Comment 01: Section II.1 Significant Emissions Rates for O_3 and $PM_{2.5}$

Note there may be some $PM_{2.5}$ nonattainment areas (designated as serious or above) where ammonia emissions are considered $PM_{2.5}$ precursors. A source with ammonia emissions located close to one of these nonattainment areas may need to assess its impacts on any nearby nonattainment areas where ammonia has been defined as a $PM_{2.5}$ precursor.

Comment 02: II.3 Significant Impact Levels for O_3 and $PM_{2.5}$

Region 3 reminds OAQPS staff that AERMOD does not currently calculate the annual $PM_{2.5}$ concentration in the correct format of the NAAQS; the annual standard is calculated from seasonal averages (40 CFR Part 50, Appendix N, Section 4.4 (a)[1]) and is not a straight annual weighted value as determined in AERMOD. This oversight may call into question model values that are very close to the SIL, NAAQS or PSD increment values.

Comment 03: II.5.2 $PM_{2.5}$ PSD Increments Compliance

We should consider cautioning applicants with demonstrations that have (or will have) increment expanding sources. Similar to (annual) NO_2 increment expansion, addressing $PM_{2.5}$ precursor reductions using a screening technique (such as MERPS) may over-estimate increment expansion given the conservative nature of our current screening techniques.

Comment 04: III. PSD Compliance Demonstrations for the O_3 and $PM_{2.5}$ NAAQS: Source Impact Analysis

Figure II-2 provides a flow path for modeling sources based on location outside a designated nonattainment area. Sources located inside nonattainment areas are to follow Nonattainment NSR rules requiring emission offsets (and no modeling). For ozone purposes, there are areas in the northeast Ozone Transport Region[2] or OTR that while designated as attainment or

[1] https://www.govinfo.gov/content/pkg/CFR-2015-title40-vol2/pdf/CFR-2015-title40-vol2-part50.pdf

[2] See §7511c. Control of interstate ozone air pollution: the OTR is defined in section (a) as *"… comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia…"*

unclassifiable are still required to secure emission offsets as if the area was designated as a "moderate" nonattainment area. The application of this guidance may also be subject to section (d) *Best available air quality monitoring and modeling*, which reads:

> *"[F]or purposes of this section, not later than 6 months after November 15, 1990, the Administrator shall promulgate criteria for purposes of determining the contribution of sources in one area to concentrations of ozone in another area which is a nonattainment area for ozone. Such criteria shall require that the best available air quality monitoring and* ***modeling techniques*** *be used for purposes of making such determinations."*

Comment 05: III.4.1 Conceptual Model

Applicants developing modeling protocols describing ozone or PM-2.5 trends and speciation data should consider consulting state and local air monitoring reports and periodic ambient monitor network assessment plans[3] for additional information on local and regional trends along with any potential transport issues. Monitor trends should be examined for statistical significance along with any correlation with documented local and/or regional emission trends. For PM-2.5, regional haze SIPs and Regional Planning Organization or RPO documents could be consulted for Class I area speciation trends[4]. Future regional/local emission control programs could also be cited as a "weight of evidence" showing source emission impacts could be offset by future decreases in local and regional emissions in response to local and regional control programs (for SIPs *et cetera*).

Just a comment on low-level jets, using single-site ASOS measurements in a dispersion modeling analysis is not going to be able to resolve these features. These features will only be captured using met tower/SODAR combinations or fine-scale WRF (prognostic meteorological) simulations.

Comment 06: III.4.2 Tier 1 Assessment Approach

EPA should caution applicants to ensure that the developed MERPs calculations reflect the current regional emissions mix in which the source is being located. Using information from photochemical modeling studies that are "out of date" may be inappropriate since the source may

[3] As required under 40 CFR 58.10(e)

[4] See MANE-VU Report: https://otcair.org/MANEVU/Upload/Publication/Reports/MANE-VU_Speciation_and_Trajectory_Analyses_-_Final.pdf

now be located in a different ozone and secondary PM-2.5 formation environment than represented in the photochemical grid model. Examples of this may include areas with recent emission increases due to wide-scale natural gas development (regional increases in NOx emissions), portions of the northeast, Mid-Atlantic, Southeast and Midwest that are experiencing significant shifts in electric generation from coal-fired power plants to combined-cycle natural gas plants or regions where significant wide-ranging ozone/PM-2.5 emission control programs such as the NOx SIP Call/CAIR/CASPR/Cross State rule have been recently implemented.

Comment 07: III.4.3 Tier 2 Assessment Approach

Similar to our previous comment, any use of a photochemical or similar models for single source impact analysis should ensure that the emission inventory is reflective of area in which the source is to be located.

Should the photochemical model include emissions that are current, model "base case" or projected future case (what inventories were used for the MERPs projections)? Keep in mind projected (future) emission inventories used in photochemical grid models will project certain emission sectors into the future (including "new" power plants in certain areas to handle expected growth in electricity consumption). Trends wise, one can see, at least in the east, significant changes in PM-2.5 speciation over the last decade mainly in the sulfate component. Recent emissions trends in SO_2 emissions have changed the characteristics of when peak PM-2.5 concentrations are occurring (summer values have become less controlling; see Comment 20).

We should consider adding some emissions threshold where the use of CTMs would be more appropriate than using a tier 1 approach. For example, a source with combined NOx and VOC emissions of over 15,000 tpy (if one were to exist) would probably be better handled using a CTM than a source with under 500 tpy of the same pollutants.

Using a CTM or tier 2 approach is time and resource intensive. It would be difficult to conduct such an analysis given the typical 180-day to 360-day review periods normally allotted for PSD/NSR applications. Region 3's experience using CTMs in SIPs indicates state and local agencies rarely submit these within the CAA allotted 18-month submittal period. We should at least acknowledge the substantial amount of time needed to develop an analysis of this complexity.

Comment 08: III.5.2 SIL Comparison for $PM_{2.5}$

If one exceeds the SIL for sources with significant levels of PM-2.5 precursor emissions, how does one determine the Significant Impact Area (SIA) for the cumulative analysis? Usually only (AERMOD) receptors that exceed the SIL are used to determine the SIA for a cumulative analysis. In this case, precursor emissions handled through the tier 1 methodology have no real spatial component. Does one use the AERMOD determined SIA or somehow expand it using the tier 1 (or tier 2) assessment (for cases 3 and 4; how do you determine a SIA for precursor emissions only)? We could not find any further discussion regarding delineating the SIA in section IV and IV.1 of this guidance.

Comment 09: IV. PSD Compliance Demonstrations for the O_3 and $PM_{2.5}$ NAAQS: Cumulative Impact Analysis

There are many areas in which ozone and PM-2.5 monitoring is very sparse. This is especially true for PM-2.5 chemical speciation sites. In some instances, the closest background monitor may be hundreds of kilometers away from a proposed source and not exactly representative of the area in which the new source will be located. The guidance should recognize this possibility and if prudent offer possible solutions for this predicament (use of CTM to establish background or confirm gradient?). We should also expect continued reductions in SLAM monitoring network in response to declining federal, state and local resources.

Comment 10: IV.1 Modeling Inventory

Consider referencing the National Emission Inventory or NEI. This database contains (actual) state and local reported emissions for multiple source categories along with stack information for most point sources. The inventory is produced every three years and is available online[5]. We may want to note that state and local offices track yearly source emissions as part of their Title V fee collection programs and could be an additional source of emissions information.

Additional emission information for larger sources is available from EPA's Clean Air Markets or CAMD website[6]. This includes hourly information that may be useful for determining more

[5] https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei
[6] https://ampd.epa.gov/ampd/

representative model emission rates. More detailed hourly emissions can be downloaded using EPA's Field Audit Checklist Tool (FACT)[7] for some large sources (under 40 CFR Part 75)[8].

Comment 11: IV.2 Monitored Background

Ozone and PM-2.5 monitoring is somewhat different that other criteria pollutants. Hourly values are not always available from either type of monitor. Ozone monitors in some areas of the country are not operated year-round and PM-2.5 monitors are often filter-based representing a daily average; some PM-2.5 monitor sites do not collect on a daily basis (as briefly discussed in section IV.3).

Comment 12: IV.3 Comparison to the NAAQS

The characterization of the annual PM-2.5 standard is incorrect. From page 48 of the proposed draft guidance:

> *"[T]he $PM_{2.5}$ design value for the annual averaging period is based on the 3-year average of the annual average $PM_{2.5}$ concentrations…"*

The annual PM-2.5 design value is determined from a monitor's daily and quarterly values in accordance with three (3) sets of equations outlined in Section 4.4 (a) of Appendix N to Part 50. We noted *(the possibility of)* AERMOD's inconsistency with the form of the annual PM-2.5 NAAQS in our second comment.

We should note that the tier 1 assessment of PM-2.5 precursor impacts do not possess a seasonal or temporal component to them (as they pertain to the level 1 and level 2 comparisons discussed on page 52). Assessing seasonal or daily secondary precursor impacts are therefore not possible as they would be for the direct component determined by AERMOD (or some other approved dispersion model).

Tier 2 CTM (for PM-2.5) will also include a primary component (as discussed in Appendix A). This situation is discussed in sections of our November 29, 2018 *Modeling Guidance for Demonstrating Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze.* Section 4.6 (Local Area

[7] https://www.epa.gov/airmarkets/field-audit-checklist-tool-fact
[8] https://www.epa.gov/airmarkets/plain-english-guide-part-75-rule

Analysis) of this guidance describes the proper procedure for assessing impacts of direct PM-2.5 using a Gaussian dispersion model by removing the direct PM-2.5 impacts from the photochemical model so that these impacts aren't double counted in the analysis. This point should also be added to this guidance.

Comment 13: V.1 Overview of the PSD Increment System

We appreciate the discussion included in this section and believe it will help the regulated community better understand PSD increment modeling. It might be helpful to provide an updated version of section II.F BASELINE DATE AND BASELINE AREA CONCEPTS – EXAMPLES from the EPA's 1990 *New Source Review Workshop Manual* as an appendix to this guidance.

Comment 14: V.1.3 PSD Increment Expansion

This section should include a discussion of the use of negative emission rates for PSD increment modeling for chemically active species such as NO_2. It is generally not recommended to use the Ambient Ratio Method or ARM for annual NO_2 increment expansion due to its conservative estimation of source emission impacts (consumption of NO_2 via simple ozone chemistry); one would be using an overestimation of NO_2 impacts in increment expansion when modeling negative emission rates with ARM. This may apply to MERPs adjustments to the secondary component of PM-2.5 from precursor (SO_2 and NO_x) emission reductions. This point may need to be expanded across several parts of section V.

Comment 15: V.2 PSD $PM_{2.5}$ Increments

As noted in our previous comment, increment expansion via reductions of PM-2.5 precursor emissions may need to be tempered along the same lines as NO_2 increment expansion due to potential conservative model assumptions for chemically active species.

As we noted in Comment 02, AERMOD does *(may)* not determine the annual PM-2.5 concentration in the proper format of the NAAQS. This should be corrected or at least communicated to the modeling community *(if it is so)*.

As noted in Comment 12, tier 2 modeling using a CTM for cases 3 & 4 will include both primary and secondary PM-2.5. Combining impacts with AERMOD will therefore create a "double counting" situation for the primary PM-2.5 component.

Comment 16: V.3.2 $PM_{2.5}$ Increments: Cumulative Analysis

Should emissions from applicants that have revised a previously approved permit application that triggered the minor source baseline date be included in a PSD PM-2.5 cumulative analysis? Region 3 has had some instances where an applicant has revised its project after it was approved due to changes in planned operations. If the previous plant design was included in the PSD increment analysis this would create a situation where there could be double counting of the source. Similarly, we have seen cumulative PSD increment analyses include sources that triggered the minor baseline date but were never built creating "phantom" increment consumption by sources that never existed and whose applications have (long) since expired.

Comment 17: V.3.2.2 Assessing Secondary $PM_{2.5}$ Impacts

In addition to the control programs noted in footnote 33, sources should also consider impacts from SO_2 reductions related to any nearby SO_2 SIP actions.

Comment 18: Appendix A: 1. $PM_{2.5}$ Monitoring Networks

It's not entirely clear if the monitoring network description in this section represents the current status of the PM-2.5 monitoring network or some past representation. Consider adding the year that this network description applies.

Comment 19: Appendix A: 1.3. $PM_{2.5}$ Chemical Speciation Monitoring

We should probably note that there is a discontinuity between PM-2.5 components measured by the chemical speciation network and what the photochemical models (such and CAMx) track (thus the Sulfate, Adjusted Nitrate, Derived Water, Inferred Carbon Hybrid material balance approach or SANDWICH[9] methodology developed by EPA for PM-2.5 SIP modeling demonstrations).

[9] https://www3.epa.gov/ttnamti1/files/2006conference/frank.pdf

Comment 20: Appendix A: 3. Seasonal and Daily Patterns of $PM_{2.5}$

Some of the seasonal PM-2.5 trends included in this section are probably out of date. In the east, SO_2 emissions have been significantly reduced (mainly from coal-fired boilers in the EGU sector) such that summer-time sulfate levels are much lower than in the past[10]. This has resulted in a shift in when peak 24-hour PM-2.5 values are occurring; from summertime to wintertime.

Comment 21: Appendix B: 2.1. Emissions

Hourly emissions for select sources are available using the EPA Field Audit Checklist Tool or FACT, which available for download at https://www.epa.gov/airmarkets/field-audit-checklist-tool-fact .

Comment 22: Appendix B: 2.5. Source groups

Users should be cautioned about using the SRCGROUP option in AERMOD when modeling for NO_2 significance using the ARM (or other simple chemical transformation) option. Attempting to model multiple operating scenarios by dividing them into different source groups will not prevent the ARM chemistry from impacting what should be separately modeled operating scenarios.

Comment 23: Appendix B: 3.1. Surface characteristics and representativeness

Section 3.1.1 of EPA's AERMOD Implementation Guide also discusses meteorological data representativeness.

Comment 24: Appendix C: Assessment of O_3

I do think looking at the source sensitivities in MERPS is an interesting approach that should be communicated to the modeling community. That being said, we feel that using this example is somewhat problematic. The Tennessee Valley Authority (TVA) Gleason Combustion Turbine

[10] See Atmos Environ (1994). 2017 Dec 2; 175: 25–32 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6134864/)

Plant[11] appears to be a 500 MW simple cycle electric generating station. These types of simple cycle units typically are demand response units (at least in Region 3). We would be concerned that this plant would mostly be running during periods of high electric demand during the summer months when ambient temperatures are high and subsequently when ozone levels would be elevated. I'd be cautious about including this as an example based on Region 3's experiences with its OTR ozone nonattainment areas that have identified sources which have elevated emissions during High Electric Demand days[12] as something to be discouraged.

Comment 25: Appendix D

This data is over ten years old. The seasonality assumptions may no longer be applicable in areas where regional control programs have taken effect (see footnote 10 to comment 20).

[11] https://www.tva.gov/Energy/Our-Power-System/Natural-Gas/Gleason-Combustion-Turbine-Plant
[12] https://www.energy.gov/sites/prod/files/2014/05/f15/tap_webinar_20080717_diem.pdf