Maryland
Department of
the Environment

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April 6, 2017

United States Environmental Protection Agency
Air and Radiation Docket and Information Center
1301 Constitution Avenue NW
Washington DC 20460

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

To Whom it May Concern:

The Maryland Department of the Environment (MDE or the Department) appreciates the opportunity to review and comment on the Environmental Protection Agency's (EPA) Preliminary Interstate Ozone Transport Modeling Data for the 2015 Ozone National Ambient Air Quality Standard (NAAQS): Notice of Data Availability (NODA 2015 Ozone Modeling) (82 FR 1733, 01/06/2017).

The Good Neighbor (GN) provisions of the Clean Air Act (CAA) require each state to include in its State Implementation (SIP) provisions 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 provisions for the 2015 Ozone NAAQS can be addressed in a timely fashion using the framework of the Cross-State Air Pollution Rule (CSAPR), and the EPA's own backstop Federal Implementation Plans (FIPs).

The MDE applauds the EPA's modeling efforts along with the timely release of this modeling data for 2015 Ozone NAAQS. In the January 6, 2017 announcement (82 FR 1733), the EPA specifically solicited comments on the following items:

- The components of the 2011 air quality modeling platform;
- The methods for projecting 2023 ozone design value concentrations; and
- The methods for calculating ozone contributions.

Keeping in mind that it is critical that the EPA stay on schedule with the implementation of the 2015 Ozone NAAQS, the MDE accepts the components, projection methods and calculations proposed and applied in the NODA 2015 Ozone Modeling. In addition, the MDE has identified certain datasets and methods for projecting future ozone design value concentrations, and offers the following comments regarding various aspects of the NODA 2015 Ozone Modeling.

GN SIPs and Continued Progress on Ozone

Over the past ten years, Maryland has made dramatic progress reducing ground-level ozone, fine particulate matter and other air pollutants. For over 30 years, the State has run one of the country's most comprehensive and effective air pollution transport research programs. Maryland's experience and research tell us clearly what needs to be done to continue making progress in reducing exposure to ozone and other air pollutants. How the EPA implements the GN SIP process is one of the most important issues that needs to be dealt with to ensure that the states and the EPA continue to reduce air pollution and protect public health. If implemented thoughtfully, the GN SIP process can also help improve the economy, create jobs and foster a more collaborative decision making process where the states and the EPA work in partnership to continue cleaning the air.

Most major air pollution problems are now regional problems, not local problems. The CAA has been highly successful, but much of the benefit from prioritizing the control of local sources has been achieved. The GN SIP provisions of the CAA have never really been well implemented and they are a powerful tool that allows the EPA to think regionally first, with local controls as the second step where they are needed. By acting regionally first, the vast majority of the countries ozone and fine particulate matter problems will be solved with no need for additional local controls. The Maryland research program shows that, for ozone and fine particulate matter, the solution needs to be regional, not local.

We fully support the NODA 2015 Ozone Modeling as it begins a process very early that will lead to better GN SIPs being submitted by their due date in 2018. The MDE believes the EPA should evolve its GN SIP process and guidance in several ways. The 2018 SIPs should be treated as an initial submittal, to be enhanced and finalized in a time frame consistent with attainment in downwind areas. The initial submittal should include implementation of some programs early and recognize that additional programs may be needed to fully satisfy GN SIP requirements. This would allow upwind contributing states to work in collaboration with downwind areas to identify and implement a full solution.

In its role, the EPA is able to encourage and create incentives for collaboration amongst the states on GN SIPs, and take part in the solution. Many of the strategies that will be needed to satisfy GN SIP responsibilities involve reducing emissions from on-road and off-road mobile sources and in many cases can only be implemented effectively through a national or super-regional effort. Many of these strategies make common sense and are supported by many states and the private sector. States, in many cases, do not have the authority to address on-road and off-road mobile sources. It is critical for the EPA to be a full partner in future collaborations linked to GN SIPs.

Simple is Not Always Better

Again, the MDE supports and applauds the EPA for the NODA 2015 Ozone Modeling. That said, air pollution transport is a complex issue where different types of meteorology drive different types of transport problems. On days where air pollution is transported to Maryland, carried by aloft westerly winds, power plants in Pennsylvania and Ohio can be very significant contributors to ozone in Maryland. On other days, where air pollution transport is dominated by ground level winds from the south, cars and trucks in Virginia can dominate downwind state contribution to high ozone in Maryland.

The EPA NODA 2015 Ozone Modeling blends different types of transport meteorology with emissions and provides an "average" ozone contribution. The measured attainment test that all the states are required to use to demonstrate attainment is specific to conditions on individual days. Ground-level southerly transport drives high ozone concentrations on specific days. High ozone levels on other days are often driven by aloft westerly transport. A process that does not comprehensively look at all of the significantly contributing states during each different meteorological regime that drives air pollution transport will likely prevent states from measuring attainment, as design value calculations almost always include a mix of days with high ozone levels driven by different meteorological regimes.

The EPA has seen the work that Maryland, New York and other modeling centers have done on this issue and we encourage the EPA to continuously improve the process for identifying significantly contributing states under the GN SIP process. This issue, state contribution during key meteorological regimes, is one of the issues that Maryland would be happy to work with the EPA and other states on as part of this continuous improvement process.

Implementation Schedule

The MDE feels that it is absolutely critical for the EPA to stay on schedule with the implementation of the 2015 Ozone NAAQS, which includes the designation, SIP preparation and attainment demonstration of the 70 parts per billion (ppb) Ozone NAAQS. In order to meet these milestones, the MDE accepts the components, projection methods and calculations proposed and applied in the NODA 2015 Ozone Modeling. Any comments contained in this letter prepared by the MDE are for consideration and application in future modeling, with the intended effort to further improve the quality of the model's accuracy.

Ozone exceedance days in Maryland have decreased by roughly 80% since 2002. This dramatic progress has been driven by federal, regional, and the Departmental efforts to reduce emissions from many sources including cars, trucks, power plants, other stationary sources, and smaller sources like gasoline stations and consumer products. On many days, about 70% of Maryland's ozone problem originates in upwind states and is transported into Maryland. The MDE runs one of the nation's most sophisticated ozone research programs and on many days we use airplanes, balloons and mountaintop monitors when measured incoming ozone levels are already approaching 70 ppb.

Additional federal and regional efforts are needed in order for Maryland to attain and maintain the 2015 Ozone NAAQS. This NODA 2015 Ozone Modeling is intended to aid states in developing an approach for meeting their GN SIP requirements. Within each state's approach will be proposed federal and state programs to reduce the levels of nitrogen oxides (NOx) and volatile organic compounds (VOCs) being emitted within the state's boundaries, and by default limiting any transport and thereby meeting the requirements of CAA 110(a)(2)(D). Within Maryland, ever more restrictive emission control measures continue to be proposed and adopted, but our modeling and research shows that regional NOx reduction programs are needed in order to reduce ozone levels in the Mid-Atlantic region. The MDE supported the CSAPR Update Rule which, when implemented on May 1, 2017, will provide an immediate and cost effective partial solution to states' GN requirements for the 2008 Ozone NAAQS. With the MDE accepting the components, projection methods and calculations in the NODA 2015 Ozone Modeling, the EPA is not prevented from moving immediately into formulating the 1% linkage, first used in CSAPR and later in CSAPR Update Rule, and begin the analysis and determination of whether and what emissions from upwind states contribute significantly to Maryland's and other downwind states' monitors.

Replace Integrated Planning Model (IPM) with Eastern Regional Technical Advisory Committee (ERTAC)

IPM, which has been in place since 2003[1], is an emission projection tool used by the EPA to forecast least cost capacity expansion, electricity dispatch, and emission control strategies for the electric power sector. Within the past few years, ERTAC, conceived by the Mid-Atlantic Regional Air Management Association (MARAMA) and supported by many states, has been run in parallel with IPM so as to compare the data entry, flexibility, adaptability and results of the two programs. Overall, IPM continues to produce modeling results which do not reflect reality, and due to the complex and proprietary nature of IPM, cannot be selectively edited to reflect actual conditions.

In addition, recent reviews by the Ozone Transport Committee (OTC) and other regional organizations have shown the IPM model to have serious flaws in the calculation of:

- Potential NOx reductions from the Clean Power Plan (CPP);
- The frequency of switching from oil to natural gas as a result of the continued low cost of natural gas;
- Projected capacity expansion, which in reality continues to slow as the demand for electricity also slows, likely as a result of increased energy efficiency and demand response programs, including solar and wind;
- Unsupported development of new power plants, which are frequently and inaccurately located in areas which are unrealistic, such as Long Island;
- Unsupported retirement of units/power plants based on fuel type, which will not happen since their continued presence is required for grid reliability;
- Installation and continuous operation of emission controls and reduced emissions; and
- Unrealistic emission reductions.

[1] http://www.ewgateway.org/pdffiles/library/aq/IPModel.pdf

ERTAC not only produces results more reflective of reality, but is more transparent and allows viewing and editing the inventory of values and growth rate factors.

Installation and Continuous Operation of Emission Controls

The MDE submitted a letter supporting the CSAPR Update Rule[2], which is to be implemented in May 2017. The CSAPR Update NOx budgets are in-line with projected modeled emissions to be achieved through the optimization of existing NOx controls on power plants. In the preamble of CSAPR Update, the EPA notes that NOx reductions can be achieved expeditiously and cost effectively by running and optimizing existing control technology that is currently idled or being used inefficiently. The EPA should aggressively track power plant emissions after the 2017 ozone season for compliance, and utilize ERTAC to quickly analyze changing factors in the electric power sector.

Maryland already has regulations in place that require coal-fired power plants to run and optimize their existing NOx controls during the ozone season. While the MDE supports the CSAPR Update NOx budgets for the near future, additional regulatory requirements more in alignment with Maryland's existing regulations, mandating the optimization of emission controls in 2018 and beyond, are required. As natural gas and other fuels displace coal, which traditionally has a greater NOx emission rate, it will become possible to operate power plants not running controls, and thus further devalue the CSAPR Update NOx allowances. Again, we should expect to see the cost to operate controls, even existing controls, exceeding the cost of purchasing CSAPR Update NOx allowances.

Reliance on 2011 Meteorology

The EPA relies exclusively on 2011 meteorology for the modeling presented in this NODA 2015 Ozone Modeling. While research has shown that 2011 was conducive to ozone formation and thus an appropriate choice in many ways, it has also been shown 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 reduced southerly air flow compared to other modeled years (2002, 2005, and 2007) and consequently produces significant differences in the state contribution modeling results. In the future, the EPA should consider contributions from southerly transport into the Mid-Atlantic region as potentially significant.

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 both Maryland and the Mid-Atlantic region. When such airflows occur, states like North Carolina become significant contributors to ozone nonattainment in the Mid-Atlantic region. However, as Figure 1 shows, the southerly transport pattern during high ozone days was very weak in 2011 compared to many other years. Figure 2, which compares air flows from 2011 to other years, further supports the lack of transport from the south in 2011 that was shown to have occurred during the other years. This meteorological variance likely resulted in the model excluding emissions from

[2] https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0500-0382

sources in southern states as significant contributors to states in the Mid-Atlantic region, although they had been previously identified as significant contributors for other modeled years with a more prominent southerly air flow.

Figure 1: Difference comparison maps for Lewes, DE 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[3]

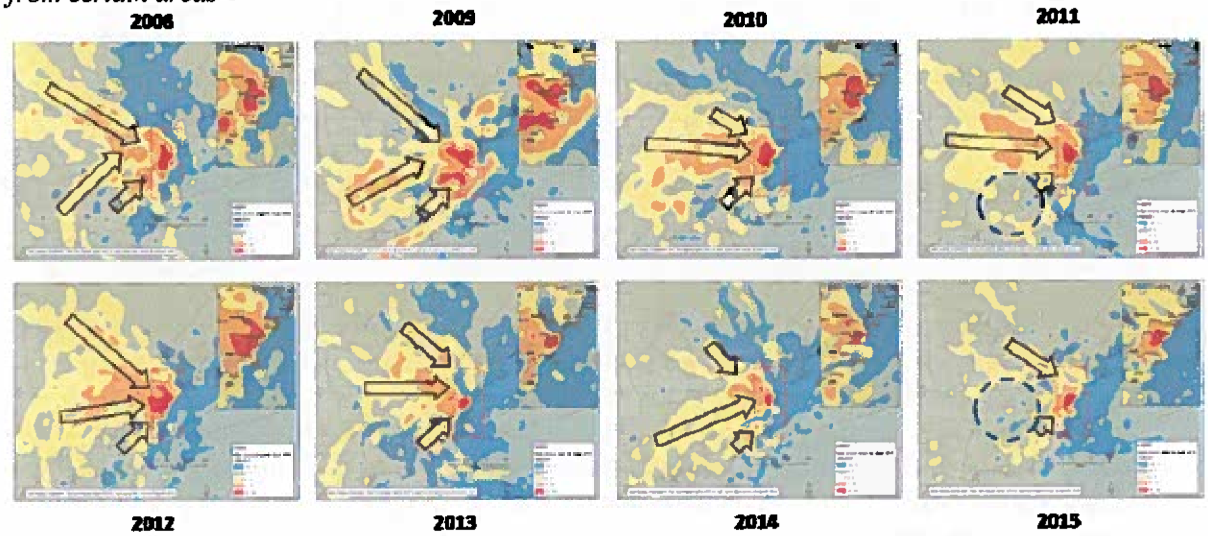
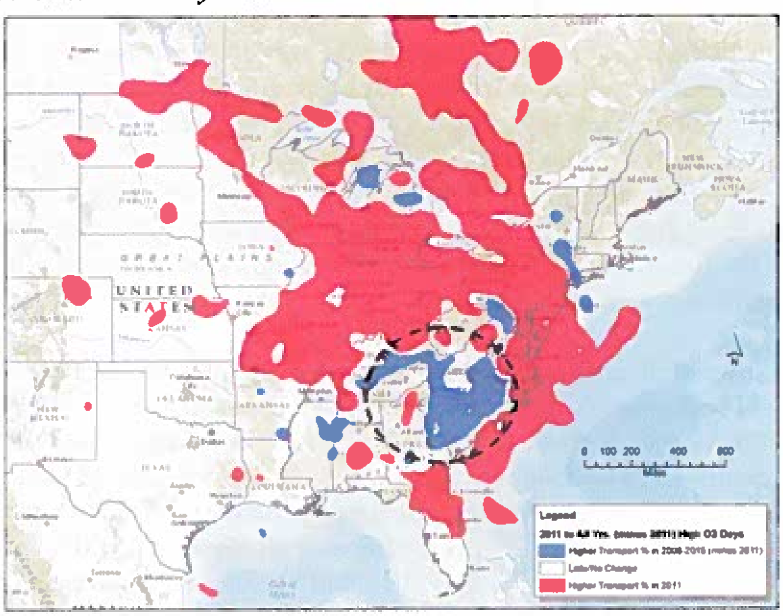


Figure 2: Difference comparison composite map for high-ozone days in 2011 versus high ozone days in all other years at the Lewes, DE monitoring site. The dashed circle indicates there was less southwesterly air flow in 2011 compared to all other years[4]



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

The MDE recognizes that there are limitations associated with the integration of meteorology into a model, since meteorology is not stagnant and is constantly in flux. A base year, in this case 2011, was selected. Regardless of how representative the meteorology was in 2011, there are both regional and local patterns which affect the formation of, and levels of ozone.

The MDE is accepting the NODA 2015 Ozone Modeling, but requests that the EPA conduct additional screening on the influence of meteorology on State transport contributions and ozone design value concentrations. Options when looking at meteorology could include:

- An average of two years, such as 2011 and 2012;
- An alternate year altogether, such as 2012; or
- Another alternative.

Some standard assumptions used in early modeling, such as 'the use of a single year's meteorology', warrant further discussion. The increased focus on transport and GN provisions is pointing towards a more complex analysis of the initial assumptions used in the early meteorological modeling.

Land/Water Interface

The EPA's document, *Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze-December 2014 DRAFT* [5], describes how to apply an air quality model to produce results needed to support an attainment demonstration and how to interpret if the modeling results support a conclusion of attainment. Though this *Guidance Document* remains as a draft, these tools were applied in the NODA 2015 Ozone Modeling.

The draft modeling guidance document recommends that the relative reduction factor (RRF) be calculated the same way using a 3 x 3 array method. The MDE believes that this approach can lead to miscalculated higher design values (DVs) for monitors located near the land/water interface. This is of particular importance to states in the Ozone Transport Region (OTR), many of which are bordered by large bodies of water, including the Atlantic Ocean, Long Island Sound and the Chesapeake Bay.

Based on the MDE modeling completed by the University of Maryland at College Park (UMCP), monitors located near the land/water interface should have their RRFs calculated differently than monitors located in an area with no water influence. Research by UMCP modelers has shown that modeled ozone concentrations over the water can result in extremely high DVs due to planetary boundary layer (PBL) venting, PBL height, potential misrepresentative emissions, etc. The MDE recently requested that UMCP modelers prepare a white paper on different methodologies that can be used to calculate design values at monitors near the land/water interface. The MDE recommends that the EPA incorporate this white paper as a revision to the draft modeling guidance.

[5] https://www3.epa.gov/scram001/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

Conclusion

In conclusion, the MDE recommends that the EPA move forward and maintain the schedule for implementing the 2015 ozone standard. In the future, consideration of replacing IPM with ERTAC, regulations requiring the continuous operation of emission controls, and alternative meteorological and land/water interface should be evaluated against the model's performance.

Thank you for the opportunity to provide these comments. If you have any questions, please contact me at george.aburn@maryland.gov or 410-537-3255.

Sincerely,

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cc: Dave Arnold, EPA Region III
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