the update cycles. Since the complex regional modeling was performed using a 2005 inventory and not all states update fleet age in the same fashion, the most current uniform data available at the time were used. DEP agrees that this may overestimate fleet turnover and air quality improvements. However, both the soaring gasoline and diesel prices in portions of these years as well as the economic situation also curtailed vehicle miles traveled, which would have the opposite effect.

6. **COMMENT:** *Another example [of modeling assumptions]: projected 2009 emissions include estimated reductions in SO₂ and NO_x from the Clean Air Interstate Rule or CAIR. However, in the time since these estimations were made, the D.C. Circuit declared the rule “fatally flawed” and remanded it to EPA. Industry uncertainty, first about whether the rule would continue to exist, and now about the final form of EPA’s CAIR replacement has caused electricity generators to cancel or delay SO₂ and NO_x controls originally intended under CAIR. (1,2)*

RESPONSE: EPA has advised states that because CAIR remains in effect during the remand, assumptions made about its effects in PM_{2.5} SIPs for very near term attainment years such as 2009 remain valid. The Department does not believe that any controls installed in anticipation of CAIR have been shut down because of “industry uncertainty.”

7. **COMMENT:** *In 2006, prompted by evidence that the 1997 standard was insufficient to protect public health, EPA issued an updated, more protective standard. While SIP revisions to comply for the new standard will not be due for several years, we believe that given the health threat that additional years of exceeding the 2006 standard entail, DEP should make every effort to bring our region into compliance with the 2006 standard in the current SIP revision. (1,2)*

RESPONSE: While the current SIP revision is designed to address the 1997 NAAQS, the Department is working in many ways to achieve even greater PM_{2.5} reductions. Pennsylvania is supporting collaborative efforts on a regional basis to ensure EPA considers the 2006 standard in a rule to replace CAIR, is urging EPA to develop national

standards for controls of SO₂ and NO_x from industrial, commercial and institutional boilers, is developing a rule to regulate outdoor wood burning furnaces, is finalizing its rules to limit NO_x from cement kilns and glass furnaces. In addition, the Department anticipates developing a regulation to reduce sulfur content in residential, commercial and industrial fuel oils. Additional measures will be examined once preliminary modeling information for the 2006 standard (based on 2007 inventories and assumptions) is available on the amount of emission reduction necessary to attain that standard. A SIP for the 2006 standard will be submitted in a timely fashion.

8. **COMMENT:** *The Proposed SIP Revision shows sharp increases in direct emissions of PM 2.5 between 2002 and 2009 (see Table E-1, p. iii). These increases appear to come from stationary sources (compare Table III-1, p. 14 and Table III-2, p. 17). These increases also show up as “negative reductions,” especially striking when compared with the actual reductions in sulfur dioxide (SO₂) and nitrogen oxides (NO_x) over the same time period (Table IV-1, p. 23). From conversations with DEP, we understand that this reflects a difference in the methodology for counting condensable PM between the 2002 actual inventory, in which most sources do not report condensables, and the 2009 projected inventory, which is based on a model that does include condensables. We suggest that DEP clarify this aspect of its approach to the emission inventory in the Proposed SIP Revision. (3)*

RESPONSE: DEP agrees that the SIP revision could benefit from clarification regarding the emission inventory methodology and explanatory language has been added. The 2002 inventory was based on emissions reported to the Department by facilities. In 2002, many facilities did not include condensable PM in their estimates of direct PM emissions. For most source categories, the 2009 inventory was developed by projecting the 2002 inventory forward to 2009 using growth factors. For electric generating units (EGUs), the Integrated Planning Model (IPM) was used to predict 2009 operating parameters and emissions. The projected 2009 PM_{2.5} emissions for EGUs include condensable PM emissions which were calculated based on operating parameters predicted by IPM and emission factors derived from AP-42 defaults. Because the 2002 inventory did not include condensables for many facilities, the emissions inventory shows an apparent increase in PM_{2.5} emissions from stationary sources from 2002 to 2009.

If the 2002 emissions inventory were corrected to account for the unreported condensable emissions, the modeled 2009 PM_{2.5} concentrations would be lower, i.e., the Pittsburgh-Beaver Valley area would be predicted to attain the standard by a larger margin.

If the 2002 emissions inventory were corrected to account for the unreported condensable emissions, 2002 would essentially have higher total PM_{2.5} emissions in the inventory.

Within the modeling, a concentration was calculated for 2002 and 2009 (based on their respective inventories). Then, in order to calculate the anticipated 2009 monitored concentration, DEP utilized the speciated pollutants (such as sulfates, nitrates, elemental carbon, organic carbon, etc.) constructed from the 2002 and 2009 modeling runs. Then a ratio (known as a relative reduction factor (RRF)) was applied, using the results of the 2002 and 2009 modeling. The RRF is calculated by dividing the 2009 modeled results by the 2002 modeled results. Therefore, if the 2002 emissions inventory had higher total

PM_{2.5} emissions, the RRF calculated would have been lower (with a larger number being the denominator of the RRF calculation). With a lower RRF, the calculated speciated component attributable to the direct PM_{2.5} emissions would have been lower, lowering the overall 2009 PM_{2.5} predicted concentration.

9. **COMMENT:** On page i of this SIP the full name of the "Pittsburgh -Beaver Valley non-attainment area" is given the short name of the "Pittsburgh area." The remaining 67 pages then use the term "Pittsburgh area." Over many years the City of Pittsburgh has experienced a difficult time in removing its antiquated image as a "smoky city." This use of the name Pittsburgh to refer to the eight-county area reinforces this past image to those who are not aware of the large region. We request the term "Pittsburgh area" be replaced with the "Pittsburgh-Beaver area" to more accurately represent the larger community this non-attainment area this represents. (4)

RESPONSE: The SIP has been changed to reflect the full name of the nonattainment area (Pittsburgh-Beaver Valley).