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September 29, 2017

Mr. David Foerter
Executive Director
Northeast Ozone Transport Commission
444 North Capitol Street, Suite 322
Washington, DC 20001

Mr. Joseph Jakuta
Environmental Associate
MANE – VU
444 North Capitol Street, Suite 322
Washington, DC 20001

RE: Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions, August 29, 2017.

Gentlemen:

Please find enclosed the comments of the Midwest Ozone Group on the August 29, 2017, Mid-Atlantic/Northeast Visibility Union (MANE – VU) Technical Support Committee memo entitled "Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions."

This memo appears to be the latest in a series of initiatives by Northeast states seeking to find a means to mandate NOx controls on distant electric generating sources instead of controlling local sources. Incredibly, this memo offers the conclusion that the additional operation of existing NOx controls on EGUs will somehow eliminate whatever visibility concerns remain at the one location in the MANE – VU region that is expected to miss its next reasonable progress goal. As these comments will note, the conclusion of this memo is not only incomplete, but is also legally and technically flawed.

As our comments note, emissions from targeted EGUs have declined at a considerably greater rate than the decline in the deposition of wet nitrates, indicating that there are other sources of NOx emissions that are increasing. This increase in nitrates from other sources must be recognized and addressed if MANE– VU is to achieve its regional haze goals.

Accordingly, the Midwest Ozone Group urges that the memo and its recommendation for the imposition of new control requirements and EGUs be withdrawn.

Very truly yours,

David M. Flannery

David M. Flannery
Legal Counsel
Midwest Ozone Group

MIDWEST OZONE GROUP

COMMENTS ON MANE-VU MEMO ENTITLED

"WINTERTIME SCR/SNCR OPTIMIZATION ON VISIBILITY IMPAIRING NITRATE PRECURSOR EMISSIONS"[1]
September 29, 2017

The Midwest Ozone Group (MOG)[2] is an affiliation of companies, trade organizations, and associations which have drawn upon their collective resources to advance the objectives of legally and technically sound national ambient air quality solutions. It is the primary goal of MOG to work with policy makers in evaluating air quality policies by encouraging the use of sound science. MOG members and participants operate more than 85,000 MW of coal-fired and coal-refuse fired generation in more than ten states. As members of the business community, the MOG membership also has a keen interest in assuring that policy makers are assessing the appropriate data and information required to accurately evaluate its emission control strategies.

MOG has reviewed the August 29, 2017, Mid-Atlantic/Northeast Visibility Union (MANE-VU) Technical Support Committee memo entitled "Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions." This memo appears to be the latest in a series of initiatives by Northeast states seeking to find a means to mandate nitrogen oxides (NOx) controls on distant electric generating sources instead of controlling local sources, including EGUs, as well as other source categories. Incredibly, this memo assesses EGU emissions in 35 states and offers the conclusion that operating existing post combustion NOx controls on these EGUs beyond their current regulatory or permit requirements will somehow eliminate whatever visibility concerns remain at the one location in the MANE-VU region that is expected to miss its next reasonable progress goal. As these comments will note, the analysis contained in this memo is not only incomplete, but is also legally and technically flawed and provides no basis for advancing the operation of these types of controls that is being urged, especially considering that emissions from the EGUs located in these states have declined at a rate considerably greater than the decline in the deposition of wet nitrates. In the case of sulfur dioxide (SO2), the percentage decline in wet deposition of sulfates is consistent with the decline in emissions from the EGUs. This should be expected as historically the largest source of SO2 has been the EGU sector. In the case of nitrates, the percentage decline in emissions of NOx from EGUs exceeds considerably the percentage decline in wet deposition of nitrates. That indicates that there are other

[1] These comments were prepared with the technical assistance of Alpine Geophysics, LLC. Comments or questions about this document should be directed to David M. Flannery, Steptoe & Johnson PLLC, 304-353-8171; dave.flannery@steptoe-johnson.com or Edward L. Kropp, Steptoe & Johnson PLLC, (317) 946-9882, skipp.kropp@steptoe-johnson.com Legal Counsel for the Midwest Ozone Group.

[2] The members of and participants in the Midwest Ozone Group include: American Coalition for Clean Coal Electricity, American Electric Power, American Forest & Paper Association, Ameren, Alcoa, ARIPPA, Associated Electric Cooperative, Big Rivers Electric Corp., Citizens Energy Group, Council of Industrial Boiler Owners, Duke Energy, East Kentucky Power Cooperative, FirstEnergy, Indiana Energy Association, Indiana Utility Group, LGE / KU, Ohio Utility Group, Olympus Power, and the Springfield (IL) City Water P&L.

sources of NOx emissions that are increasing at this time and must be recognized and considered as part of the MANE-VU analysis and memo. Not only is this a technical issue but it is also a Clean Air Act issue because over control of a source category to remedy emissions or increases in emissions from other source categories is unlawful.

1. **MANE-VU should submit SIPs in 2021 because of significant reductions in visibility impairment due to regulatory programs that will impact sources over the next several years.**

The 1999 Regional Haze Rule (RHR) requires that states and tribes, in coordination with the Environmental Protection Agency, the National Park Service, U.S. Fish and Wildlife Service, the U.S. Forest Service, and other interested parties, develop and implement air quality protection plans to reduce visibility impairment under Clean Air Act (CAA) Sections 169A and 169B. The first State plans for regional haze were due in December 2007. States, tribes, and five multi-jurisdictional regional planning organizations worked together to develop the technical basis for these plans. Comprehensive periodic revisions to these initial plans were due in 2018, 2028, and every 10 years thereafter. Significantly, however, in January of 2017 EPA revised the RHR (82 FR 3078), extending the date for submittal of the second Regional Haze SIP from 2018 to 2021.

By way of background, CAA Section 169A(b) requires that EPA promulgate regulations that

> (1) provide guidelines to the States ... for implementing this section...and (2) require each applicable implementation plan for a State in which any area listed by the Administrator ... is located (or for a State the emissions from which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area) to contain such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting the national goal specified in subsection (a) of this section, including ... a requirement that each major stationary source which is in existence on August 7, 1977, but which has not been in operation for more than fifteen years as of such date, and which, as determined by the State (or the Administrator in the case of a plan promulgated under section 7410(c) of this title) emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area, shall procure, install, and operate, as expeditiously as practicable (and maintain thereafter) the best available retrofit technology, as determined by the State (or the Administrator in the case of a plan promulgated under section 7410(c) of this title) for controlling emissions from such source for the purpose of eliminating or reducing any such impairment....

Under the RHR, "for each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility

for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period." The term "visibility" is defined at 40 CFR § 51.301 as "any humanly perceptible change in visibility (light extinction, visual range, contrast, coloration) from that which would have existed under natural conditions." 40 CFR § 51.301 also defines "Visibility impairment or anthropogenic visibility impairment" as "means any humanly perceptible difference due to air pollution from anthropogenic sources between actual visibility and natural visibility on one or more days. Because natural visibility can only be estimated or inferred, visibility impairment also is estimated or inferred rather than directly measured."

Unlike wet deposition measurements, visibility impairment or anthropogenic visibility impairment is not directly attributable to available emission inventories. Consequently, the method is acceptable for tracking progress, but not considered a viable option for modeling reasonable progress goals (RPGs) at Class I areas. Specifically, it is noted that an increasing contribution from international anthropogenic emissions contribute to Class I visibility impairment, yet the metric does not demonstrate how to identify and explicitly include this emission source. Current "Boundary Condition" contributions with PSAT include both anthropogenic and natural source international emissions and have not, to date, been simulated to identify and separate out the difference. Accordingly, if there is to be a showing that a Class I area is not meeting its reasonable progress goals, international anthropogenic contribution to visibility at Class I areas must be identified and accounted for in that assessment. No such effort has been offered or identified by MANE-VU as part of the analysis or subject memo.

The January 2017 revision to the Regional Haze Rule (82 FR 3078) extended the date for submittal of the second Regional Haze SIP from 2018 to 2021 but MANE-VU states have elected to submit their SIPs in 2018 because, as stated by the MANE-VU Technical Support Committee, "OTC developed a 2011-based SIP quality modeling platform for states in nonattainment of the 2008 ozone NAAQS,[3]" adding that "MANE-VU Air Directors agreed that 2011 should also be used for regional haze modeling rather than develop an entirely new modeling platform they want to be able to use their work to date, which is based on a 2011 base case.[4]"

The preamble to the most recent Regional Haze Rule revisions[5] states as follows:

> With regard to the extension of the deadline of July 31, 2018, to July 31, 2021, for states' comprehensive SIP revisions for the second implementation period, this one-time change will benefit states by allowing them to obtain and take into account information on the effects of a number of other regulatory programs that will be impacting sources over the next several years. The change will also allow states to develop SIP revisions for the second implementation period that are more integrated with state planning for these other programs, an advantage that was widely confirmed in early discussions with states and in comments submitted to the docket for this rulemaking. We anticipate that this change will

[3] MANE-VU Technical Support Committee presentation September 7, 2017
[4] *Id*
[5] 82 Fed Reg 3078, January 10, 2017

result in greater environmental progress than if planning for these multiple programs were not as well integrated.

It appears that MANE-VU states used the opposite logic to decide to submit SIPs in 2018. MOG believes that MANE-VU should develop new modeling in support of the next RPG SIP for exactly the reason stated by EPA in extending the RPG SIP deadline, i.e., "to obtain and take into account information on the effects of a number of other regulatory programs that will be impacting sources over the next several years." The conservation of resources cannot be used as the basis for justify the development of costly regulatory policy that relies on erroneous and incomplete work product and concomitant attempts to illegally over-control sources in upwind states[6].

2. **Mobile sources are the most significant contributor to visibility impairment in MANE-VU but MANE-VU failed to assess their impact.**

MANE-VU acknowledges the significant role of mobile source emissions on visibility but fails to assess the impact of these emissions on visibility and dismisses any possibility of further controls being imposed on those sources sufficient to allow Brigantine to achieve the appropriate glide path goal. The portrayal of emission sources in the MANE-VU memo is very misleading. Figure 15 in the memo identifies sources of NOx by region in 2011 and 2018 to make the point that EGU Coal emissions are the largest single emission source in each region. This is accomplished, however, by disaggregating mobile source NOx emissions into multiple categories. Had the memo combined on road and off-road categories, it would have been clear that these mobile source categories dwarf coal EGU emissions in all regions.

As a further indication of the obvious bias of the memo, we note that the back trajectories performed were intentionally selected to target EGU sources. The memo itself states "the back trajectories were not run at an elevation intended to evaluate against mobile and area sources and were not run for a long enough time period to demonstrate impacts from further away states such as Texas.[7]" Additional comment on the significance of onroad mobile sources on visibility impairment is discussed elsewhere in these comments.

3. **The single-minded focus of the memo on EGUs fails to assess the extent to which EGUs collectively or individually may, or may not, have an impact on visibility at Brigantine.**

MANE-VU offers no analyses about whether the control strategy it advances would help Brigantine in any meaningful way achieve its appropriate glidepath goal in 2028. Brigantine is, of course, the only Class I area in MANE-VU that is projected not to meet reasonable progress goals in 2028. For example, Figures 1 and 2, showing NOx and SO2 emission trends, depict how these emissions have changed over time on a national basis. Comparing EGU SO2 and NOx emission trends (Figures 3 and 4) and sulfate contribution trends at Brigantine (Figure 5), we see that there is a direct correlation in the reduced contribution of sulfates to impairment and EGU SO2 emission reductions. In contrast, as

[6] EPA v. EME Homer City Generation, 696 F. 3d 7

[7] Impact of Wintertime SCR/SNCR Optimization on Visibility Impairing Nitrate Precursor Emissions, page 13.

demonstrated in Figure 6, there is a negative correlation between EGU NOx emissions and nitrate contributions during those same periods (EGU NOx decreases and nitrate contribution increases). However, a positive correlation is noted between non-EGU industrial source NOx and nitrate contributions to visibility impairment, but MANE-VU hasn't analyzed impairment by that sector, instead focusing only on EGUs.

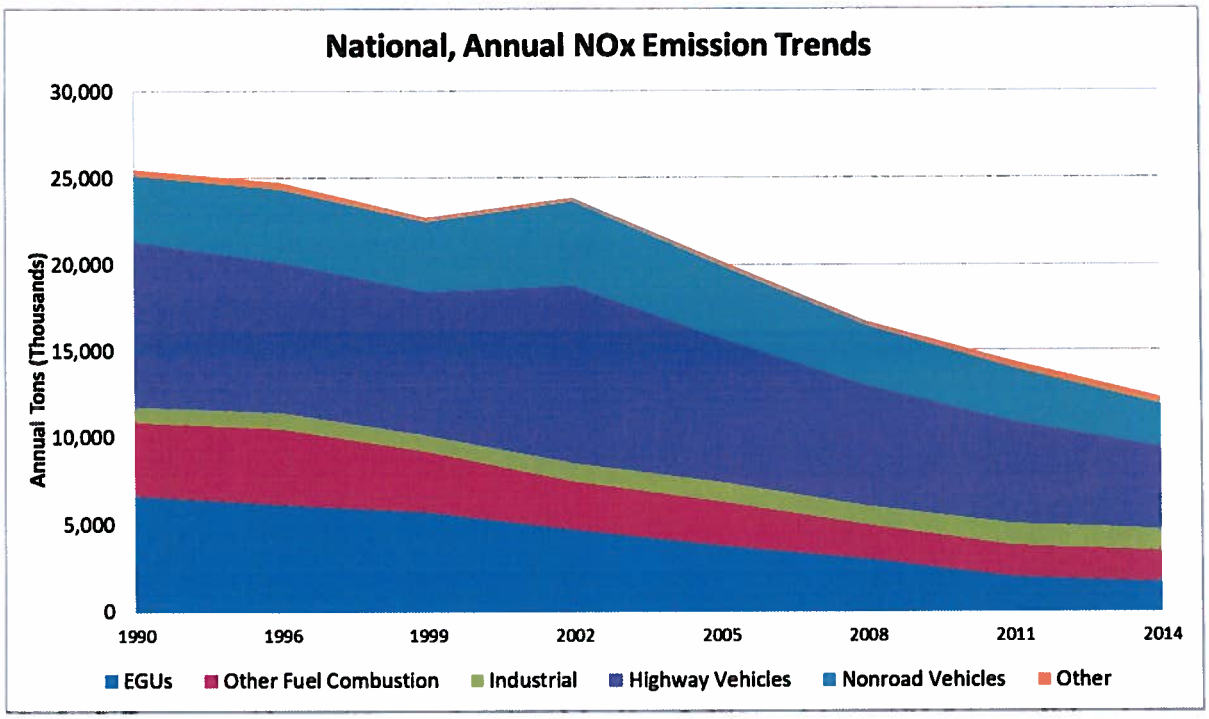

Figure 1. National, annual NOx emission trends by source sector.

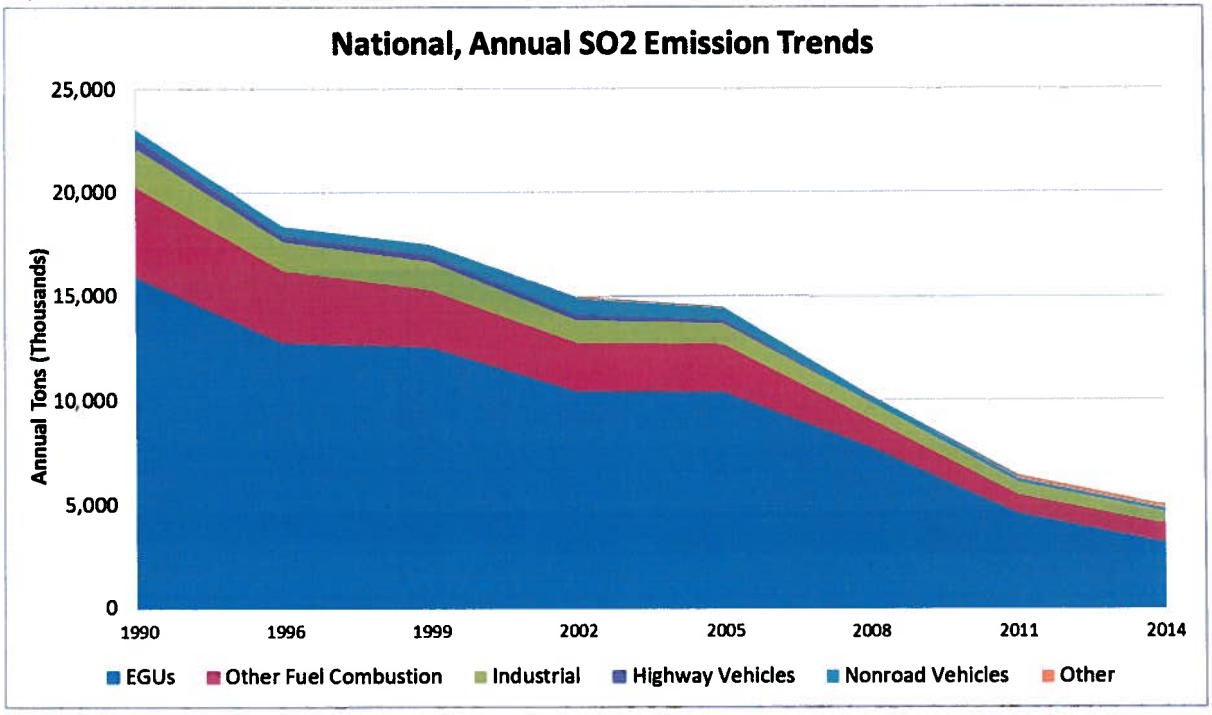

Figure 2. National, annual SO2 emission trends by source sector.

As seen in Figure 3 below, the most significant EGU SO2 reductions have occurred since 2014, but the MANE-VU memo doesn't address them. 2016 includes SO2 reductions for MATS acid gas and 2016 SO2 tonnage is less than half of what was emitted in 2014. Non-ozone season NOx in 2017 could remain at the 2016 level, 660,000 tons, but annual emissions will be down due to the CSAPR Update budget and PA RACT II. The non-OS NOx in 2016 is about 33% lower than in 2014. Interestingly, the ozone season and non-ozone season NOx split is very close to the 5 month/7 month split of the total. These data significantly call into question the MANE-VU conclusion that national 2016 EGU SO2 emissions of about 1.5 million tons are not a major source of visibility impairment, but EGU NOx annual emissions of 1.2 million tons are a major contributor.

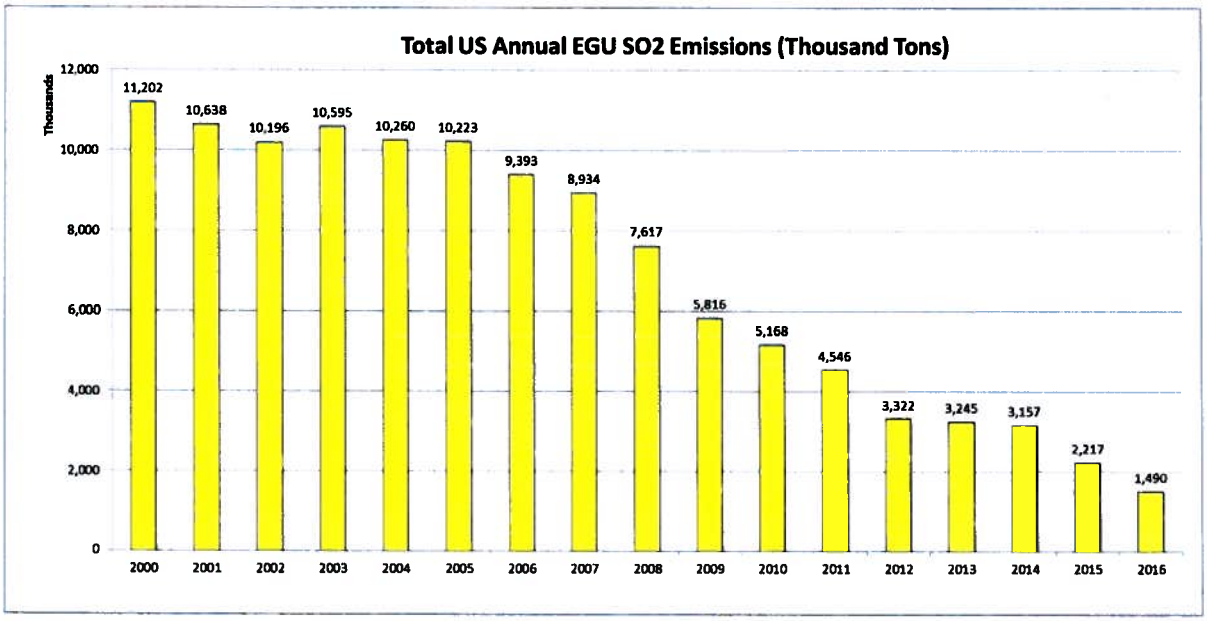

Figure 3. National, annual EGU SO2 emission trends (2000-2016).

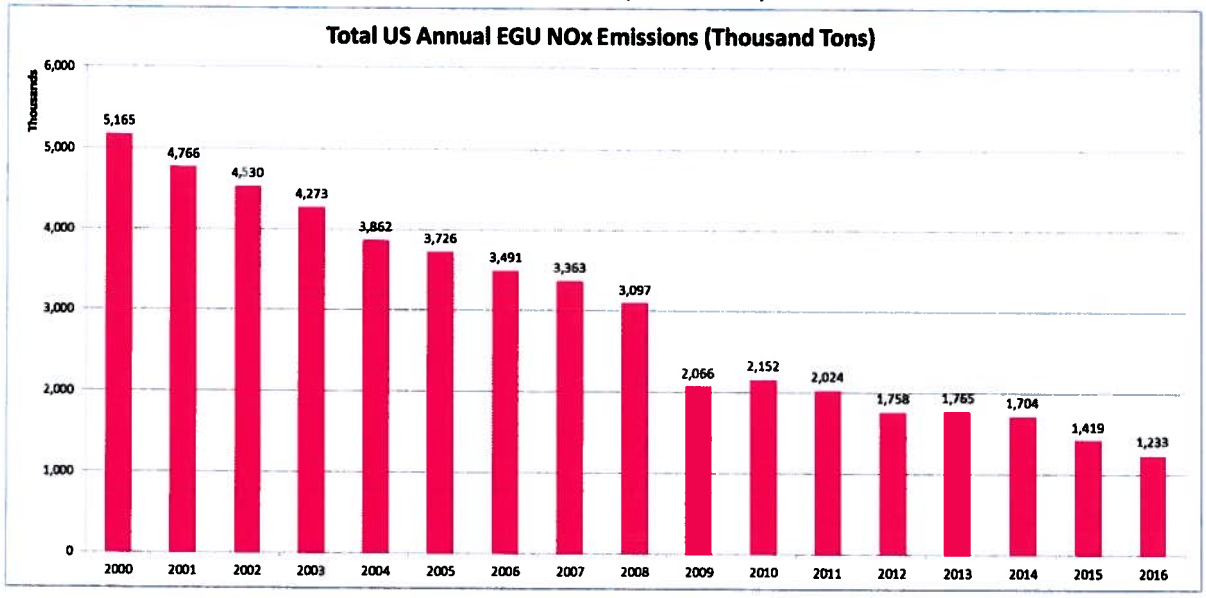

Figure 4. National, annual EGU NOx emission trends (2000-2016).

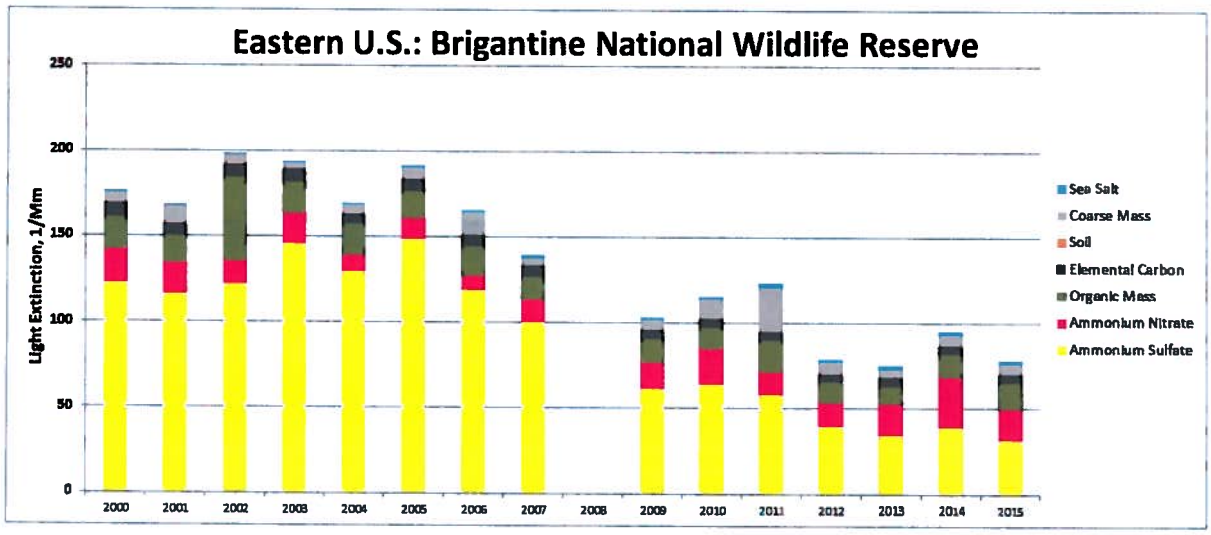

Figure 5. Relative contribution to light extinction at Brigantine NWR on W20% visibility days.

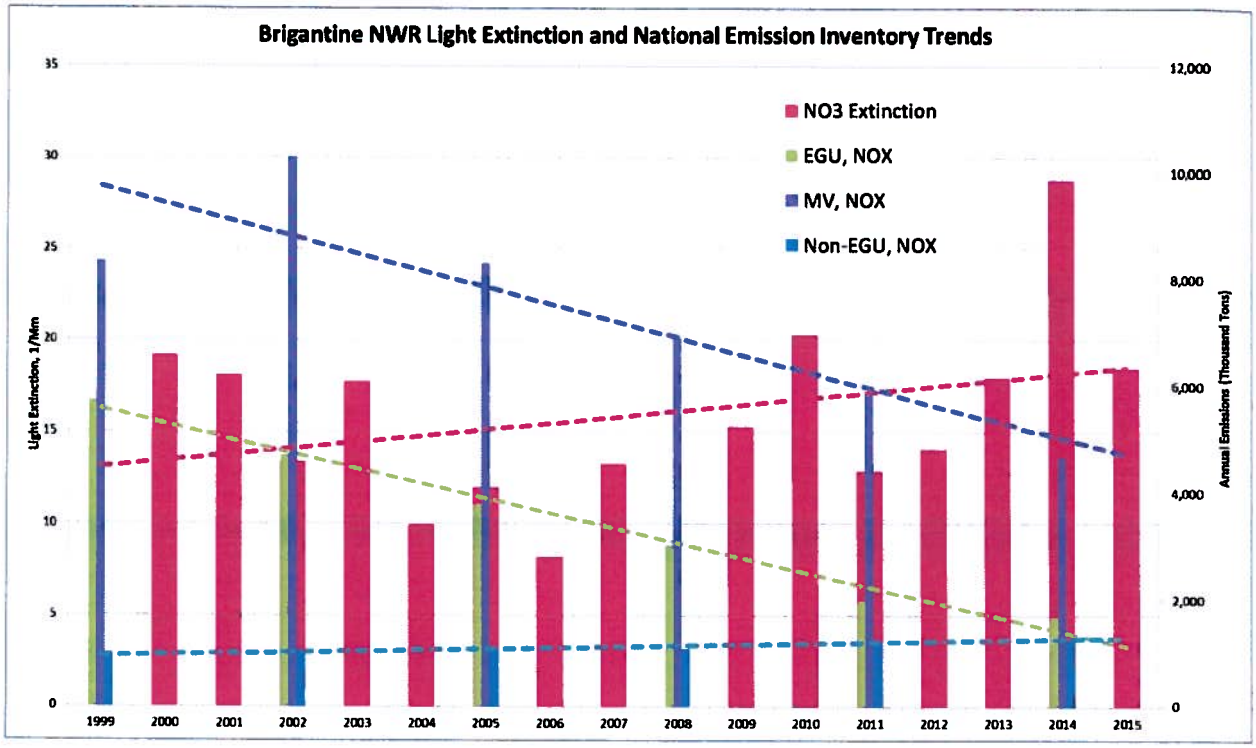

Figure 6. Brigantine NWR Light Extinction and National Emission Inventory Trends

MANE-VU offers no analysis about whether any impact on Brigantine could be accomplished in a cost effective manner. For example, the graphs on pages 2 and 3 of the MANE-VU memo show an increase in autumn degradation as well as winter but MANE-VU offers no discussion on the cause, only positing that winter EGU NOx emissions should be addressed. The only support offered in the MANE-VU memo to justify the imposition of the new EGU control strategy it is advancing is the comment appearing on page 13 of the memo which states "since the emissions from these power plants are released into air masses that are <u>likely</u> to travel to Brigantine, these emissions <u>should have a significant benefit at Brigantine</u>. (emphasis supplied)

The demands being made by MANE-VU for this type of EGU control program must be supported by far more rigorous science It is simply not enough for the memo to make conclusions that such controls are "likely to" or "should have" significant benefits.

4. **Reliance on the historical BOR for the units examined in the memo is an arbitrary action that ignores the capability of the existing NOx control equipment at the selected EGUs to achieve that the historical BOR.**

The memo erroneously estimates the emission reductions that would occur from the operation of NOx control equipment in the winter of 2028 by applying the best observed rate (BOR) that had ever been reported by an EGU to CAMD.

Any discussion of the operation of these controls must necessarily begin with the point that these EGUs are being operated in conformity with and in compliance with both state and federal law.

The CSAPR program results in unit-specific caps being placed on each of the subject power plants. In addition, all units are subject to Title V air permits and many units are subject to state or federal consent orders. These units are, in fact and in law, being operated appropriately.

Aside from the lack of any regulatory reason to maintain the BOR throughout the operation of NOx control equipment, there are myriad factors that prevent the BOR from being used as the indicator of unit performance today or in the future. These include but are certainly not limited to the following:

1. The efficiency of NOx control equipment inevitably degrades from initial unit operations. This best illustrated by the fact the when a unit begins operation it catalyst is completely new and therefor the most effective. After startup it is typical for the catalyst of a unit to be replaced at a rate of 25% every two years. Therefore there is never a time after unit startup that 100% of the catalyst is fresh.
2. Taking units from operation during the ozone season only to year round operation, raises maintenance issue for the units. This overtaxing of the units is known to plug-up air heaters and to result in ammonia slip.
3. The fact that units today may well be part of a control strategy to remove mercury also creates limitations on the ability of an EGU to optimize the unit for NOx. This is because the SCRs are being used to oxidized mercury so that it can be effectively captured the plant's baghouses. Optimizing for mercury necessarily means that the unit cannot be optimized for NOx.
4. It is also the case that units are not operated the same today as they have been operated historically. The reality of today's unit dispatching is that units swing load dramatically on a daily basis. This is especially true for units operating in wholesale markets. This changing load not only results in lower efficiency of the control equipment as it seeks to follow the load of the generator, but also results in lower flue gas temperature which makes the unit less efficient and increases the potential for plugging. Also, forcing units to remain at elevated loads during "out of market" periods to achieve a lower emissions rate forces unnecessary economic burdens on the units as well as negating to a considerable degree the lower NOx emission rate because of the higher heat input necessary to maintain unit load with sufficient SCR inlet temperature to allow the injection of ammonia. Moreover, this doesn't consider and account for the increases in all other pollutants that occur due to forced operation at higher loads.

MANE-VU has not presented any data to show that it considered any of these operational factors in its analysis. In addition, the best observed rate used to calculate emission reductions during the non-ozone season shows a six-month reduction of about 95,700 tons from MANE-VU, LADCO, and SESARM sources relative to the ERTAC v2.6, or roughly 526 tons/day from all three regions. The MANE-VU memo fails, however, to offer any analysis about whether these emission reductions (even if true) would be enough to move the needle in Brigantine on a 20% worst day when the vast majority of NOx is being emitted from the mobile source sector within 100 miles of Brigantine on that day.

5. **Had the memo used 2016 emission rates for the EGUs examined, and not the BOR for those plants, it is clear that the proposed strategy would have resulted is significantly lower emission reductions – and with no analysis in either case about what if any improvement in visibility would have resulted at Brigantine.**

MANE-VU, in an attempt to estimate the impacts of optimizing post-combustion EGU controls during the winter on coal-fired sources, applied Maryland Department of Environment methodology for best operating rate (BOR) calculations to ERTAC v.2.6 projected heat input rates for 2028. The resultant NOx emission values were designed to develop a possible future year control strategy designed to address regional haze at the Brigantine NWR receptor.

As noted in the previous section, these "optimized" rates are far from achievable on a regular, annual basis, largely due to the limitations in the ability of the operators to match these "out of the box" rates when both the equipment and catalysts were new, as well as the reality of today's dispatching schedules, and daily load swings associated with operating an EGU. To better estimate a realistic level of EGU operation in today's market environment, MOG developed an independent analysis[8] utilizing the same 2028 heat input projections from ERTAC v.2.6 and 2016 ozone season NOx emission rates. Using these most current operating rates, MOG found that projected emissions using 2016 rates were 117,405 tons higher (267,026 tons total) in the non-ozone season compared to MANE-VU's BOR rate application (149,621 tons total). This translated to a 2016-based average emission rate in 2028 of 0.127 lbs NOx/MMBtu compared to the BOR rate of 0.071 lbs NOx/MMBtu for the same 291 units. It should be recognized that this projection is likely a significant overstatement of EGU NOx emissions, especially for states in which the electric generation operates within a wholesale market.

MANE-VU also attempted to associate these calculated emission reductions to achieving visibility improvements at Brigantine, without the benefit of additional visibility modeling or analyses. In fact, MANE-VU chose to ignore the largest nitrate contributing source category, onroad motor vehicles, and dismissed the source sector by stating "the focus of the analysis is not on heavy-duty vehicles or mobile sources in total, which do have a large overall contribution". By excluding the onroad mobile category, MANE-VU was predisposed to controlling what category was next in line, although recent source apportionment analyses[9] indicate EGU NOx contributions to monitors in both rural and urban MANE-VU states are less than half that of onroad source emissions.

Furthermore, visibility impairment in the northeast is still largely based on sulfate contributions for both the worst and best 20% visibility days. Figure 7 shows extinction budgets by group for 2015 at the Brigantine NWR receptor. And as is demonstrated in further sections of this response, for the noted days when nitrate is the primary contributor to light extinction at this location, NOx emissions are attributed to local EGU operations or to international emission sources, either anthropogenic or natural.

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[8] "2016 Non-Ozone Season NOx Emission Rate Application Compared to MANE-VU Best Observed Rate Analysis - 2028 EGU Projection," Alpine Geophysics, LLC, September 2017 (See: http://www.midwestozonegroup.com/files/Alpine_-_BOR_v_2016_Rate_Comparison.pdf)

[9] http://midwestozonegroup.com/files/Relative_Contribution_of_Upwind_Sources_on_Key_Monitors.pdf

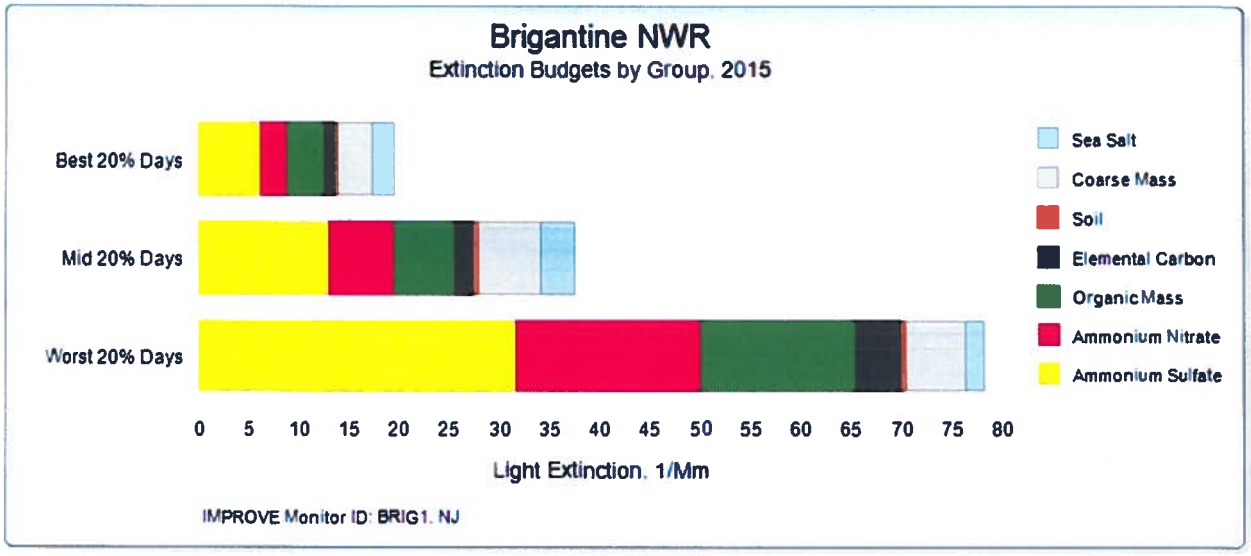

Figure 7. Extinction budget by group, 2015, Brigantine NWR.

6. **Recent 2015 nitrate-based visibility impairment at Brigantine is attributable to northeastern state wintertime EGU operations.**

Figures 6 through 10 of the MANE-VU memo demonstrate the widely-reported observation that sulfates have historically driven visibility impairment in the northeast. Recent observations (Figure 8) at the Brigantine NWR now demonstrate an increased contribution of nitrate during the early year winter months of 2015 and for a percentage of the worst 20% (W20%) visibility days at the Class I area. As noted in item 3. above, SO2 emissions from EGU control nationwide have decreased and so has the contribution of sulfate to visibility at many Class I areas in the eastern U.S. In its memo, MANE-VU attributes this increased contribution of nitrates to non-OTC regions using simple back trajectory maps and emission summaries and projections.

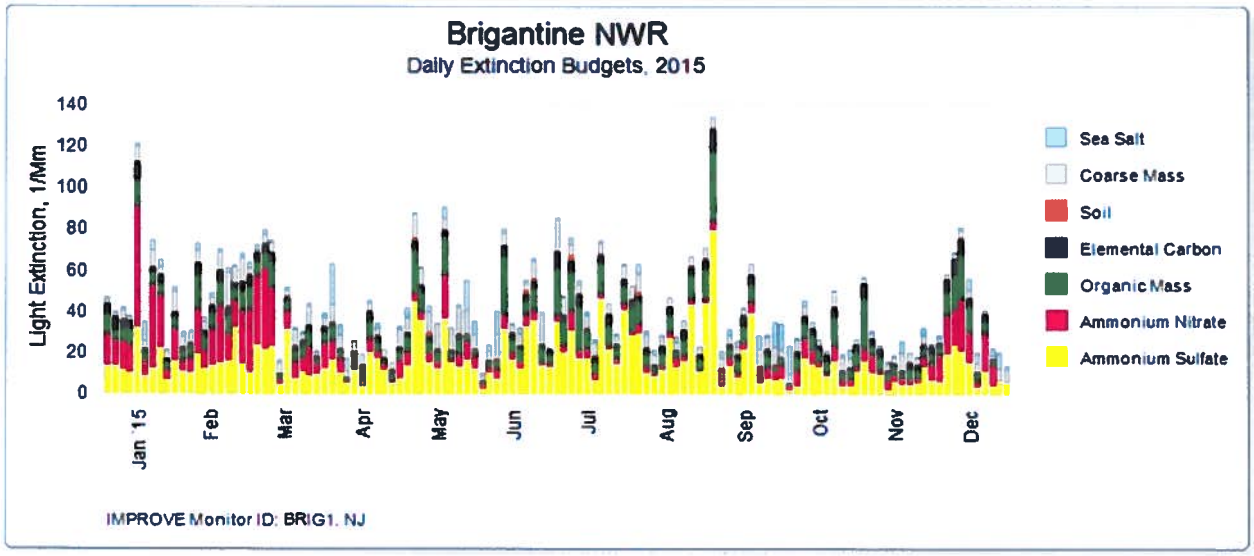

Figure 8. Daily light extinction budgets, Brigantine NWR, 2015.

Focusing on reported 2015 monthly CEM NOx data by unit, aggregated to RPO, we see in Figure 9 that for the months that MANE-VU has indicated nitrate has displaced sulfate in the W20% calculation list (Jan, Feb, and Mar), OTC EGUs (minus PA) collectively operate at higher emission rate ratios than in the other months and seasons and that correlate to nitrate contribution light extinction budgets for the same periods. Comparably, EGUs from other upwind RPOs (plus PA) demonstrate consistently lower emission rate ratios during this same time period and consistent average operating rates during the course of the year, raising the question whether the increased emission rates seen in the OTC during January and February of 2015 are driving the nitrate-based visibility impairment during those same months at Brigantine NWR.

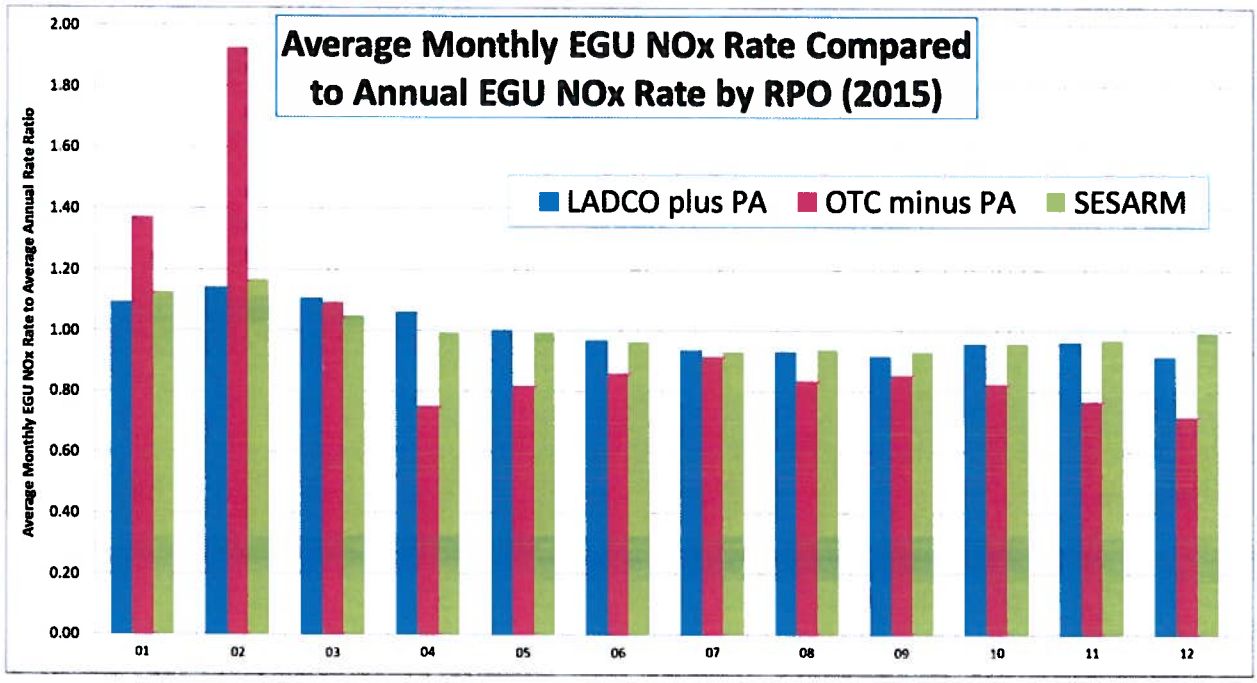

Figure 9. Reported CEM average monthly EGU NOx emission rates for 2015 by RPO (Source: CAMD data download).

Based on these data, it is apparent that MANE-VU is incorrect in its conclusion that nitrates from EGUs outside its own state borders are the most significant contributor to visibility impairment in MANE-VU.

7. **The back trajectory analyses described in the memo clearly indicate that on the most critical nitrate impacted days selected for examination at Brigantine NWR in winter 2015, the winds were out of the North and initiated outside of the U.S.**

Based on Figure 14 of MANE-VU's memo (also included as Figure 10 here), the back trajectory analysis for the 20% most impaired days during winter 2015 at Brigantine NWR includes a majority of days where there is a demonstrated northern wind pattern out of Canada that brings anthropogenic and natural emission contributions of international origin. In fact, two of the three highest days of light extinction (January 15th and February 17th) have a direct trajectory from the north while passing over

New York and Maine, respectively, on the path to the Brigantine NWR receptor. With the exception of January 24th, it appears that all other winter visibility impaired days also have at least one daily origin track back into Canada and locations north of the continental U.S. indicating an international contribution to the light extinction observations.

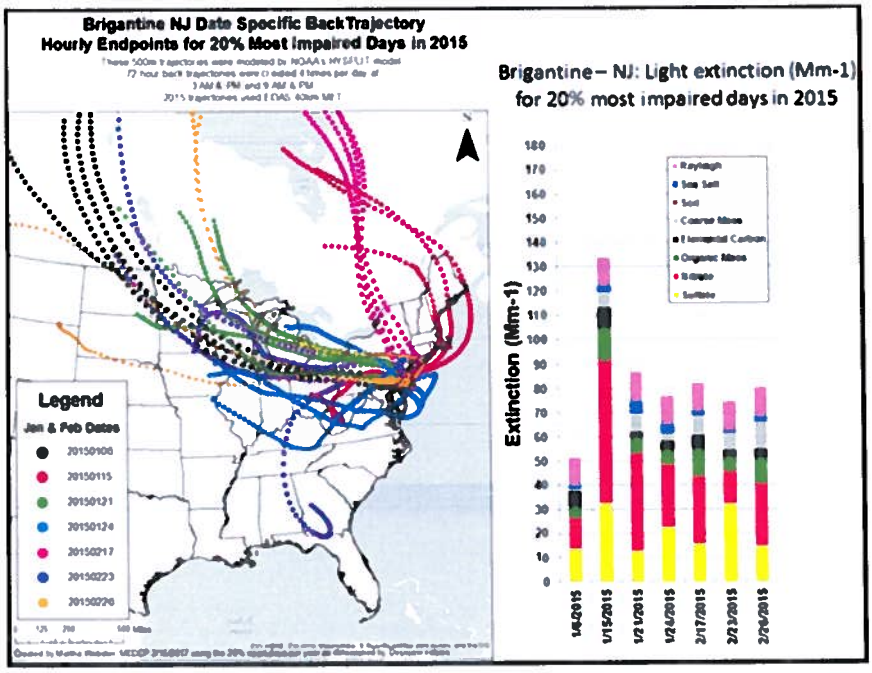

Figure 10. Trajectory analyses of Brigantine 20% most impaired days during Winter 2015 (Source: Figure 14, MANE-VU Winter NOx Control Memo 170905).

8. **Before asserting its position that an additional control requirement of any kind should be imposed on upwind US EGUs, MANE-VU has an obligation to assess international and non-anthropogenic emissions with a view towards adjusting the glidepath in accordance with EPA's regional haze rules.**

Recent white papers presented at the 2017 Western States Air Quality Modeling Workshop[10] have reinforced that as the Regional Haze Rule (RHR) requires states to quantify the natural level of visibility and requires states to adopt emission control measures needed to make reasonable progress towards natural visibility conditions at Class I areas, it is important that the models used for ozone and regional haze planning be evaluated to assess how well they simulate background ozone and natural haze levels. At many rural sites in the U.S., the largest contributor to ozone and haze include both natural sources and long range transport of non-U.S. anthropogenic emissions. One of the recent WRAP workshop presentations[11] states:

[10] https://www.wrapair2.org/pdf/4th%20Biannual%20Western%20Modeling%20Workshop%20Sept6-8_2017%20finalagenda.pdf

[11] https://www.wrapair2.org/pdf/West%20Reg%20Air%20Workshop%20draft%20issue%20paper%20O3%20haze.pdf

> "EPA's draft recommended approach for using IMPROVE data for regional haze planning purposes does not attempt to separate international from domestic impacts, despite modeling studies that suggest international impacts can dominate at some Class I areas. The draft recommended approach also attributes between natural and anthropogenic using limited observations of the speciation of natural particulate matter. Both of these aspects of the data analysis could be improved by additional, robust modeling analyses."

The same workshop resulted in the following statement[12] regarding modeling:

> "The modeling domains of regional and urban-scale photochemical models used in air quality planning for O3, PM2.5, and regional haze are usually defined to encompass the majority of sources and receptors of interest. However, sources outside the modeling domain, such as long-range, international transport or stratospheric intrusion, may affect concentrations within the domain. To quantify the contribution of these extra-regional sources to concentrations within the domain, global-scale chemical transport models are being used increasingly to define time-varying boundary conditions for regional and urban scale modeling, as opposed to the past practice of assuming static conditions based on climatological averages."

Between the establishment of the glide slope and a modeled projection of visibility at each Class I area impacted by the RHR, there is a disjoint in the ability to quantify the natural contribution from international locations. In fact, current regional modeling of ozone, PM, and regional haze utilize boundary condition files from global chemistry models that do not separate natural from man-made emissions and therefore cannot provide an adequate accounting for the relative contribution of international background visibility to that of anthropogenic contributions to visibility. Additionally, as in ozone modeling, we find that the relative decrease in domestic U.S. regional haze and visibility impairing precursor emissions is generally offset by an ever increasing contribution from international source emissions. EPA's latest proposed tracking progress metric, using the average of the 20% most anthropogenic impaired days instead of the current practice of using the average of the 20% haziest days, attempts to remove the influence of natural source contribution to human emission contribution. In this proposal, however, is the issue of quantifying natural international source contribution to visibility impairment.

Ralph Morris (Environ-Ramboll) made the following points[13] at the workshop and recommended a particulate source apportionment technology (PSAT) metric to identify international contribution:

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[12] https://www.wrapair2.org/pdf/West%20Reg%20Air%20Workshop%20draft%20issue%20paper%20global.pdf
[13] https://www.wrapair2.org/pdf/Regional_Haze_Morris_2017-09-06.pdf

1. The fundamental difference between EPA and PSAT Most Impaired Days is treatment of international emissions. EPA includes international emissions unless screened out by total carbon and dust threshold. PSAT considers International emissions uncontrollable so they are excluded.
2. In the future, it is recommended to conduct PSAT runs that separate international anthropogenic and natural contributions.
3. If EPA Most Impaired Days visibility metric is dominated by International transport, controls on U.S. anthropogenic emissions will be ineffective for improving visibility, meaning that states will be unable to demonstrate RPGs.
4. EPA proposes to address International anthropogenic emission contributions by adding them on to the 2064 Natural Conditions goal, changing the slope of the URP Glideslope. Another suggested approach would be to subtract it from the 2028 modeled visibility.
5. As International SO2 emissions are changing, which year of International contributions should be used [Baseline (2000-2004); modeling year (e.g., 2011, 2016); landmark year (2028); end point year (2064)]

Brian Timin of EPA made the following points[14] regarding the agency's initial 2028 visibility air quality modeling:

1. EPA's draft recommended natural conditions guidance contains enough uncertainty that it should not be used to adjust the glidepath for potential international anthropogenic and prescribed fire impacts. Instead EPA believes that the draft recommended natural conditions levels should be further examined.
2. The RHR allows for the adjustment of 2064 natural conditions to include international anthropogenic and prescribed fire impacts.
3. Photochemical modeling can be used to estimate the impacts of these sources. However, due to the uncertainty in this current modeling, EPA does not recommend using these modeling results to adjust the glidepath endpoint.
4. The draft recommended natural conditions values should be further examined (which can be informed by future modeling).
5. Visibility at most Eastern Class I areas is projected to be below the glidepath, with large percentages of the projected light extinction from U.S. anthropogenic sources.
6. There are large uncertainties associated with many aspects of the analysis which causes the position relative to the 2028 glidepath to be highly uncertain.
7. Because of the uncertainties, EPA recommends using caution when considering whether and how these results can help guide the next steps in SIP preparation. 2028 Source Apportionment modeling demonstrates that boundary conditions tend to dominate at many Class I areas and that boundary conditions include both natural and international anthropogenic sources. There is need to separately quantify the international anthropogenic impacts.

[14] https://www.wrapair2.org/pdf/Timin-EPA%20Initial%202028%20Regional%20haze%20modeling%20summary-West.pdf

8. The largest Canadian emissions impact is to wintertime nitrate along the northern US border.
9. US anthropogenic source contributions are sizable in the East (25-60% of modeled non-Rayleigh impairment), but smaller in the West (5-25% of modeled non-Rayleigh impairment).

In summary, EPA and others have identified a number of uncertainties associated with their initial 2028 regional haze modeling analysis and with the calculation of regional haze progress and glide slopes using current methods and data. A significant issue in this uncertainty is the ability to adequately quantify international anthropogenic and natural source contributions to visibility impairment at Class I area locations. Until these issues are addressed and vetted with the states and regions impacted by the decisions, MOG recommends that MANE-VU follow EPA's advice to work collaboratively with MJOs, states, and FLMs to make necessary improvements and ultimately update this modeling.

9. The Northeast is already achieving what appears to be the unadjusted glidepath in all areas in 2018 and is expected to achieve the glidepath in 2028 at all areas other than Brigantine.

According to MANE-VU reporting[15], "Regional Haze metrics trends were completed for both the previously approved calculation method looking at "20% worst" visibility days and EPA proposed calculation method looking at the "20% most impaired" visibility days. Trends for both methods show that all Class I areas are well below the 2018 Uniform Rate of Progress (URP) level for the first SIP planning period and all but the Brigantine Wilderness Class I area are currently below the 2028 URP level for the second SIP planning period. "

[15] http://www.otcair.org/MANEVU/Upload/Publication/Reports/MANE-VU_Speciation_and_Trajectory_Analyses_-_Final.pdf

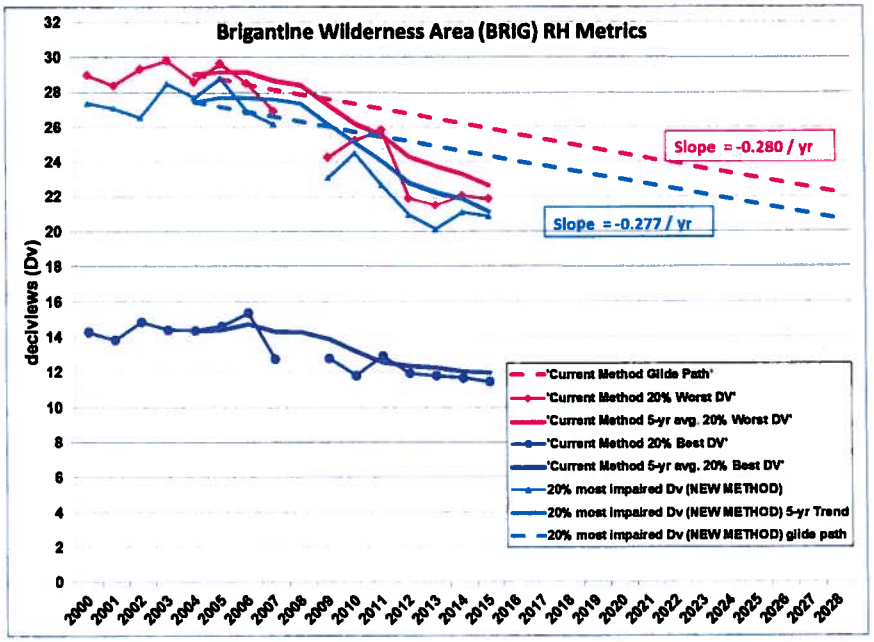

Figure 11. Brigantine Wilderness Haze Metrics Trends (Source: Regional Haze Metrics Trends and HYSPLIT Trajectory Analyses, MANE-VU, May 2017)

Based on the points made above, concerning both OTC nitrate contribution to the Brigantine visibility impairment and the uncertainty involved in quantifying the ever increasing proportion of international background contribution to this metric, MOG recommends a thorough review of local source control programs (both elevated and low level emissions) and a coordinated international assessment with the cooperation of EPA and other MJOs before making determinations as to the viability of requesting explicit upwind control strategies to improve visibility at MANE-VU state Class I areas.

Conclusion

For all of the aforementioned reasons, MOG urges that the memo and its recommendation that new control requirements be imposed on EGUs be withdrawn.