OZONE TRANSPORT COMMISSION

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April 6, 2017

United States Environmental Protection Agency
Air and Radiation Docket and Information Center
1301 Constitution Ave. N.W., Washington, DC 20460
Mail Code: 2822T

Attention: Docket ID No: EPA-HQ-OAR-2016-0751

RE: Notice of Availability of the Environmental Protection Agency's Preliminary Interstate Ozone Transport Modeling Data for the 2015 Ozone National Ambient Air Quality Standard (NAAQS)

Dear Docket Administrator:

The Ozone Transport Commission (OTC) appreciates the opportunity to review and comment on the United States Environmental Protection Agency (EPA)'s "Notice of Availability of the Environmental Protection Agency's Preliminary Interstate Ozone Transport Modeling Data for the 2015 Ozone National Ambient Air Quality Standard (NAAQS)." (Transport NODA) (82 FR 1733, January 6, 2017)

The OTC is a multi-state organization created under the Clean Air Act (CAA) led by Governors and state air official representatives from 12 states and the District of Columbia to advise the EPA on finding solutions to the common problem of ground level ozone and precursor pollutants. The Commission ensures public health and welfare protection by identifying practical and cost-effective emissions reduction solutions. Ground-level ozone is a criteria pollutant formed by precursors and transported across state lines directly affecting the health of more than 66 million people in the northeast and mid-Atlantic region particularly the young, elderly, and persons with compromised health.

Section 110(a)(2)(D)(i)(1) of the CAA, also known as the "Good Neighbor" (GN) provision, requires each state to include provisions in its State Implementation Plan (SIP) that prohibit emissions that will significantly contribute to nonattainment of, or interfere with maintenance of, a NAAQS in a downwind state. Per the CAA, the GN SIPs are due within 3 years of promulgation of a revised NAAQS, i.e. by October 26, 2018 for the 2015 ozone standard. The EPA memorandum of October 1, 2015 noted that the GN provision for the 2015 ozone NAAQS can be addressed in a timely fashion using the framework of the Cross-State Air Pollution Rule (C-SAPR). If EPA finds that states have not timely submitted GN SIPs or disapproves such a SIP, then EPA must promulgate Federal Implementation Plans (FIPs) to satisfy the GN provision. EPA has applied the C-SAPR framework to address the GN provision for previous standards for ozone and other criteria pollutants.

The Transport NODA addresses steps 1 and 2 of the four-step C-SAPR framework, using preliminary modeling for 2023 to identify projected nonattainment and maintenance receptors and identifying upwind states that contribute to these receptors. EPA notes that states may choose to modify or supplement these data when developing their GN SIPs, and/or EPA may update these data for potential future analyses or regulatory actions related to interstate ozone transport for the 2015 ozone NAAQS. ***However, as described below, the Transport NODA in its current form has technical deficiencies that should preclude its use in GN SIPs.***

As many areas within the OTR continue to monitor nonattainment of the 2015 ozone standard, it is critical to the OTC that Good Neighbor requirements for the 2015 ozone standard are addressed on schedule.

The OTC states offer the following comments regarding various aspects of the Transport NODA.

Air Quality Modeling Underprediction

EPA applied the Version 6.3 emission inventory and the Comprehensive Air Quality Model with Extensions (CAMx) v6.32 for base year and future year air quality modeling to identify receptors and quantify contributions[1]. The platform was nearly identical to that used to model 2017 ozone levels to identify receptors and quantify contributions for the C-SAPR Update Rule[2]. Ozone season monitoring data for two of the years (2015 and 2016) that constitute the 2017 design value (DV) period are available, so some comparison of the modeled projections to monitored values is possible. Since the procedure for determining monitored DVs is specifically designed to minimize anomalies in a particular year from having too much weight, large swings in DVs for 2017 are not expected when compared to the 2015 and 2016 values.

Table 1 compares 2015 and preliminary 2016 monitored DVs at the 23 worst sites in the OTR with 2017 modeled future design values (DVFs) from EPA's C-SAPR Update Rule. The differences are **Error! Reference source not found.**substantial, with all but two sites underpredicted by the C-SAPR Update Rule modeling for 2017. The results in Table 1 show that the 2017 C-SAPR Update Rule projections underpredicted the preliminary 2016 DVs by 5ppb or more at 15 sites, and by 10 ppb or more at 4 sites. Some of the largest differences occur at the Connecticut coastal sites (e.g. Westport, Greenwich and Stratford) which recorded the highest preliminary 2016 DVs in the OTR. For comparison, Table 1 also shows 2017 DVFs predicted by the OTC with the Community Multi-Scale Air Quality (CMAQ) model, which are somewhat higher than EPA's projections, but still tend to underpredict the preliminary 2016 measured DVs. Although EPA's Tier 3 Motor Vehicle Emission and Fuel Standards commence in 2017, EPA projects the program will provide an average decrease in ozone DVs of only about 0.6 ppb in

[1] US EPA, "Technical Support Document (TSD) Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2023," December 2016.
[2] US EPA, *Air Quality Modeling Technical Support Document for the Final Cross State Air Pollution Rule Update*, Technical Support Document, (Office of Air Quality Planning and Standards, August 2016).

2018[3]. Even lower ozone benefits are projected by EPA[4] for Connecticut from the C-SAPR Update in 2017.

The projections used in the 2017 C-SAPR Update Rule are clearly under predicting current DVs in the Ozone Transport Region (OTR), often by large amounts. Since the projections contained in the Transport NODA rely on the same underlying platform and many of the same methodologies, the 2023 projections are likely to underpredict as well. As a result, the Transport NODA modeling should not be used as the basis for any 110(a)(2)(d) SIPs for areas that could contribute to nonattainment or interfere with maintenance of the ozone NAAQS in the OTR.

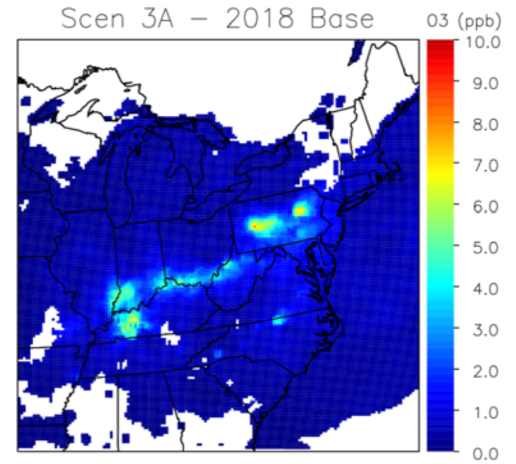
Table 1: Monitored and Modeled Results at Top 23 Ozone Monitors in OTR by 2016 Design Value (in ppb)

State	County	Site	AQS Code	2016 DV (Prelim.)	2015 DV	2017 EPA C-SAPR Update DVF[5]	2017 OTC CMAQ DVF[6]
CT	Fairfield	Westport Sherwood Island	90019003	85	84	76	83
CT	Fairfield	Greenwich Point Park	90010017	82	81	74	77
CT	Fairfield	Stratford	90013007	81	83	75	77
CT	Middlesex	Middletown	90070007	79	80	69	70
CT	Fairfield	Western Conn State Univ	90011123	78	76	71	74
PA	Philadelphia	North East Airport (NEA)	421010024	77	73	73	73
PA	Bucks	Bristol	420170012	77	75	70	70
CT	New Haven	Criscuolo Park-New Haven	90090027	76	76	66	67
NY	Richmond	Susan Wagner HS	360850067	76	74	75	78
MD	Cecil	Fair Hill	240150003	76	73	69	73
CT	New Haven	Hammonasset State Park	90099002	76	78	76	77
CT	Hartford	McAuliffe Park	90031003	75	76	65	66
CT	Litchfield	Mohawk Mt-Cornwall	90050005	74	70	61	62
NJ	Middlesex	Rutgers University	340230011	74	72	70	71
NY	Westchester	White Plains	361192004	74	73	71	73
NJ	Bergen	Leonia	340030006	74	74	68	68
NJ	Mercer	Wash Crossing	340219991	73	71	66	66
NJ	Ocean	Colliers Mills	340290006	73	72	71	72
NJ	Gloucester	Clarksboro	340150002	73	73	72	74
CT	Tolland	Stafford	90131001	73	76	65	67
PA	Chester	New Garden	420290100	73	69	64	66
MD	Harford	Edgewood	240251001	73	71	78	81
MD	Harford	Aldino	240259001	73	70	66	70

[3] US EPA, *Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards Final Rule*, Regulatory Impact Analysis EPA-420-R-14-005, (Office of Transportation and Air Quality, March 2014).
[4] US EPA, *Ozone Transport Policy Analysis Final Rule TSD*, August 2016.
[5] US EPA, "Data File with Ozone Design Values and Ozone Contributions," August 2016.
[6] Ozone Transport Commission, *Technical Support Document for the 2011 Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union Modeling Platform*, Washington, DC (OTC, November 15, 2016).

Integrated Planning Model (IPM) Projection Flaws

Figure 1: Scenario 3A (NOX Control Case) versus 2018 Alpha 2 OTC Ozone Modeling



The EPA modeling is based on a 2023 Electric Generating Unit (EGU) inventory that relied on IPM model v5.16 for projecting EGU activity and emissions[7]. OTC modeling has shown that substantial ozone reductions can occur even if emissions are lowered at specific individual power plants. This is demonstrated in Figure 1 where emissions from several units have been substantially reduced from the base case resulting in localized ozone benefits in the 6 ppb range.

Given this sensitivity of modeling results to EGU emissions, if IPM's projections are incorrect, then the results of the modeling may also be incorrect. This would in turn affect conclusions about future year ozone levels, linkages between upwind and downwind states, and contribution responsibilities. Ongoing EGU projection efforts in the OTC and other areas using the Eastern Regional Technical Advisory Committee's (ERTAC) EGU Forecasting Tool have shown that the IPM modeling has potential flaws which could adversely affect the transport remedies developed by states that rely on the IPM-based modeling to assess their GN responsibilities, thereby providing downwind states with insufficient relief from transported ozone pollution. Some of these potential flaws with the IPM modeling are described below.

Potential reductions from the Clean Power Plan (CPP) and C-SAPR Update

The current projections include substantial reductions from the CPP, which was stayed by the Supreme Court pending judicial review. In addition, on March 28, 2017 President Donald J. Trump issued an executive order calling for EPA to review the CPP for the possibility of withdrawing the regulation. If the rule is ultimately vacated, or if significant delays occur during the judicial review process, or the rule is withdrawn, then the anticipated emission reductions will not occur by 2023. If EPA does continue to include the CPP in its future projections, it should consider using a more conservative approach for determining future year emissions. The mass-based, no-interstate-trading approach likely overestimates future emission reductions. The Regional Greenhouse Gas Initiative (RGGI) is already in place in the Northeastern US, so a trading-based approach to the CPP is far more likely in this region.

In addition, the C-SAPR Update (81 FR 74504, October 26, 2016), which is scheduled to take effect in the 2017 ozone season, may be eliminated under a proposed Congressional Review Act disapproval resolution. This would mean that states relying on the modeling presented in this Transport NODA would be taking enforceable emissions reduction credit based on a rule whose outcome is uncertain at this time. Any GN SIP that relies on emission reductions that are ultimately not enforceable must be disapproved by EPA. States should quantify these emission reductions to include in their Good Neighbor SIPs if they choose to use EPA's platform.

IPM predictions and assumptions

[7] US EPA, "EPA Base Case v.5.16 for 2015 Ozone NAAQS Transport NODA Using IPM Incremental Documentation," December 2016.

The IPM modeling predicts that a significant number of new units, capacity expansions, controls, and retirements will occur by 2023. However there is little evidence (i.e. supporting permit applications or adopted federal or state specific rules) to indicate that this will occur in such a short period. Also, some units have a consistent history of being projected by IPM as undergoing an operational change which does not ultimately occur. For example, IPM has consistently predicted that a number of coal-fired EGUs in the Northeast will retire, even though there are no current plans to retire these units. Finally, IPM assumes that installed emission controls will operate throughout the ozone season. Based on multiple detailed analyses of NOx emissions data provided to EPA and the states, it has been shown that in reality, NOx controls are not consistently operated. The potentially unrealistic predictions and assumptions associated with the IPM modeling have resulted in significantly overoptimistic emissions reduction projections, compared with other EGU emissions projection tools such as the ERTAC EGU Forecasting Tool.

The ERTAC EGU workgroup has developed an extensive EGU dataset of state-approved unit-specific information on emission levels, air pollution control equipment, and retirement plans. Table 2 compares ozone season NOx emissions projected by the IPM and ERTAC tools. ERTAC projects 2023 emissions will be 77% higher than projected by IPM. IPM projects far less NOx emissions from coal than projected by ERTAC (only PA, MD, and VA continue to have emissions from coal in IPM). While some of these changes may occur, they are far more aggressive than can be expected considering the feedback received from states through the ERTAC EGU data review process and on-the-books rules. Another notable difference is IPM's projection that oil units do not run in 2023. Many of these units, in the New York City area in particular, are must-run units needed for electric reliability. These must-run units often operate on the worst air quality days during the ozone season, so the IPM appears to under-represent an important temporal component regarding NAAQS attainment and maintenance in its projections.

Table 2: 2023 Ozone Season NOx Emissions (tons) by State and Fuel Type in ERTAC v2.6 and IPM v5.16

	Coal		Gas		Oil	
State	**ERTAC**	**IPM**	**ERTAC**	**IPM**	**ERTAC**	**IPM**
CT	95.45		316.34	375.41	38.15	
DC						
DE	304.24		567.21	527.74	117.30	
MA			686.43	944.20	31.48	
MD	5080.60	1063.67	257.02	770.73	499.58	
ME			237.31	142.11	8.38	
NH	524.98		99.59	140.01	9.14	
NJ	987.36		1294.54	1283.64	28.43	
NY	1112.69		5165.84	4251.50	258.05	
PA	21961.03	8260.34	2277.51	4708.48	442.16	
RI			299.22	237.25		
VA	5562.51	2265.19	1952.97	3427.05	141.74	
VT				0.35		
Grand Total	**35628.86**	**11589.20**	**13153.99**	**16808.47**	**1574.40**	**0**

EPA should conduct a true-up of IPM emissions projections (e.g. comparing C-SAPR Update projections to actual emissions), in order to better assess IPM accuracy. In future EPA modeling of utility sector emissions, EPA should modify some of IPM's input assumptions regarding unit retirements, shutdowns, and operation of controls to better reflect currently known conditions. EPA should also consider utilizing the ERTAC EGU Forecasting Tool as a basis or supplement for its EGU emissions projections.

Other Emission Inventory Projections

Though OTC has concerns about the use of IPM for projecting future year emissions from EGUs, we appreciate the willingness of EPA to use the growth factors that were submitted by our states for many other inventory sectors. States often have more direct knowledge as to changes in local emission inventories, and EPA's use of this data has strengthened the relevant sectors of the 2023-projected emissions inventory.

Meteorology

The EPA relies exclusively on 2011 meteorology for the modeling presented in this Transport NODA. While OTC research has shown that 2011 was conducive to ozone formation and thus an appropriate choice in many ways, we also found that the 2011 meteorology had some notable air flow differences from other high ozone years in our region. One specific concern is that the 2011 meteorology contains a relatively weak southerly air flow compared to other modeled years (2002, 2005, and 2007) and consequently produces significant differences in the state contribution modeling results.

Historically, the southwesterly airflow pattern which carries ozone and its precursors up the Atlantic coast, when combined with westerly upper level transport, can lead to ozone exceedances in the OTR. When such airflows occur, states such as North Carolina can become contributors to ozone nonattainment in our region. Here we will look at an analysis of the major air flow patterns impacting the Lewes, Delaware monitor over a number of years as an example. As Figure 22 shows, the southerly transport pattern during high ozone days was relatively weak in 2011 compared to many other years. Figure 33, which compares air flows from 2011 to the other seven years analyzed, further illustrates the lack of transport from the south in 2011 compared to other recent years. This meteorological difference likely contributed to the exclusion of southern states as significant contributors to the OTR according to the 2011-based modeling, even though previous CSAPR modeling identified these states as significant contributors for modeled years with more prominent southerly air flow, e.g. in 2007.[8]

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[8] US EPA, *Air Quality Modeling: Final Rule Technical Support Document*, Research Triangle Park, NC, Technical Support Document (Office of Air Quality Planning and Standards, June 2011).

Figure 2: Difference comparison maps for Lewes for high-ozone days versus all ozone-season days (2008–2015). Arrows indicate major flow patterns. Dashed circles in 2011 and 2015 indicate lack of flow from certain areas[9]

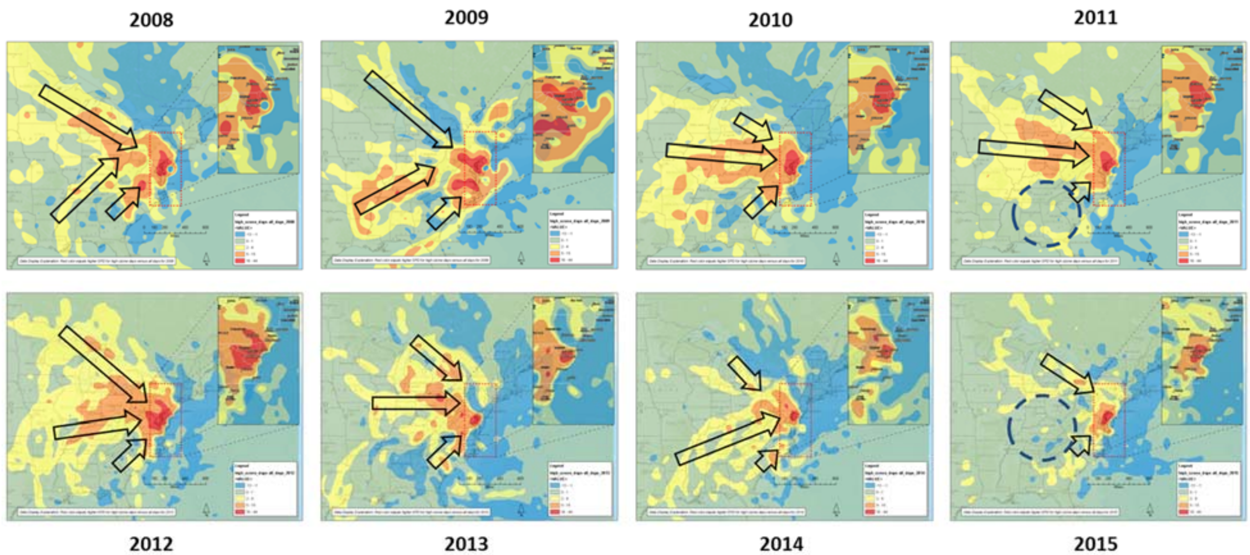
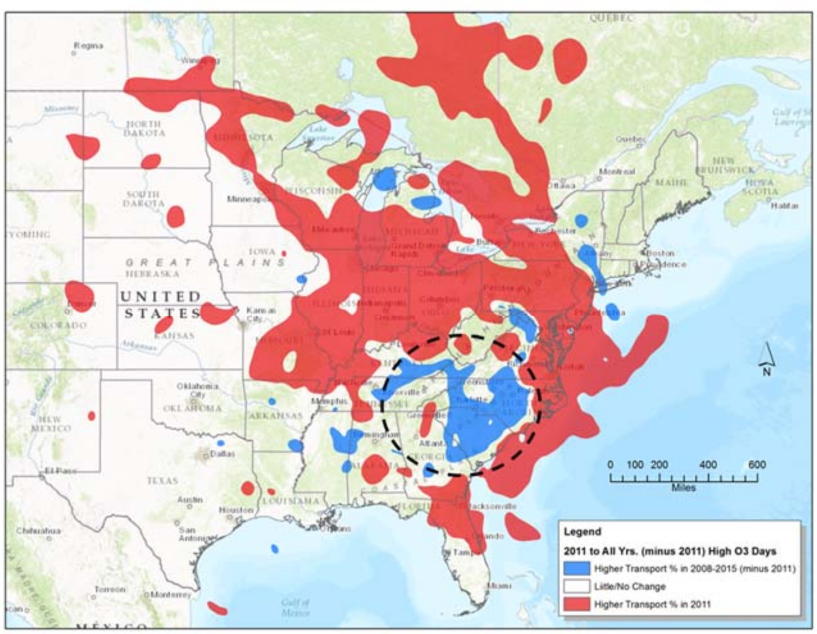


Figure 3: Difference comparison composite map for high-ozone days in 2011 versus high ozone days in all other years at the Lewes monitoring site. The dashed circle indicates there was less southwesterly air flow in 2011 compared to all other years[10]



OTC requests that future EPA analyses consider all meteorological regimes, including the southerly transport flows that have been shown to contribute to ozone transport into the Northeast. This could be accomplished by using 2015 and 2016 meteorology for future transport modeling efforts or by including projections from 2012 (reflecting 2012 meteorology) in addition to 2011.

[9] Sonoma Technology, Inc., "Delaware Trajectory Assessment," Technical Memorandum, (October 6, 2016).
[10] Ibid.

Shorter Contribution Time Period

Scientific literature shows that short-term exposure to ozone can be problematic to human health.[11,12] As a result, the EPA has determined that the most appropriate way to show that an area is in nonattainment of the health-based standard is by using a 4th highest 8-hour average ozone concentration. However, in the modeling conducted by EPA to show contribution to ozone nonattainment through the GN process, EPA derives the 8-hour attainment assessment from a cumulative ozone season average contribution calculation.

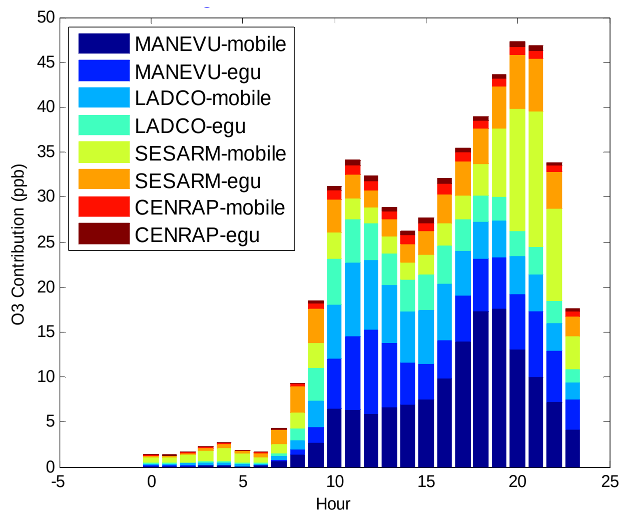
Research from OTC states has shown that various upwind states can contribute significantly (>1% of the ozone NAAQS) over a high ozone period of 8 hours as the transport patterns shift during the day. However, despite the fact that different regions dominate, each for several hours, EPA is applying a seasonal average mathematical calculation, which diminishes the role of some of these contributing states, and thus fails to include them in a remedy to ozone nonattainment in the OTR. In the Northeast, significant ozone contributions can come from many upwind locations and seasonal averages may oversimplify the situation leading to only a partial solution to the ozone transport problem.

The following is an example using the CMAQ Integrated Source Apportionment Method (CMAQ ISAM) to display the importance of looking at short term contributions. CMAQ ISAM was applied to compute the ozone contribution associated with the mobile and EGU NOx and VOC emissions from regions of MANE-VU, LADCO, SESARM and CENRAP within the OTC modeling domain at the Edgewood, MD monitor. The modeling was conducted by New York State Department of Environmental Conservation and used CMAQ_ISAM v5.0.2, the NEI 2011 v1 emissions inventory, EPA's 2011 12-km WRF meteorology, and GEOS-Chem boundary conditions.

[11] Michelle L. Bell, Jonathan M. Samet, and Francesca Dominici, "Ozone and Mortality: A Meta-Analysis of Time-Series Studies and Comparison to a Multi-City Study (The National Morbidity, Mortality, and Air Pollution Study)," 2004, http://biostats.bepress.com/jhubiostat/paper57/.
[12] Xue-yan Zheng et al., "Association between Air Pollutants and Asthma Emergency Room Visits and Hospital Admissions in Time Series Studies: A Systematic Review and Meta-Analysis," ed. Tim S. Nawrot, *PLOS ONE* 10, no. 9 (September 2015): e0138146.

Error! Reference source not found.4 shows the contributions from mobile sources and EGUs on June 8, 2011 at Edgewood, MD. Emissions from the LADCO region have a strong impact in the morning and emissions from the SESARM region have a strong impact during the highest ozone hours. In fact the emissions from SESARM contribute more to ozone levels on several hours than local MANE-VU emissions do. However, if these contributions are averaged over the course of a day, the signals from LADCO and SESARM lose strength because ozone impacts are not particularly high during the morning or evening hours.

Figure 4: CMAQ ISAM results for Edgewood, MD (240251001), June 8, 2011



To ensure that a full remedy will be effective over many years of varying meteorology, EPA must better evaluate how individual 8-hour ozone events build, and should consider shorter timeframes when looking at contributions.

Use of Projections to Determine Contributions

EPA's use of future year emission projections to make attainment/nonattainment determinations and to identify the need for additional remedies is problematic.

The IPM-projected 2023 emission estimates rely on unenforceable emissions reductions. EPA's current IPM modeling runs assume that all unenforceable emission reductions will occur on time so that only the remedy from the resulting assessment would be needed. This assumption is overly optimistic. (See pages 4-6 above for OTC's issues with IPM assumptions)

Meeting ozone attainment ultimately depends on a monitoring demonstration, while modeling analyses are applied to demonstrate that plans are on the right track to meet attainment requirements. Stretching the application of future year modeling to determine which areas will and will not be in attainment, and then developing a remedy for only those areas is highly problematic. This approach assumes knowledge of future economic strength and energy-based market forces, and future weather patterns, all of which affect emissions as well as monitored and predicted ozone levels. Inaccurate assumptions or calculations including use of unenforceable emission limits could mean the remedy fails.

Future year projections should not be used as the basis for assessing state contributions to interstate ozone transport. Significantly contributing states should be identified using the known emissions of a base year. Applying already-identified future year enforceable emission reductions is an acceptable part of the remedy. If additional controls are necessary to address a state's contribution, then such a remedy needs to be adopted and made enforceable in the

GN SIP.

Contributions Broken Down by Source Category

The maximum ozone contributions by each state reported in the NODA represent the sum of total contributions from all source categories or sectors within each state. They are not linked to just one specific sector like EGUs. EPA has not performed contribution modeling for individual source categories or sectors on a state by state basis. A sector contribution analysis would provide states with specific contributions related to specific activities within the state and allow state air programs to identify the most effective Good Neighbor emission reduction strategy. ***EPA should assist states in determining specific sector or source category contributions to nonattainment in each state.***

State Use of EPA Modeling for GN SIPs

In the Transport NODA, EPA stated that "These data are considered preliminary because states may choose to modify or supplement these data in developing their GN SIPs." ***Please confirm that EPA's intent of this statement is that the modeling in this Transport NODA is not of sufficient quality to be used in a GN SIP without additional improvement, modification, or supplement, i.e. it is not "SIP quality." This includes some of the issues listed above such as the uncertain future of the CPP, among other things.***

Conclusion

Based on the evidence provided, the projections included in the Transport NODA cannot stand alone as the basis for GN SIP submissions.

Not all states have the resources to conduct their own transport modeling and thus are reliant on EPA's modeling efforts. EPA's modeling must be as accurate as possible for states to discharge their obligations to reduce pollution transport and also to determine which upwind states contribute to such transport. The OTC is developing an alternative 2011/2023 modeling platform using inventories produced by the Mid-Atlantic Regional Air Management Association (MARAMA) for state use in GN SIPs. This alternative modeling platform utilizes the ERTAC EGU model for EGU projections which addresses many of the technical issues with IPM outlined above and excludes emission reductions that are not currently enforceable.

Given the deficiencies of EPA's preliminary NODA modeling, the OTC recommends that states utilize the OTC modeling platform for their GN SIP submissions. For future transport modeling, OTC recommends that EPA use the ERTAC EGU model and include contribution by source categories in addition to states. Additionally, contribution assessments should be developed using base year data rather than less reliable future year projections, ozone events rather than entire ozone seasons, and at least two years of meteorological data, to better capture the variety of flow patterns that can contribute to transport impacts. These methodologies will ensure that EPA and states have reliable data to support future transport work.

If you have any questions, please do not hesitate to contact me.

Sincerely,

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CC: OTC Air Directors