Compilation of Comments

Draft PM2.5 Precursor Demonstration Guidance

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Air Quality Policy Division
Research Triangle Park, NC

May 2017

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EXECUTIVE SUMMARY

On November 17, 2016, the U.S. Environmental Protection Agency (USEPA) released the *$PM_{2.5}$ Precursor Guidance* as a draft guidance document for consideration, review, and comment by state, local and tribal air agencies, as well as the public. The original comment period was scheduled to end January 31, 2017 but was extended to March 31, 2017 after multiple requests were received from the stakeholder community for additional time to review the draft guidance.

At the close of the comment period, the USEPA had received comments from 12 industrial, environmental, and state/local regulatory stakeholders on the *$PM_{2.5}$ Precursor Guidance*. These comments are provided in this Compilation of Comments document for reference by the broader stakeholder community.

The draft *$PM_{2.5}$ Precursor Guidance* is available for reference on the USEPA's website at the following web address:
https://www.epa.gov/pm-pollution/draft-pm25-precursor-demonstration-guidance

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AAPCA ASSOCIATION OF AIR POLLUTION CONTROL AGENCIES

January 13, 2017

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Subject: Draft $PM_{2.5}$ Precursor Demonstration Guidance; Comment Period Extension Request

Dear Mr. Timin and Mr. Lessard:

The Association of Air Pollution Control Agencies (AAPCA)[1] requests an extension of the public comment period for U.S. EPA's draft $PM_{2.5}$ Precursor Demonstration Guidance[2] for a minimum of two weeks, until at least February 14, 2017. An extended comment period would help to ensure important, meaningful feedback on this guidance from state and local agencies to EPA.

Released on December 9, 2016, EPA's draft $PM_{2.5}$ Precursor Demonstration Guidance currently has a comment deadline of January 31, 2017.[3] While a webinar was held on December 19 to discuss the guidance, the comment period includes three Federal holidays[4] and the 2017 presidential inauguration, and overlaps with the review periods of several other EPA rulemakings and deadlines related to modeling.

Alongside reviewing this guidance, agencies are also evaluating EPA's draft Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program (comment deadline of February 3, 2017)[5] and EPA's final rule Revisions to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter,[6] which is projected to be published in the Federal Register on January 17, 2017.[7] Air agencies also anticipate

[1] AAPCA is a national, non-profit, consensus-driven organization focused on assisting state and local air quality agencies and personnel with implementation and technical issues associated with the federal Clean Air Act. Twenty state environmental agencies currently sit on AAPCA's Board of Directors. AAPCA is housed in Lexington, Kentucky as an affiliate of The Council of State Governments. You can find more information about AAPCA at: http://www.cleanairact.org.

[2] https://www.epa.gov/sites/production/files/2016-11/documents/transmittal_memo_and_draft_pm25_precursor_demo_guidance_11_17_16.pdf.

[3] $PM_{2.5}$ Precursor Demonstration Guidance, pg. 2.

[4] A listing of Federal holidays can be found at: https://www.opm.gov/policy-data-oversight/snow-dismissal-procedures/federal-holidays/#url=2017.

[5] https://www3.epa.gov/ttn/scram/guidance/guide/EPA-454_R-16-006.pdf.

[6] https://www3.epa.gov/ttn/scram/appendix_w/2016/AppendixW_2016.pdf.

[7] https://www.federalregister.gov/documents/2017/01/17/2016-31747/guideline-on-air-quality-models-enhancements-to-aermod-dispersion-modeling-system-and-incorporation.

additional opportunities to engage with U.S. EPA staff to understand the relationship between draft $PM_{2.5}$ Precursor Demonstration Guidance and these actions.

These documents are extensive and highly technical, requiring significant time to read and process. An adjusted deadline for comments on the $PM_{2.5}$ Precursor Demonstration Guidance would provide a better opportunity for state and local agencies to offer substantive feedback, as well as allow for a more appropriate timeline for examining related documents.

AAPCA appreciates your consideration of this request to extend the comment deadline for the draft $PM_{2.5}$ Precursor Demonstration Guidance for at least an additional two weeks. If you have any questions regarding our request, please contact Clint Woods at cwoods@csg.org or (859) 244-8040.

Sincerely,

Clinton J. Woods, Executive Director
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March 31, 2017

Subject: Georgia EPD Comments on EPA's Draft $PM_{2.5}$ Precursor Demonstration Guidance

Dear Mr. Timin and Mr. Lessard:

The Georgia Environmental Protection Division (EPD) appreciates the opportunity to provide the following comments to the U.S. Environmental Protection Agency (EPA) on the recently released *Draft $PM_{2.5}$ Precursor Demonstration Guidance.* EPD has reviewed the document and has provided detailed comments below.

Major comments

1. Page 25, Section 3.2.1: It is not clear how a $PM_{2.5}$ precursor demonstration for multiple precursors (e.g., NOx, NH_3, and VOCs) should be performed. Should each precursor be evaluated independently (one model run with reduced emissions of NOx, one model run with reduced emissions of NH_3, and another model run with reduced emissions of VOCs) by comparing each individual model run against the $PM_{2.5}$ SILs? Or, should all precursors of interest be evaluated simultaneously (one model run with reduced emissions of NOx, NH_3, and VOCs) by comparing the combined precursor model run against the $PM_{2.5}$ SILs? The proper approach for multiple precursor demonstrations should be clearly stated in the guidance document.

2. Page 36, 2nd Paragraph: It is stated, "If the precursor impacts are calculated using future year modeling, two SMAT runs are needed to calculate precursor impacts. The first SMAT run will calculate future year base case $PM_{2.5}$ concentrations using the base case and future year model outputs. The second SMAT run will calculate future year $PM_{2.5}$ concentrations from the zero-out/source apportionment or sensitivity model run(s). The two future year $PM_{2.5}$ concentration values are subtracted from each other to get the total $PM_{2.5}$ impact from the precursor. The precursor impact is then compared to the threshold(s) identified in Section 2.2.".

   While this is one approach, GA EPD feels that a better approach would be to perform the two SMAT runs in sequential order rather than parallel. The first SMAT run will calculate future year base case $PM_{2.5}$ concentrations using the base case and future year model outputs. The second SMAT run will calculate future year $PM_{2.5}$ concentrations from the zero-out/source apportionment or sensitivity model run(s) using the future year base case as the new "base case" and the future year zero-out/source apportionment or sensitivity model run as the new "future year". Relative Response Factors (RRFs) calculated based on the future year base case and the future year zero-out/source apportionment or sensitivity model run(s) will be applied to the future year design values calculated from the first SMAT run (as opposed to the current year design values used in the first SMAT run). The two future year $PM_{2.5}$ concentration values are subtracted from each other to get the total $PM_{2.5}$

impact from the precursor. The precursor impact is then compared to the threshold(s) identified in Section 2.2.

This alternative approach will have minimal impact on the annual $PM_{2.5}$ contributions, but could have a significant impact on the daily $PM_{2.5}$ contributions if the high $PM_{2.5}$ days in the base year model run are different than the high $PM_{2.5}$ days in the future year model run.

3. Page 45, Section 6.6: Add a sentence to read "There may be some cases where relative impacts for a NNSR precursor demonstration may be appropriate. In those cases, the Unmonitored Area Analysis described in the EPA's Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze should be followed to estimate source impacts throughout the area potentially impacted by the major sources."

Minor comments

1. Page 12, 1st Paragraph: "petitioners" needs to be capitalized to read "Petitioners presented conflicting arguments…"
2. Page 15, 2nd Paragraph: remove "to" so that text reads "…are insignificant, and thus ~~to~~ do not "contribute" to $PM_{2.5}$ concentrations that exceed the standard."

Thank you for the opportunity to provide input on this important guidance document. Please contact me at 404-363-7014 or james.boylan@dnr.ga.gov if you have any questions or wish to discuss these comments.

Sincerely,

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Ohio Environmental Protection Agency

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MAR 3 1 2017

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RE: Ohio EPA Comments on U.S. EPA's November 17, 2016 Draft $PM_{2.5}$ Precursor Demonstration Guidance

Dear Mr. Brian Timin and Mr. Patrick Lessard:

The Ohio Environmental Protection Agency (Ohio EPA) has reviewed and is providing comment on U.S. EPA's draft $PM_{2.5}$ precursor guidance for demonstrating whether emissions of a particular precursor in a nonattainment area would not or do not contribute significantly to $PM_{2.5}$ levels that exceed the standard as part of a State Implementation Plan (SIP) demonstration. Ohio EPA appreciates the opportunity to provide U.S. EPA with comments on this draft guidance.

Background:

U.S. EPA posted draft guidance with respect to $PM_{2.5}$ precursor demonstrations on November 17, 2016, one month after the submission deadline for SIP demonstrations for moderate nonattainment areas designated in April 2015. Ohio EPA worked extensively with our U.S. EPA Regional Office (Region 5) in developing a plan based on facts and circumstances relevant to our nonattainment area in order to submit a technically valid and complete SIP demonstration by the October 15, 2016 SIP submittal deadline mandated by the Clean Air Act (CAA). This was managed absent a timely final Implementation Rule, made available July 29, 2016 and absence this guidance. Ohio EPA cannot express enough how ill-timed rulemaking and guidance continues to be a significant obstacle for air agencies in developing meaningful SIPs that meet CAA mandated deadlines.

In addition, Ohio should not be required to conform to the final guidance package, when it is finally released. Ohio EPA, working with Region 5 and the Lake Michigan Air Director's Consortium (LADCO), expended a large amount of resources to develop, model, analyze, assemble, and submit a complete demonstration consistent with the available guidance and conforming to the deadlines in the CAA. Ohio EPA should not be placed in a position to be required to essentially "do over" our analysis as a result of U.S. EPA's failure to release timely guidance. The application of the guidance should be prospective and only to future SIP submittals.

Ohio EPA's comments are presented below.

General Comments:

1. Ohio EPA is concerned that U.S. EPA has presented excessively conservative guidance and encourages U.S. EPA to highlight a path towards a scientifically valid demonstration that may be approved without unnecessary costs incurred by air agencies to fulfill requirements of such an unrealistic demonstration. The content of the draft guidance fails to recognize the scale of resources and pace of work required by air agencies to fulfill technical requirements of the $PM_{2.5}$ Implementation Rule. Furthermore, such excessive conservatism could lead to over-regulation and control of emissions sources that are truly insignificant.

2. The draft is untimely – published weeks after attainment demonstrations were due for several states, including Ohio. Ohio EPA worked closely with Region 5 without the need for bright line values and methods that could be construed as the only values and methods U.S. EPA would approve in a significant contribution analysis. Ohio EPA requests U.S. EPA further emphasize throughout the guidance that variety of methods and values for significance may be appropriate for demonstrations based on the specific facts and circumstances of the area.

3. Ohio EPA finds the draft guidance unfairly prescriptive. Whereas, the guidance treats a demonstration as a two-step analytical process making a contribution analysis distinct and separate from a sensitivity analysis, there is no explication in rule that these two analyses must be performed separately, only that if a contribution analysis does not support a finding of insignificant contribution, U.S. EPA may approve a demonstration on a review of sensitivity to decreased emissions. The draft guidance requires a contribution analysis to be performed, analyzed, and documented prior to performing a sensitivity analysis. In consideration of the significant resources air agencies must expend performing these analyses, if an air agency determines it prefers to only perform the sensitivity analysis, there should be no requirement to first perform a separate contribution analysis. The outcomes of a modeled sensitivity analysis implicitly address contribution, according to the modeling framework and reference quantitative contribution value. Guidance should recognize this to avoid unfairly burdening air agencies. Ohio EPA believes U.S. EPA must certainly consider submitted evidence of contribution, but must not require distinct analyses by air agencies to comprehensively demonstrate contributions that are insignificant.

4. The draft guidance references a quantitative contribution value from the Technical Basis Document[1] (TBD) issued on August 1, 2016 and still in draft form. Ohio EPA suggests the draft guidance instead draw reference to the originating analysis to avoid setting a static value from a document that may be updated in the future. The question becomes, will the values identified as significant in this document override any future amendments to U.S. EPA's draft TBD or will the significance value in the TBD always take precedence?

5. Ohio EPA reiterates comments submitted on September 30, 2016 in review of the draft TBD. Ohio's comments are clearly relevant to this draft guidance because U.S. EPA relies on the analysis for setting a significance level. The draft TBD offers little justification for use of the 50th percentile confidence interval (CI), which appears arbitrary in light of an extensive body of peer-reviewed scientific literature. The sample size and methods applied in the draft TBD simply do not support a value more conservative than a 68th percentile CI; Ohio EPA finds no credibility in the argument to tighten beyond one standard deviation of the mean. The selection of a 50th percentile CI was evidently a matter of convenience, given the analysis was set up to produce discrete estimates of 25%, 50%, 75%, and 95% CIs. Arguing against selection of a 95th percentile CI, U.S. EPA used loose interpretations of long well-understood concepts of statistical significance to justify a tighter, excessively conservative value of 50%. Furthermore, Ohio EPA would like to highlight inconsistent application of the analysis in having recommended a $PM_{2.5}$ 24-hour value in SILS guidance that differs from the figure applied in the precursor demonstration guidance. Ohio's full comments on the draft TBD are attached for consideration under this action also.

6. Ohio EPA disagrees entirely with a "zero-out" brute force method for a comprehensive precursor demonstration. Ohio EPA does not support the argument that a "zero-out" approach can relay contribution realistically, but advises an approach with a range that respects inherent nonlinearity from complex secondary $PM_{2.5}$ chemistry for informing on contribution. A "zero-out" method may be applicable to single-source or possibly major stationary source contribution reviews, but is an absurd approach to an area-wide inventory. Over-shooting stability points in the differential by unrealistically cancelling out 100% nonattainment area-wide emissions risks delivering false conclusions about the mechanisms of contribution.

7. Ohio EPA finds the suggestion that it is not unrealistic or arbitrary to apply a 30%-70% range for a comprehensive sensitivity analysis to be invalid. The upper range is unrealistic in terms of a sensitivity analysis while the lower end of the range is arguably arbitrary. Noted in a draft guidance footnote, "(t)he majority of studies have used across the board percentage precursor emissions reductions of between 30% and 60%, with the most common reduction percentages being 30% and 50%." Even in these referenced studies, authors admit to the arbitrary selection of these ranges. In the draft guidance, U.S. EPA indicated percent

[1] U.S. Environmental Protection Agency, 2016a. Technical Basis for the EPA's Development of Significant Impact Thresholds for PM2.5 and Ozone, Draft August 1, 2016. EPA-454/D-16-001a.

changes in recent anthropogenic emissions of the four precursors from which the range is supposedly derived. Only sulfur dioxide has seen this level of overall reductions due to nationwide restrictions across major industry with decades of policy development, advances in controls, and widespread participation. No other pollutant (from among these precursors) has seen or is expected to see such huge industry-wide declines going forward. While NO_x has a high end value of 39.9% with a median value of 31.8% for the time period, both NO_x and SO_2 reductions in this table projecting to 2017 are heavily influenced by CSAPR updates and Tier 3 fuel standards effective next year. U.S. EPA acknowledges in draft guidance that any additional reduction of 60% or more in SO_2 or other precursor is unlikely or may not be possible in a six to ten-year time frame. Even a range of 30%-50% may be considered conservative when treating two of the four precursors. Ammonia's emission reduction range in the draft guidance is not higher than 9.3% while VOC does not exceed 26.9%.

8. Ohio EPA strongly discourages naming a default or general recommendation for the reference year in contribution/sensitivity analyses. The decision should be case-by-case based upon specific circumstances of the area.

9. A recommendation to examine recent major source permits is unfairly rigid and fails to recognize other useful, often superior, sources of data that air agencies collect and may access. Furthermore, permits cite allowable emissions rather than actual, representative emissions. A review of inventories would be sufficiently informative while reflecting foreseeable economic conditions, market saturation, and growth potential. Statewide or regional inventories provide details of emissions magnitudes useful in planning contribution/sensitivity analyses.

10. A suggestion to record details including stack parameters should be clarified. In the case of photochemical modeling, stack release characteristics are generally grouped as "low" or "high" while the recommendation implies a higher resolution than is practical or necessary. Given the size of a SIP demonstration, the scope of recommended curation of details should be clear.

11. Ohio EPA reiterates that any guidance provided should be flexible and prefaced with consideration of the facts and circumstances specific to the area. Ohio EPA appreciates U.S. EPA for avoiding default recommendations on size and number of hypothetical new and/or existing sources to model in NNSR demonstrations, however, it should be emphasized that the air agencies specific information and expertise within their own region should be relied upon to determine a set of hypothetical sources.

12. The draft guidance references Software for the Modeled Attainment Test (SMAT) as a recommended option for post-processing. Ohio EPA wishes to emphasize that the draft Implementation Rule made no mention of SMAT, but recommended the Modeled Attainment Test Software (MATS). The final Implementation Rule, recommends the "community edition" of SMAT (SMAT-CE) and notes it had replaced MATS in January 2016; however, at the time of our submittal in October of 2016 it was still not released for official use and U.S. EPA suggested we continue to use MATS. Ohio EPA is unaware if it has even been released to date.

Regardless, Ohio EPA suggests avoiding prescriptive language for use of SMAT-CE and instead refer to the use of U.S. EPA approved modeled attainment test software unless U.S. EPA intends to populate the SCRAM website with the appropriate links and supporting documents for its widespread use.

13. The draft guidance is not the appropriate place to dictate detailed modeling protocol elements but should refer to Appendix W and other official resources, such as ("DRAFT Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze, December 2014[2]" (Draft O3-PM-RH) to avoid recursive inconsistencies. There is nothing novel in the protocol proposed in the draft guidance that is not addressed in these resources.

14. The draft guidance should more clearly identify 12 km horizontal grid resolution as customary and generally sufficient. In Draft O3-PM-RH, U.S. EPA states that 12 km is generally recommended, while grid cells as small as 1 km should be weighed on a case-by-case basis. Baker (2015), as cited by U.S. EPA, notes impact is generally 50-100 km downwind, making higher resolution from close proximity unnecessary, while clarifying that peak $PM_{2.5}$ sulfate ion impacts are typically closer than 50 km downwind but rarely in the same grid cell as the source. High-resolution modeling requires substantially more computer resource and modeling time. Furthermore, getting high-resolution emissions is an almost impossibly high bar; without these, modeling would not improve even with finer grids.

15. Page 22, footnote 21, provides a conversion factor range for conversion of organic carbon to carbon mass with no literature reference. Air agencies should not be left to discern the basis or most up-to-date source of a recommended conversion factor. A reference, if not further discussion, should be provided with such a footnote.

16. Ohio EPA disagrees on the recommendation for using an absolute concentration change estimate. Given uncertainties in $PM_{2.5}$ modeling, comparison of a reference case to an alternative case should be performed on a relative basis. Contribution/sensitivity analyses are not nearly as straightforward as a single source permit application. U.S. EPA asserts the same point in Draft O3-PM-RH (page 19), regarding minimizing uncertainty in different components of emissions inventory by use of relative concentration changes. Also, this draft precursor guidance seems to overlook the interpolated gradient-adjusted fused surface method in examining impacts at unmonitored locations.

17. In discussing chemical transport modeling "in most cases," U.S. EPA should avoid setting a preference for certain alternatives. Alternatives and preferred models are identified in Appendix W.

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[2] U.S. Environmental Protection Agency, 2014b. Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze. http://www.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf.

18. Ohio EPA questions the recommendation to compare the highest 24-hour daily average rather than a value that better reflects uncertainty, such as the 98th percentile used in PSD reviews.

19. Ohio EPA implores U.S. EPA to use language consistent with the Implementation Rule in referring to approvals of NNSR precursor demonstrations. Such demonstrations relieve air agencies of burdens to perform analyses and modify local rules unnecessarily, whereby diverted resources may be allocated more meaningfully. The Implementation Rule language hinges on "if" a precursor demonstration is approved, acknowledging procedure and next steps in the event of disapproval, partial disapproval, or elevation to Serious. Ohio EPA finds the draft guidance phrasing on page 39 Section 6.1 NNSR Demonstration "*(u)pon* the EPA's approval of a NNSR precursor demonstration" to be misguiding. The Implementation Rule provides VOC and ammonia to phased in as regulated NSR pollutants by a prescribed scheduled "*unless* the EPA has determined, prior to the scheduled phase-in, that the state submitted a complete proposed NNSR program for $PM_{2.5}$ that includes a NNSR precursor demonstration."

Typographical errors noted:

1. A statement on page 11 is contrary: "This indicates that Congress intended to exempt sources of $PM_{2.5}$ precursor emissions from control requirements where there is an impact ***greater than*** a simple contribution, but how much greater is not specified."

2. Megaritis, 2013 bibliographic entry should have correct year, volume, and page numbers.

3. Pun, 2012 bibliographic entry should have pages 297**9**-2987.

Again, Ohio EPA thanks you for this opportunity to comment.

Sincerely,

Robert Hodanbosi

Robert Hodanbosi, Chief
Division of Air Pollution Control
Ohio EPA

Cc: Jennifer Van Vlerah, SIP Manager, Ohio EPA DAPC

Att

EARTHJUSTICE

March 31, 2017

Via electronic mail: timin.brian@epa.gov and lessard.patrick@epa.gov

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Patrick Lessard
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Research Triangle Park, NC 27711

Re: Draft PM2.5 Precursor Demonstration Guidance

Dear Mssrs. Timin and Lessard:

Thank you for the opportunity to comment on the proposed PM2.5 Precursor Demonstration Guidance. This guidance is intended to assist State and local air quality planning agencies in complying with the requirements of Clean Air Act section 189(e) and the PM2.5 Implementation Rule, 81 Fed. Reg. 58010 (Aug. 24, 2016). Section 189(e) provides:

> The control requirements applicable under plans in effect under this part for major stationary sources if PM-10 shall also apply to major stationary sources of PM-10 precursors, except where the Administrator determines that such sources do not contribute significantly to PM-10 levels which exceed the standard in the area. The Administrator shall issue guidelines regarding the application of the preceding sentence.

42 U.S.C. § 7513a(e).

Before providing comments on specific elements of the Guidance, it is important to keep in mind two overarching points. First, while the Guidance asserts that the term "contribute significantly" is ambiguous, it should also note that the Agency's interpretation of that term must be consistent with the goals of the statute – specifically the Act's overarching goal of protecting public health by complying with the Act's requirements for expeditious attainment of the national ambient air quality standards. *See* 42 U.S.C. §§ 7401(b)(1), 7502(c)(1) and 7513(c). Guidance that allows areas to avoid adopting controls that would expedite attainment would be inconsistent with the goals of the Act, and could not be legally defended as a reasonable interpretation of purportedly ambiguous terms.

Second, the Guidance must recognize that it is being offered nearly 20 years after the adoption of the first national ambient air quality standards for PM2.5. Over those decades, because of EPA's illegal interpretation of the Clean Air Act and the applicability of subpart 4,

PM2.5 precursors – especially ammonia – have largely escaped regulation. Moreover, monitoring networks and other fundamental systems for measuring and attaining the national standards have been designed without regard the sources of precursor emissions. Thus, Guidance that assumes we are starting from the point where all sources of PM2.5 will be treated equally ignores the history of neglect around the monitoring and controlling of these pollutants and could arbitrarily reinforce that neglect. Instead the Guidance should take steps to get areas to "catch up" in the treatment of these precursors.

Locations at Which to Evaluate Air Quality Changes

The Guidance on where contributions should be measured for purposes of determining significance is an example of this second overarching comment. The proposed Guidance suggests that significance for the comprehensive or major stationary source demonstration should be evaluated at existing or relevant historical monitoring locations, but that for nonattainment new source review (NNSR) permitting purposes, should be based on modeled concentration levels. Guidance at 16. The premise of this distinction is that the NNSR exercise, unlike the planning exercise, is focused on new sources that may not be well represented by the monitoring network. *Id.* at 16-17. The Guidance notes that by contrast, "the ambient monitoring network is designed to represent air quality based on the geographic orientation and magnitude of existing sources." *Id.* at 17.

But this assertion has no record basis and defies common sense. Because precursors such as ammonia have been specifically excluded from attention under EPA's past illegal interpretations of the Act, the monitoring networks have not been designed to capture major sources of these precursor emissions.

For both planning and NNSR, modeling should be used to determine the significance of precursor contributions. Given the history of neglect, it is virtually certain that these points of maximum contribution will not be in the locations where monitors are currently positioned. Relying on the existing monitoring network would therefore reinforce the continued illegal neglect of these precursors.

Modeling for Sensitivity Demonstrations

The Guidance should acknowledge that there can be significant differences in the geographic size of air quality control regions. Modeling approaches that assess the significance of precursor contributions in physically small nonattainment areas with a discreet set of emission sources are not necessarily reasonable for the larger nonattainment regions in the West. In particular, it is not reasonable to ignore the fact that across larger areas, the sensitivity will vary because the mix of emissions will vary. Sensitivity is a relative term that describes the relative abundance of these various pollutants and, therefore, relatively speaking, which of these pollutants is the limiting component in the chemical reactions that lead to secondary PM2.5 formation. Such abundance assessments are *highly* localized and are unlikely to be

consistent across a large air basin. The Guidance must ensure that modeling does not miss the fact that, in certain sub-regions, precursor emissions may be the dominant cause of exceedances in local ambient PM2.5 concentrations, and controls of those emissions may be the key to ensuring attainment.

More fundamentally, and as discussed further below, these assessments only suggest that for pollutants that are more abundant, greater emission reductions would be necessary to achieve the benefits of smaller emission reductions of the less abundant pollutants. It does not mean that these abundant pollutants do not "significantly contribute" to PM2.5 exceedances in an area. At best, such sensitivity analyses might inform what pollutants are the most cost-effective to control, but even this is dubious because the fact that certain pollutants are more abundant is likely the result of a history of under-regulation. Thus, while it might seem like better policy to target the pollutants that are the "limiting factors" in the chemistry that produces PM2.5, it may actually be cheaper to control the more abundant pollutants even though more tons of reductions would be necessary to achieve the same air quality benefit. These policy decisions, however, should be part of the attainment demonstration process and are not relevant to answering the statutory test in section 189(e).

Emissions Reductions for Sensitivity Analyses

Here too, the Guidance should recognize the history of illegal under-regulation of PM2.5 precursors like ammonia. The Guidance proposes that modeling look at the sensitivity to emission reductions in the range of 30 to 70%. Guidance at 28. The rationale for this range is based on the level of reductions achieved by the Cross State Air pollution Rule. *Id.* But this is a flawed basis for determining feasible emission reductions for several reasons. First, CSAPR did not target reductions for ammonia and VOC, so it is unreasonable to suggest that the rule represents what is reasonable for these precursors. Ammonia in particular has never been targeted for national emission reductions. Second, the CSAPR cost-effectiveness foundation reflects the fact that it targets sources and emissions that have been the subject of multiple rounds of emission controls. This is not a reasonable comparison for under-regulated pollutants like ammonia. Like early NOX measures, it is reasonable to think the first rounds of controls could achieve emission reductions well over 80%. Finally, EPA itself has acknowledged in the ozone implementation rule that CSAPR is not necessarily equivalent to RACT. So relying on these numbers as a blanket surrogate for RACT level controls (even for NOx and SO2) is not reasonable.

The subsequent discussion of how these emission reduction numbers could be applied also ignores the historic under-regulation of precursors like ammonia and is inconsistent with the statutory obligation for expeditious attainment. The Guidance implies that an area just exceeding the significance threshold at 30% reduction level might evaluate the impact of applying reasonably available controls and still claim insignificant contribution if those controls do not result in some level of impact. Guidance at 29. This approach conflates the significant contribution determination and the attainment demonstration. Such an approach could ignore,

for instance, the fact that the application of RACT for all other PM2.5 sources also does not achieve attainment. It would be arbitrary to claim that an area failing to demonstrate attainment through regulation of certain pollutants could rule out the regulation of others that demonstrably contribute to ambient PM2.5 levels simply because these additional controls do not make up the difference. At a minimum, agencies should have to show that the cost-effectiveness thresholds are being applied uniformly for all pollutants. In California, RACT level controls for NOx are considerably more expensive than any controls that have ever been considered for ammonia. These policy choices – of what sources to control and at what cost – are part of demonstrating whether an area has satisfied the expeditious attainment requirement and thus should be part of the attainment demonstration, not the significant contribution assessment.

Clean Air Act section 189(e) provides that the control requirements for major sources of PM-10 shall also apply to major stationary sources of PM-10 precursors. The statute allows EPA to make an exception to this general requirement where it finds that "such sources do not contribute significantly to PM-10 levels which exceed the standard in the area." 42 U.S.C. § 7513a(e). Sulfur dioxide, nitrogen oxides, volatile organic compounds, and ammonia are all factual and scientific precursors to PM formation. This scientific fact means that the default in section 189(e) is that sources of these pollutants must be subject to the control measure requirements. The Guidance should be clear that the reasonable degree of that control is a separate question from whether the contribution is small enough to overcome the statutory presumption for control.

Sincerely,

/s/

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January 18, 2017

Via E-Mail

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REQUEST BY THE UTILITY AIR REGULATORY GROUP TO EXTEND THE COMMENT DEADLINE FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S "DRAFT $PM_{2.5}$ PRECURSOR DEMONSTRATION GUIDANCE"

Dear Messrs. Timin and Lessard:

We write on behalf of the Utility Air Regulatory Group ("UARG") to request a sixty-day extension of the January 31, 2017 comment period deadline for the *Draft $PM_{2.5}$ Precursor Demonstration Guidance* (Nov. 2016) ("Draft Guidance").[1] This extension is needed to provide stakeholders a meaningful opportunity to analyze the Draft Guidance and prepare thorough comments.

The Draft Guidance is a technical document which will require significant time to fully review and draft a response. In preparing these comments, UARG members must also review and take into account several other documents recently released by EPA that, like the Draft Guidance, address issues concerning modeling of ambient ozone and $PM_{2.5}$. These other documents include *Draft Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ Under the PSD Permitting Program*,(Dec. 2016) ("MERPs Guidance"); *Guidance on the Use of Models for Assessing the Impacts of Emissions from Single Sources on the Secondarily Formed Pollutants: Ozone and $PM_{2.5}$* (Dec. 2016); *Implementation of the 2015 National Ambient Air*

[1] UARG is a group of individual electric generating companies and national trade associations. UARG participates on behalf of its members collectively in Clean Air Act proceedings that affect electric generator, and in litigation arising from those proceedings.

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Quality Standards for Ozone: Nonattainment Area Classifications and State Implementation Plan Requirements: Proposed Rule, 81 Fed. Reg. 81276 (Nov. 2016)("Ozone SIP Requirements Proposal"); and *Revisions to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches To Address Ozone and Fine Particulate Matter: Final Rule*, 82 Fed. Reg. 5182 (Jan. 17, 2017). Moreover, comment periods for two of these documents overlap with the comment period for the Draft Guidance. Specifically, comments on the MERPs Guidance are due February 3, 2017, and comments on the Ozone SIP Requirements Proposal are due on February 13, 2017. In addition, the comment period on each of these documents overlapped with several holidays, effectively shortening the time for review and comment preparation. Therefore, a 60-day extension of the comment period on the Draft Guidance is necessary to provide informative comments to EPA on that and related documents.

Please contact us if you have any questions about this request and let us know as soon as possible if the comment period will be extended.

Sincerely,

Lucinda Minton Langworthy
Alexandra Hamilton*
Counsel for the
Utility Air Regulatory Group

cc: Steve Page
Richard Wayland
Tyler Fox

* Admitted only in California

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January 18, 2017

VIA ELECTRONIC MAIL

Brian Timin
Patrick Lessard
Office of Air Quality Planning and Standards
Environmental Protection Agency
Timin.brian@epa.gov
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REQUEST BY THE NAAQS IMPLEMENTATION COALITION TO EXTEND THE COMMENT DEADLINE FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S "DRAFT $PM_{2.5}$ PRECURSOR DEMONSTRATION GUIDANCE"

Messrs. Timin and Lessard -

I write on behalf of the National Ambient Air Quality Standards ("NAAQS") Implementation Coalition, which is comprised of trade associations, companies, and other entities who confront challenges in permitting and operating facilities under increasingly-stringent NAAQS, including for ozone and $PM_{2.5}$. We request that the Environmental Protection Agency ("EPA") extend the January 31, 2017 comment period for the *Draft $PM_{2.5}$ Precursor Demonstration Guidance* ("Draft Guidance") by 60 days in order to provide stakeholders a meaningful opportunity to analyze it and draft comments.

The Draft Guidance is a technical document which will require significant time to fully review and draft a response. However, the Draft Guidance's current review period has been effectively shortened by the intervening holiday season. Exacerbating this strain, our members must also simultaneously review several other technical NAAQS implementation documents recently released by EPA, many of which have comment deadlines competing with the Draft Guidance. These include the *Draft $PM_{2.5}$ Precursor Demonstration Guidance*, with a comment deadline of February 3, the *Proposed Implementation of the 2015 NAAQS for Ozone Rule*, with a comment deadline of February 13, and the *Final Revisions to the Guideline on Air Quality Models Rule*, a signed version of which was released on December 20, 2016. Therefore, a 60-day extension to the Draft Guidance's comment period is necessary to evaluate the Draft Guidance and provide informative comments to EPA.

HUNTON& WILLIAMS

We understand that because the Draft Guidance is not undergoing the formal rulemaking process, its comment deadline is informal. While the Draft Guidance's comment deadline is not an administrative barrier to considering stakeholder views, we nevertheless request that it be extended.

Furthermore, we request that EPA open up a docket on regulations.gov for comments and materials related to the Draft Guidance. Generally speaking, we encourage EPA to open such dockets for all future draft guidance or related documents. This will provide stakeholders an opportunity to review comments submitted by the public and will foster more transparency as EPA develops implementation policy. Alternatively, EPA could make these materials publicly available on its website, with a link to the document itself to help people locate them.

The NAAQS Implementation Coalition appreciates your attention to this matter.

Sincerely,

Joseph C. Stanko, Jr.
Counsel for the
NAAQS Implementation Coalition

cc: Tyler Fox, fox.tyler@epa.gov
Steve Page, page.steve@epa.gov
Chet Wayland, wayland.richard@epa.gov

STATE OF MISSOURI
Eric R. Greitens, Governor • Carol S. Comer, Acting Director
DEPARTMENT OF NATURAL RESOURCES
dnr.mo.gov

January 30, 2017

Attn: Brian Timin and Patrick Lessard
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711

Dear Sirs:

The purpose of this letter is to provide comments on the following:

Memo from Stephen Page – Draft $PM_{2.5}$ Precursor Demonstration Guidance

The Missouri Department of Natural Resources' Air Pollution Control Program (air program) appreciates the opportunity to provide comments on the draft guidance document. EPA has indicated this guidance is intended to help air agencies develop optional precursor demonstrations for a specific nonattainment area, as allowed by the fine particulate matter ($PM_{2.5}$) Implementation Rule (81 FR 58010). These demonstrations evaluate the significance of a particular precursor to $PM_{2.5}$ levels in the area, and, if approved by EPA, require no further evaluation for state implementation plan (SIP) and/or nonattainment new source review (NNSR) purposes. The air program respectfully provides the following comments with regard to the draft guidance document.

Comprehensive Precursor Demonstrations (for SIP Obligations)

The air program requests EPA revise the guidance to expressly provide for a streamlined approach to precursor demonstrations in nonattainment areas that have clean data determinations. While clean data determinations suspend many attainment-related planning obligations for states with nonattainment areas, in order to be redesignated to attainment and permanently remove such planning obligations, a maintenance plan must be developed and approved for the area. For precursors where nonpoint and biogenic sources that are difficult to control and quantify comprise the vast majority of the emission inventory (such as ammonia and volatile organic compounds (VOC)), the guidance should permit states to make simple qualitative precursor demonstrations to exclude these pollutants from any remaining SIP obligations after the clean data determination is made, including maintenance plans. This will allow states to focus their planning efforts on the pollutants that are more easily quantified and controlled, rather than expend resources on an extensive precursor demonstration to quantify and develop potential control strategies for pollutants where the anthropogenic point source emissions are insignificant when compared to nonpoint and biogenic emission sources.

NNSR Precursor Demonstrations

As mentioned above, certain SIP obligations are not suspended when a clean data determination is made for an area. NNSR permitting is one such SIP obligation. The air program requests, similar to above, that the final guidance document expressly provide for a streamlined precursor demonstration that does not require photochemical modeling to exempt certain precursors from NNSR permitting in $PM_{2.5}$ nonattainment areas that have achieved attainment and a clean data determination has been made. In particular, NNSR precursor demonstrations for VOC and ammonia in $PM_{2.5}$ nonattainment areas that have already achieved attainment should be granted presumed approval. These two pollutants typically have insignificant point source contributions when compared to nonpoint and biogenic sources. Subjecting these two pollutants to NNSR permitting in $PM_{2.5}$ nonattainment areas that have already attained the standard is unnecessary, and states should be given a streamlined option for removing such obligations.

For ammonia in particular, the guidance should be even more lenient for NNSR precursor demonstrations. Many nitrogen oxide (NO_x) control strategies for large point sources of NO_x emissions (selective and nonselective catalytic reduction) inherently result in an increase of ammonia emissions due to the reagent that must be injected into the exhaust stream. Subjecting ammonia emissions to NNSR permitting obligations, particularly in situations where sources are seeking permits to construct and install NO_x controls, would be counterproductive as it would place barriers in the way of the installation of necessary emission controls. EPA should be mindful of this and allow for simplified precursor demonstrations to remove ammonia from NNSR requirements.

The Department's Air Pollution Control Program appreciates the opportunity to comment on the draft guidance document. Should EPA require further information on this matter, please contact Darcy Bybee, Air Quality Planning Section Chief with the Department's Air Pollution Control Program at P.O. Box 176, Jefferson City, MO 65102-0176, or by telephone at (573) 751-7840.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kyra L. Moore

Kyra L. Moore
Director

KLM:mlc

From:	Bhandutia, Ketan
To:	Timin, Brian; Lessard, Patrick
Cc:	Leon, Joel; Wong, Danny; John, Greg; Davis, Sharon
Subject:	Comments on EPA Draft PM2.5 Precursor Demonstration Guidance
Date:	Monday, January 30, 2017 2:52:06 PM

Brian and Patrick - Thank you for the opportunity to comment on the United States Environmental Protection Agency's (EPA) November 17, 2016 draft version of "$PM_{2.5}$ Precursor Demonstration Guidance".

The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) implementation rule (August 24, 2016 Federal Register, page 58161) identifies sulfur dioxide (SO2), nitrogen oxide (NOx), volatile organic compounds (VOC) and ammonia (NH3), as $PM_{2.5}$ precursors, and requires to address these precursors presumptively in the Non-attainment New Source Review (NNSR) permitting and attainment planning. The rule allows states to forego adopting controls to reduce emissions of a particular precursor if a state adequately demonstrates that the precursor does not contribute significantly to $PM_{2.5}$ levels that exceed the standard in a non-attainment area. The November 17 2016 draft is intended to provide guidance who wish to submit $PM_{2.5}$ precursor demonstrations.

We request EPA to consider the following comments before issuing the final "$PM_{2.5}$ Precursor Demonstration Guidance".

1. With respect to ammonia, EPA should provide significant emission rate (SER) for NNSR permitting. EPA November 17 2016 draft guidance refers to EPA's December 2, 2016 guidance on modeled emission rate for precursors (MERPs) which did not specify SER for ammonia. The August 24, 2016 $PM_{2.5}$ NAAQS implementation rule does not provide ammonia SER for NNSR permitting. EPA failure to provide SER for ammonia leaves a major gap and creates uncertainty for states with respect to permitting of major sources of ammonia, including sources equipped with ammonia emitting NOx control systems. The SER for ammonia remains to be defined by each state as a part of their NNSR program.

   EPA November 17 2016 draft guidance recommends case-by-case photochemical modeling fixed ton per year increase for the NNSR demonstration (evaluation of the effects of emission increases from major stationary sources at hypothetical new and existing sources in non-attainment area). The draft guidance does not recommend a specific tonnage or number of sources. In absence of SER for ammonia, states would be required to model any proposed emission increase of ammonia for each permit application which would be highly resource intensive.

2. EPA should provide guidance on precursor demonstration in multi-state non-attainment areas of $PM_{2.5}$ NAAQS instead of state specific contribution analysis.

3. EPA should provide examples, share appropriate EPA modeling, and assist state with new modeling to determine if a precursor can be excluded from controls. EPA should provide states discretion and flexibility to work with EPA to determine feasible and appropriate

analysis for a particular area. EPA should provide funding since the precursor demonstration is resource intensive.

Thanks again for sharing the draft.

Ketan Bhandutia
Environmental Scientist
New Jersey DEP Air Program
(609) 984-6356

Air Quality
ENVIRONMENTAL QUALITY

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

SHEILA C. HOLMAN
Director

January 31, 2017

Mr. Brian Timin, Air Quality Assessment Division (MC: C439-01)
Mr. Patrick Lessard, Air Quality Policy Division (MC: C539-01)
U.S. Environmental Protection Agency
109 T.W. Alexander Drive
Research Triangle Park, NC 27709

Subject: Draft $PM_{2.5}$ Precursor Demonstration Guidance

Dear Mr. Timin and Mr. Lessard:

The North Carolina Division of Air Quality (DAQ), within the Department of Environmental Quality, appreciates the opportunity to comment as requested on the U.S. Environmental Protection Agency's (EPA) draft *$PM_{2.5}$ Precursor Demonstration Guidance* dated November 7, 2016. The draft guidance is clear, descriptive, and does an excellent job of outlining the process for insignificance determinations for PM2.5 precursors. I would like to offer the following detailed comments for your consideration:

1) Section 2.2 Criteria for Identifying an Insignificant Contribution (Pages 12-16)

The EPA selected a confidence interval (CI) of 50% for determining the change in concentration that is considered "statistically significant" for the purpose of meeting requirements for Prevention of Significant Deterioration (PSD) modeling demonstrations. The EPA is proposing to use this same CI of 50% for insignificance determinations of $PM_{2.5}$ precursors. However, there are important differences between PSD modeling and a precursor insignificant determination as outlined in this guidance document. For PSD modeling, a source or small number of sources are modeled, and the resulting changes in concentrations will be relatively small. For determining precursor insignificance, many counties or entire states may be modeled, whose total emissions are far greater than an individual source or collection of sources. The resulting change in modeled concentrations may be an order of magnitude higher than changes modeled for a PSD demonstration. A higher confidence interval of at least 75% should be used to establish significance thresholds for $PM_{2.5}$ precursor demonstrations. This roughly coincides with the one standard deviation or 68% confidence level described in the 2016 EPA document, "Technical Basis for the EPA's Development of Significant Impact Thresholds for $PM_{2.5}$ and Ozone".[1]

[1] U.S. Environmental Protection Agency, 2016. Technical Basis for the EPA's Development of Significant Impact Thresholds for PM2.5 and Ozone, Draft August 1, 2016. EPA-454/D-16-001a.

2) Section 5.4.2 Estimating the Daily $PM_{2.5}$ Impact from Precursors (Page 36)

The DAQ recommends incorporating daily model performance for evaluating daily $PM_{2.5}$ impacts from precursors. A poor performing model day (or days) may lead to incorrect and/or highly uncertain daily $PM_{2.5}$ design values as well as impacts from precursors. Poor performing model days should be removed from any calculations and replaced with the next highest model days with good performance. The EPA notes in its photochemical modeling guidance[2] (page 102) that days with normalized error greater than 20 percent should be examined for appropriateness, and also that days with bias greater than +/- 20% may have a detrimental effect on design value calculations.

If you have any questions regarding this submittal, please contact Nick Witcraft at (919) 707-8484 or nick.witcraft@ncdenr.gov.

Sincerely,

Sheila C. Holman, Director
Division of Air Quality, DEQ

SCH/nw

cc: Michael Abraczinskas, DAQ
Sushma Masemore, DAQ
Randy Strait, DAQ

[2] Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5 and Regional Haze https://www3.epa.gov/scram001/guidance/guide/Draft-O3-PM-RH-Modeling_Guidance-2014.pdf

Cathe Kalisz
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March 3, 2017

Submitted via email to timin.brian@epa.gov

Mr. Brian Timin
Office of Air Quality Planning and Standards
United States Environmental Protection Agency
109 T.W. Alexander Drive
Research Triangle Park, NC 27709

RE: Draft EPA $PM_{2.5}$ Precursor Demonstration Guidance (Issued November 17, 2016)

Dear Mr. Timin:

The American Petroleum Institute (API) provides comments on the Environmental Protection Agency's (EPA) November 17, 2016 draft *$PM_{2.5}$ Precursor Demonstration Guidance* (Guidance).

API represents over 625 oil and natural gas companies, leaders of a technology-driven industry that supplies most of America's energy, supports more than 9.8 million jobs and 8 percent of the U.S. economy, and, since 2000, has invested nearly $2 trillion in U.S. capital projects to advance all forms of energy, including alternatives. Efficient and cost-effective implementation of National Ambient Air Quality Standards (NAAQS) is important both to conserve state resources and to facilitate our members' timely construction or modification of facilities to meet our nation's energy needs.

The $PM_{2.5}$ State Implementation Plan (SIP) Requirements Rule (finalized August 2016) added the $PM_{2.5}$ precursors of VOC and ammonia to the definition of a regulated NSR pollutant. The rule also provided options for states to exempt precursor emission sources from control requirements in attainment plans or to exempt precursor sources from NNSR permitting, if the state can demonstrate that the precursor emissions do not significantly contribute to area $PM_{2.5}$ ambient concentrations.

We support the option for air agencies to make $PM_{2.5}$ precursor demonstrations as provided by the SIP Requirements Rule. Our review of EPA's draft Guidance for developing such demonstrations identified the following areas for improvement or clarification.

The quantitative threshold used to determine a contribution to air quality impacts is overly conservative.

In its Guidance, EPA relies on the $PM_{2.5}$ Significant Impact Levels (SIL) set out in its August 1, 2016 Technical Basis Document[1] to assess whether VOC or ammonia precursor emissions are contributing to ambient $PM_{2.5}$. The draft $PM_{2.5}$ SILs were established based on a bootstrapping analysis of ambient monitor data and represent the uncertainty in the value of monitor design concentrations at a 50% Confidence Interval. As further discussed in API's comments on the SIL guidance[2], the use of a 50% Confidential Interval in assessing significance is overly conservative. While we acknowledge that use of the SIL values is an initial first step in determining whether a contribution is significant[3], the SIL threshold is so conservative that it is not likely to provide any benefit as an initial screening.

Evaluation of modeled secondary organic aerosol data from anthropogenic sources (SOAA) could be used to assess whether VOC precursor emissions are a significant contributor, without the need for a sensitivity analysis.

The draft Guidance describes a concentration-based analysis as the first step of a precursor demonstration. For VOC, the analysis provides for examination of observed $PM_{2.5}$ speciation data for Organic Carbon (OC). Organic aerosol (OA) mass is determined by multiplying the organic carbon by an appropriate factor (typically 1.4x to 1.8x of the OC) and all of the mass is assumed to be secondary organic aerosol (SOA, i.e., VOC precursor). If the 24-hour OA is < 1.3 $\mu g/m^3$ and annual OA < 0.2 $\mu g/m^3$, then it has been demonstrated that VOC is not a significant $PM_{2.5}$ precursor. If the organic aerosol is greater than these SIL thresholds, then the draft Guidance recommends performing a VOC emissions reduction sensitivity modeling analysis.

A next-step evaluation before a sensitivity analysis could be an examination of the contribution of VOC emissions to SOA using existing CMAQ or CAMx modeling results (e.g., EPA's ozone transport analysis using the 2011v6.3 platform). Both CMAQ and CAMx output separate SOA species for different VOC species that can be post-processed to separately track SOA that are mainly formed from biogenic (SOAB) or anthropogenic (SOAA) VOC emissions. If the SOAA concentrations within a $PM_{2.5}$ nonattainment area are less than the 24-hour and annual $PM_{2.5}$ significance thresholds, then it has been demonstrated that VOC is not a significant $PM_{2.5}$

[1] https://www.epa.gov/pm2_5_sils_and_ozone_technical_basis_document.pdf

[2] API Comments SIL Guidance

[3] The EPA makes clear on Page 17 of the draft Guidance that "If the estimated air quality impact exceeds the recommended contribution thresholds in the Technical Basis Document, this fact does not necessarily preclude approval of the precursor demonstration. There may be cases where it could be determined that precursor emissions have an impact above the recommended contribution thresholds, yet do not "significantly contribute" to levels that exceed the standard in the area (pursuant to section 189(e)). Under the $PM_{2.5}$ SIP Requirements Rule, the significance of a precursor's contribution is to be determined "based on the facts and circumstances of the area."

precursor. If SOAA is above the thresholds, then the sensitivity analysis would be required. Note that the CMAQ/CAMx SOA species represents SOA from all anthropogenic VOC emissions sources so this would be a conservative estimate of the amount of SOA from anthropogenic VOC emissions within the PM nonattainment area. Attachment A discusses the CMAQ and CAMx SOA modules and species mappings to obtain SOAA and SOAB for the most frequently used SOA modules in the two models.

Thank you for your consideration of these comments. If you have any questions, please contact me at kaliszc@api.org or at (202) 682-8318.

Sincerely,

Cathe Kalisz

Cathe Kalisz

Attachment A

Attachment A

CAMx and CMAQ Estimates of Anthropogenic (SOAA) and Biogenic (SOAB) Secondary Organic Aerosol from VOC Emissions

CAMx SOAP Secondary Organic Aerosol Module

SOAP is the CAMx default SOA chemistry/partitioning module when the aerosol keyword is set to “CF”, “CF_SOAP2” or “CMU” in the chemistry parameters input file. Directly emitted (primary) organic aerosol is treated by SOAP as a single non-volatile species called POA that does not chemically evolve. However, POA does influence the evolution of SOA. SOA species exist in equilibrium with condensable gasses (CG) that can be produced by VOC oxidation:

$$\text{VOC + oxidant} \rightarrow \text{CG} \leftrightarrow \text{SOA}$$

The SOAP module consists of two parts: gas-phase oxidation chemistry that forms CG products, and equilibrium partitioning between gas and aerosol phases for each CG/SOA pair. CG formation from VOC oxidation reactions is handled within the SOAP module rather than the main gas-phase chemistry, as described below. This approach has the following advantages: (1) it separates the VOC precursors and lumping schemes for oxidant chemistry and SOA formation (e.g., for aromatics, different lumping schemes may be appropriate for oxidant and SOA formation); (2) it allows the same SOA mechanism to be used with different oxidant mechanisms; (3) it allows inclusion of SOA precursors without explicitly defining oxidant reactions (e.g., sesquiterpenes are explicit in the SOA module but their oxidant formation may be represented by surrogate species).

Each precursor produces three CG species: more-volatile, less-volatile and non-volatile products. The more- and less-volatile CG products from all anthropogenic precursors are lumped to CG1 and CG2, respectively. The CG products from all biogenic precursors are similarly lumped to CG3 and CG4. No CG is needed to represent non-volatile products as they are instantly condensed to form SOA (SOPA and SOPB from anthropogenic and biogenic precursors, respectively). The physical properties of the SOAP species are shown in Table A-1.

Table A-1. SOA parameters for CAMx SOAP SOA module.

SOA species	VOC precursor	Aerosol mass yield[1]	C* [µg/m^3] at 298K	ΔH^{vap} [kJ/mol]	MW [g/mol]
SOA1	Benzene	0 / 0.605	48	20	150
	Toluene	0 / 0.137			
	Xylene	0 / 0.093			
	IVOC	0 / 0			
SOA2	Benzene	0 / 0.036	1.6	24	150
	Toluene	0 / 0.064			
	Xylene	0 / 0.036			
	IVOC	0.224 / 0.200			
SOPA	Benzene	0.37 / 0.019	0	-	220
	Toluene	0.30 / 0			
	Xylene	0.36 / 0.00006			
	IVOC	0.348 / 0.183			
SOA3	Isoprene	0.209	140	24	180
	Monoterpene	0.626			
	Sesquiterpene	1.885			
SOA4	Isoprene	0.035	2.9	57	180
	Monoterpene	0.062			
	Sesquiterpene	0.431			
SOPB	Isoprene	0.004	0	-	220
	Monoterpene	0			
	Sesquiterpene	0			

[1] Mass-based yields of CG products from VOC precursors (low-NOx yield / high-NOx yield)

Polymerization reactions in organic aerosol phases will increase the molecular weight of the condensed aerosol and reduce the volatility. Detailed descriptions of polymerization depend upon the chemical composition of the organic and inorganic aerosol phases (e.g., aerosol acidity). SOAP assumes that semi-volatile SOAs are polymerized to form non-volatile SOAs (SOPA and SOPB) with a half-life of 20 hours (Kalberer et al., 2004). In-cloud SOA formation by the RADM module is added to SOPB. Total SOA is the sum of SOA1-4 plus SOPA and SOPB. Total organic aerosol is the sum of total SOA and the single POA species.

Output from CAMx running with the SOAP SOA module can be post-processed to estimate the amount of SOA from anthropogenic (SOAA) versus biogenic (SOAB) VOC emissions as follows:

SOAA = SOA1 + SOA2 + SOPA

SOAB = SOA3 + SOA4 + SOPB

Note that the definitions of SOAA and SOAB are based on VOC species and essentially assume that all benzene, toluene, xylene and IVOC emissions are from anthropogenic sources and all isoprene, monoterpene and sesquiterpene emissions are from biogenic sources. If non-anthropogenic sources were emitting benzene, toluene, xylene or IVOC, then the SOAA would be a conservative (i.e., overstated) estimate of anthropogenic VOC. So we are more concerned

about anthropogenic sources that are emitting isoprene, monoterpene or sesquiterpene emissions that would be classified as the SOAB category rather than as SOAA. We examined

the VOC speciation from EPA's 2011 Version 6.3 modeling[4] platform and found that monoterpene and sesquiterpene species were only emitted by the biogenic emissions sources category, but that isoprene was emitted by several source categories. The total 2011v6.3 isoprene emissions across the U.S. were 13,145,935 tons per year (TPY) of which 13,112,446 TPY were from biogenic (BEIS) emissions. Of the remaining 0.3%, 0.2% (22,943 TPY) were from open land fires (i.e., not anthropogenic). Thus, 99.92% of the isoprene emissions across the U.S. in the 2011v6.3 modeling platform were not from anthropogenic sources, so SOAA is an accurate estimate of SOA due to anthropogenic VOC emissions.

CMAQ SOA Module

The SOA module in the CMAQ aerosol scheme (AERO6, default aerosol scheme in CMAQ version 5.1) also treats SOA formation from various VOC precursors. Table A-2 lists model species names of CMAQ SOA species and their precursors.

Table A-2. SOA species and their precursors in the CMAQ AERO6 aerosol scheme

SOA model species	VOC precursors	Note
AALK1J/AALK2J	Long-chain alkanes	
AXYL1J/AXYL2J/AXYL3J	Xylene	
ATOL1J/ATOL2J/ATOL3J	Toluene	
ABNZ1J/ABNZ2J/ABNZ3J	Benzene	
APAH1J/APAH2J/APAH3J	Naphthalene	
AISO1J/AISO2J/AISO3J	Isoprene	
ATRP1J/ATRP2J	Monoterpenes	
ASQTJ	Sesquiterpenes	
AOLGAJ	Anthropogenic SOA precursors	SOA from polymerization of anthropogenic SOA
AOLGBJ	Biogenic SOA precursors	SOA from polymerization of biogenic SOA
AORGCJ	Glyoxal and methylglyoxal	SOA from in-cloud processes

As with the CAMx SOAP SOA module, the CMAQ output can be post-processed to separate SOA formed from anthropogenic and biogenic precursors:

SOAA = AALK1J + AALK2J + AXYL1J + AXYL2J + AXYL3J + ATOL1J + ATOL2J + ATOL3J + ABNZ1J + ABNZ2J + ABNZ3J + APAH1J + APAH2J + APAH3J + AOLGAJ

SOAB = AISO1J + AISO2J + AISO3J + ATRP1J + ATRP2J + ASQTJ + AOLGBJ + AORGCJ

We assume that emissions of all long-chain alkanes and aromatics are from anthropogenic sources and all isoprene, monoterpene and sesquiterpene emissions are from biogenic

[4] See file "2011ek_cb6v2_v6_11g_state_sector_totals.xlsx" from https://www.epa.gov/air-emissions-modeling/2011-version-63-platform

sources. Glyoxal and methylglyoxal are predominantly formed from oxidation of isoprene, thus they are considered biogenic precursors.

CMAQ v5.1 provides another aerosol scheme, AERO6i, which is available only with the SAPRC07 chemistry mechanism with detailed isoprene chemistry (SAPRC07TIC). The SOA module in AERO6i updated SOA formation from isoprene and monoterpenes including aerosol-phase SOA formation from isoprene epoxides and explicit organic nitrate formation from isoprene and monoterpenes. With AERO6i, the above equation for biogenic SOA (SOAB) will include more SOA species from the updated isoprene and monoterpene SOA formation, but anthropogenic SOA remains the same as AERO6.

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

March 28, 2017

BY EMAIL

Mr. Brian Timin (timin.brian@epa.gov)
Air Quality Assessment Division
Mr. Patrick Lessard (lessard.patrick@epa.gov)
Air Quality Policy Division
Office of Air Quality Planning & Standards
United Stated Environmental Protection Agency
Research Triangle Park, NC

Re: Comments on Draft $PM_{2.5}$ Precursor Demonstration Guidance Doc. No. EPA-454/P-16-001 (Nov. 2016)

Dear Messrs. Timin and Lessard:

On behalf of the Bay Area Air Quality Management District (Air District or District), I am writing to provide comments on the above-referenced Draft $PM_{2.5}$ Precursor Demonstration Guidance published on November 17, 2016 (Draft Guidance). The Air District is the regional agency with responsibility for regulating air emissions from stationary sources within the nine-county San Francisco Bay Area in Northern California (Bay Area). The Air District is the agency that implements the portion of the California State Implementation Plan applicable within the Bay Area.

At the outset, I would like to thank you and your staff for preparing this valuable guidance document. The Air District and other state and local air quality agencies around the country will undoubtedly find it extremely useful in assessing how best to evaluate $PM_{2.5}$ precursors when preparing their State Implementation Plan submissions. The Air District also appreciates the opportunity to submit comments on the Draft Guidance.

The Air District's comments concern the thresholds that EPA is proposing for use in demonstrating whether emissions of $PM_{2.5}$ precursors "contribute significantly" to $PM_{2.5}$ levels exceeding the National Ambient Air Quality Standards (NAAQS) – i.e., the "Precursor Demonstration" referenced in the title of the Draft Guidance. The Precursor Demonstration is highly important because it will form the basis of EPA's determination as to whether the Clean Air Act's non-attainment requirements apply to a particular precursor in areas that have been administratively designated as non-attainment for the $PM_{2.5}$ NAAQS. Under Section 189(e) of the Clean Air Act and related provisions of EPA's implementing regulations, states with $PM_{2.5}$ non-attainment areas are not required to apply those requirements to any precursor where EPA determines that emissions of the precursor do not contribute

significantly to $PM_{2.5}$ levels that exceed the NAAQS. The Precursor Demonstration will form the basis of EPA's determination on this issue.

The Air District submits that EPA should clarify whether and how the proposed thresholds should be applied in situations where ambient $PM_{2.5}$ concentrations are below the NAAQS. This is important to understand how to demonstrate that precursor emissions do not contribute significantly to $PM_{2.5}$ levels that exceed the NAAQS in situations where there are no $PM_{2.5}$ levels exceeding the NAAQS in the first place. It is especially important in the context of understanding how EPA will apply its new regulations in 40 CFR 51.165(a)(13) and 51.1006(a)(3) pertaining to Precursor Demonstrations for purposes of non-attainment new source review (NNSR).

The Draft Guidance focuses primarily on how to determine what constitutes a significant contribution in situations where existing ambient concentrations *do* exceed the NAAQS. This is understandable, given that the non-attainment regulatory requirements that are the focus of the Precursor Demonstration apply in $PM_{2.5}$ non-attainment areas, which are generally designated as such because they have $PM_{2.5}$ concentrations exceeding the NAAQS. But some $PM_{2.5}$ non-attainment areas do not have any $PM_{2.5}$ concentrations exceeding the NAAQS. The Bay Area is in this category, as EPA has made a "Clean Data Determination" recognizing and formally determining that the monitored design value is less than or equal to 35 $\mu g/m^3$ (the $PM_{2.5}$ NAAQS) at all monitored locations throughout the region. (Determination of Attainment for the San Francisco Bay Area Nonattainment Area for the 2006 Fine Particle Standard; California; Determination Regarding Applicability of Clean Air Act Requirements, 78 FR 1760, Jan. 9, 2013.) In addition, even in non-attainment areas that do have design values exceeding the NAAQS, not every location within those areas will necessarily have a design value over the NAAQS. It is important that EPA clarify how an NNSR Precursor Demonstration would work in such situation.

The Air District's concerns center on the recommended 1.3 $\mu g/m^3$ threshold EPA is proposing in the Draft Guidance for demonstrating whether $PM_{2.5}$ precursor emissions contribute significantly to 24-hour $PM_{2.5}$ concentrations exceeding the 24-hour NAAQS. (The 24-hour standard is the Air District's primary focus because that is the standard for which the Bay Area is designated as non-attainment, but the same concerns would apply generally to a Precursor Demonstration for the annual standard as well.) Under the approach set forth in the Draft Guidance, agencies like the Air District will be required to undertake a "sensitivity analysis" to determine if precursor emissions from new major sources and major modifications that could potentially locate within the region would have a significant impact on $PM_{2.5}$ concentrations in the region. This analysis would be undertaken by first determining the extent of the precursor emissions increases that could occur from such new or

modified sources, and then modeling the impacts of those emissions increases at appropriate locations in the region to determine the impacts on ambient $PM_{2.5}$ concentrations. Under Section 6.4 of the Draft Guidance, the modeled impacts would be compared with the 1.3 $\mu g/m^3$ threshold to determine whether or not a valid Precursor Demonstration can be made for purposes of 40 CFR 51.165(a)(13) and 51.1006(a)(3).

While this 1.3 $\mu g/m^3$ threshold may be appropriate for use in situations where ambient concentrations exceed the NAAQS, it would not be appropriate for situations where ambient concentrations are below the NAAQS. An example illustrates why this is true. Say that a non-attainment area with a Clean Data Determination has existing ambient concentrations of between 20 and 30 $\mu g/m^3$ (depending on the specific location within the non-attainment area). If the emissions of a precursor were modeled to increase ambient $PM_{2.5}$ levels by 1.3 $\mu g/m^3$, that would still leave overall $PM_{2.5}$ levels well below the NAAQS, which is 35 $\mu g/m^3$. In such a case, it could be said that the precursor contributes significantly to $PM_{2.5}$ levels in the 20-30 $\mu g/m^3$ range (i.e., the precursor would increase ambient concentrations to 21.3 to 31.3 $\mu g/m^3$, depending on the location). But it could not be said that the emissions of the precursor "contribute significantly to *$PM_{2.5}$ levels that exceed the standard*," which is the determination that must be made under 40 CFR 51.165(a)(13) and 51.1006(a)(3).

The Air District does not believe that it was EPA's intent in the Draft Guidance to suggest that a modeled increase exceeding the proposed 1.3 $\mu g/m^3$ threshold should preclude a state from making a Precursor Demonstration under 40 CFR 51.165(a)(13) and 51.1006(a)(3) where the increase is not actually contributing to any ambient concentrations exceeding the NAAQS. As the Draft Guidance explains (p. 39), the goal of the precursor analysis is to demonstrate "whether the resulting $PM_{2.5}$ air quality change that could result from potential major source growth would be a significant concentration to *$PM_{2.5}$ levels that exceed the NAAQS in a $PM_{2.5}$ nonattainment area*." (Emphasis added.) As written, however, Section 6.4, as well as other statements in the Draft Guidance, could be read to suggest that *any* analysis that shows a modeled increase above a 1.3 $\mu g/m^3$ threshold would preclude the region from making a Precursor Demonstration under 40 CFR 51.165(a)(13) and 51.1006(a)(3) – even in situations like the one in the example above where ambient concentrations are below the NAAQS, and would continue to be below the NAAQS even with the addition of any impacts from emissions of the precursor from potential new major sources or major modifications.

The Air District suggests that EPA should clarify how the Precursor Demonstration would work in situations such as this one. The Air District submits that EPA should clarify that the 1.3 $\mu g/m^3$ threshold applies only where total predicted ambient $PM_{2.5}$ levels will exceed the NAAQS. The Air District suggests that EPA should clarify that

if a modeled increase exceeds the 1.3 $\mu g/m^3$ threshold, the state can still make the Precursor Demonstration as long as the increase will not be contributing to any ambient concentrations exceeding the NAAQS.

The Air District further submits that for situations where existing concentrations are below the NAAQS, it would be appropriate to analogize to the approach EPA uses for demonstrating that new and modified major sources will not cause or contribute to a violation of any applicable NAAQS or PSD Increment under the PSD permitting program. This requirement is set forth in 40 CFR 52.21(k), with further elaboration provided in various EPA regulations and guidance documents – including the Technical Basis Document on which the Draft Guidance draws heavily. Under that approach, emissions from new major sources and major modifications are modeled to determine what their predicted ambient impacts will be. The modeled impacts are then added to existing background concentrations to determine whether there will be a predicted violation of the applicable NAAQS. If the sum of the background concentration plus the modeled impact is below the NAAQS, the analysis ends there – the new/modified source will not be causing or contributing to an exceedance of the NAAQS, because there will be no exceedance of the NAAQS. If the background concentration plus the modeled impact exceeds the NAAQS, then the 1.3 $\mu g/m^3$ threshold is applied to determine whether the new/modified source will be "causing or contributing" to the exceedance within the language of 40 CFR 52.21(k).

This same approach would be appropriate for purposes of making the Precursor Demonstration under 40 CFR 51.165(a)(13) and 51.1006(a)(3). The analysis would use the approach outlined in the Draft Guidance of identifying the extent of the precursor emissions increases that could potentially occur from new major sources or major modifications, and then modeling the impacts of those emissions increases at appropriate locations in the region to determine the impacts on ambient $PM_{2.5}$ concentrations. The modeled impacts would then be added to background concentrations at each modeled location to determine whether the total predicted concentration would exceed the NAAQS at that location. If the analysis shows that there will be no exceedance at a modeled location, then the analysis would end there for that location. If the analysis shows that there will be an exceedance at a modeled location when the modeled impact is added to background concentrations, then the 1.3 $\mu g/m^3$ threshold could be applied to determine if the precursor emissions from the new/modified sources that were modeled will "contribute significantly to $PM_{2.5}$ concentrations that exceed the standard" as required by 40 CFR 51.165(a)(13) and 51.1006(a)(3).

It would be appropriate to analogize to the PSD approach in this manner for the same reasons that EPA has found it appropriate to analogize to the PSD approach in developing the proposed 1.3 $\mu g/m^3$ threshold for Precursor Demonstrations. Moreover, using this PSD approach would allow the Precursor Demonstration

guidelines to remain true to the principle that precursor emissions must contribute significantly "to $PM_{2.5}$ concentrations that exceed the standard" in order for NNSR requirements to apply to them. Simply applying a 1.3 $\mu g/m^3$ threshold in all cases – i.e., precluding the use of a Precursor Demonstration whenever modeled impacts from new/modified sources result in an increase over 1.3 $\mu g/m^3$, regardless of whether or not the resulting concentrations exceed the NAAQS – would not be appropriate to implement this requirement. The Air District submits that EPA should state explicitly that this is not how the 1.3 $\mu g/m^3$ threshold should be applied, and should provide for the PSD approach to be used in situations where ambient concentrations do not exceed the NAAQS.

Thank you for the opportunity to comment on the Draft Guidance. If you have any questions about these comments, or if the Air District can provide any further information, please contact Pamela Leong of my staff at (415) 749-5186.

Sincerely,

Jaime A. Williams
Director, Engineering Division

THE STATE of ALASKA
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March 30, 2017

Submittal via e-mail Clean_Air_Act_105@epa.gov
U.S. Environmental Protection Agency

Subject: $PM_{2.5}$ Precursor Demonstration Guidance

Dear Docket Manager:

The Alaska Department of Environmental Conservation (ADEC) Division of Air Quality has reviewed the U.S. Environmental Protection Agency's (EPA's) draft version of the "$PM_{2.5}$ Precursor Demonstration Guidance" (Guidance) issued on November 17, 2016. ADEC appreciates the opportunity to provide input on this important matter and offers the following comments on the proposal. The comments are presented based on the section of the guidance document.

2.3 Locations at Which to Evaluate Air Quality Changes
…air quality changes should be evaluated at existing or relevant PM 2.5 monitoring locations… (pg. 16)

ADEC supports using this method for assessing $PM_{2.5}$ precursors within a nonattainment area.

4.0 Sensitivity Based Analysis
This type of optional analysis is only necessary if the concentration-based analysis described above does not adequately demonstrate insignificant impacts to PM 2.5 concentrations in the nonattainment area. (pg. 25)

It is unclear what metrics (if any) there are for judging whether an analysis adequately demonstrates precursor insignificance beyond producing ambient analysis or modeling analysis that shows contributions below the stated thresholds. ADEC requests that EPA specify what the metrics are in the final Guidance document.

5.1.1 Air Quality Modeling Process
The protocol should detail and formalize the procedures for conducting all phases of the modeling study, such as describing the background and objectives for the study, creating a schedule and organizational structure for the study, developing the input data, conducting model performance evaluations, interpreting modeling results, describing procedures for using the model to demonstrate whether regulatory levels are met, and producing documentation to be submitted for review and approval. (pg. 32)

Considerable resources and time will be required to develop both a precursor demonstration and a control measures analysis across all pollutants. Has EPA established a process to approve a precursor demonstration in advance of submittal of the full State Implementation Plan (SIP)? It will be difficult for states to meet requirements for SIP submittals if precursor demonstrations are not approved in a timely manner prior to submittal deadlines. Therefore, ADEC recommends that EPA establish a process for approving or conditionally approving demonstrations prior to SIP submittal and include it in the final Guidance document. It is ADEC's intention to develop precursor demonstrations and then develop the SIP and control measures, assuming the demonstrations will be approved. Timely approval of precursor demonstrations will provide industry and the community an understanding of where ADEC is concentrating control efforts and what control options may be required.

5.3 Modeling Approaches
Additionally, some photochemical models have been instrumented with source apportionment, which tracks emissions from specific sources, source sectors, and/or source regions through chemical transformation, transport, and deposition processes to estimate the apportionment of predicted PM 2.5 species concentrations (Kwok et al., 2015; Kwok et al., 2013). ... Air agencies can choose the most efficient modeling technique for their particular situation and should discuss the options with the appropriate EPA Regional office. (pg. 34)

It is unclear in the Guidance when assessing the volatile organic carbon (VOC) contribution to $PM_{2.5}$ whether the precursor demonstration can be performed by summarizing the total secondary organic aerosol (SOA) component of PM modeled at the monitor locations for the nearest base year, or whether a run using a modified inventory or source apportionment mode is required. EPA should clarify in the final Guidance if this method is acceptable for a precursor demonstration.

5.4 Calculating the Modeled Impact from Precursors (pg. 34)

ADEC requests that EPA provide parameters (or examples), beyond model bias, on when using absolute or relative model results are considered appropriate.

5.4.2 Estimating the Daily PM 2.5 Impact from Precursors
When using the relative attainment test, the default recommendation is to use the single grid cell where the monitor is located to represent the location of the monitor. (pg. 36)

While the single grid-cell approach is consistent with EPA's modeling guidance for 24-hour $PM_{2.5}$, it is unclear if there are instances where a multi-cell average would be more appropriate. Additionally, it is not clear why the limitations described in the section 4.2.2 of *EPA's Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze Using* in regards to ozone might not also apply when modeling secondary $PM_{2.5}$. ADEC requests that EPA provide clarity on both issues in the final Guidance.

5.4.2 Estimating the Daily PM 2.5 Impact from Precursors

Air agencies should consult with the appropriate EPA Regional office to discuss the details of the calculations. (pg. 36)

It is unclear whether regional offices will be providing specific guidance to states to facilitate agencies' demonstrations. ADEC requests that regional offices provide explicit guidance on precursor demonstration calculations. We request that regions provide examples of adequate demonstrations using the different approaches: ambient concentration-based analysis, modeled concentration-based analysis, and modeled sensitivity analysis.

ADEC appreciates EPA's review and consideration of the provided comments. Please feel free to contact me if you have any questions or require any additional information.

Sincerely,

Denise Koch, Director
Division of Air Quality

cc: Larry Hartig, ADEC/Commissioner
Alice Edwards, ADEC/Deputy Commissioner
Cindy Heil, ADEC/ANPMS Manager
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