west virginia department of environmental protection

West Virginia Supplement to the State Implementation Plan Revision for Clean Air Act §110(a)(2)(A) - (M) Requirements for 2015 8-Hour Ozone NAAQS with the Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I)

FINAL
February 2019

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Promoting a healthy environment.

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Acronyms and Abbreviations

AMPD	Air Markets Program Data
ARP	Acid Rain Program
BACT	Best Available Control Technology
BEIS	Biogenic Emission Inventory System
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAIR	Clean Air Interstate Rule
CAMD	Clean Air Market Division
CAMx	Comprehensive Air Quality Model with Extensions
CFB	Circulating Fluidized Bed
CFR	Code of Federal Regulations
CISWI	Commercial and Industrial Solid Waste Incinerators
CO	Carbon Monoxide
CoST	Control Strategy Tool
CPP	Clean Power Plan
CSAPR	Cross State Air Pollution Rule
CSR	Code of State Rules
CT	Connecticut
DC or D.C.	District of Columbia
DAQ	Division of Air Quality
DEP	Department of Environmental Protection
DV	Design Value
DV_b	Design Value (base year)
DV_f	Design Value (future year)
EG	Emission Guidelines
EGU	Electric(ity) Generating Unit
EIS	Emissions Inventory System
EPA	Environmental Protection Agency
ERTAC	Eastern Regional Technical Advisory Committee
FGR	Flue Gas Recirculation
FIP	Federal Implementation Plan
FR	Federal Register
g/bhp-hr	Grams per Brake Horsepower-Hour
HAP	Hazardous Air Pollutant
HMIWI	Hospital, Medical, Infectious Waste Incinerator
ICI	Industrial/Commercial/Institutional
IPM	Integrated Planning Model
km	Kilometers
KY	Kentucky
LADCO	Lake Michigan Air Directors Consortium
LAER	Lowest Available Control Technology
lb/MMBtu	Pounds Per Million British Thermal Units
LEV	Low Emission Vehicle
LNB	Low NO_x Burner
MACT	Maximum Available Control Technology
MI	Michigan
MD	Maryland

Acronyms and Abbreviations (Continued)

MOG	Midwest Ozone Group
MW	Megawatts
NAAQS	National Ambient Air Quality Standard
NBP	NO_x Budget Trading Program
NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutant
NJ	New Jersey
NMHC	Non-Methane Hydrocarbons
NO_x	Nitrogen Oxides
NOAA	National Oceanic and Atmospheric Administration
NODA	Notice of Data Availability
NSPS	New Source Performance Standard
NSR	New Source Review
NY	New York
O_3	Ozone
OSAT/APCA	Ozone Source Apportionment Technique/Anthropogenic Precursor Culpability Assessment
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
PA	Pennsylvania
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter Less Than 2.5 Microns in Diameter
ppb	Parts per Billion
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
RACM	Reasonably Available Control Measure
RACT	Reasonably Available Control Technology
SCC	Source Classification Code
SCR	Selective Catalytic Reduction
SIL	Significant Impact Level
SIP	State Implementation Plan
SLT	State, Local, and Tribal
SMOKE	Sparse Matrix Operator Kernel Emissions
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulfur Dioxide
tpy	Tons per Year
TSD	Technical Support Document
TX	Texas
U.S.	United States
VOCs	Volatile Organic Compounds
WI	Wisconsin
WRF	Weather Research and Forecasting Model
WV or W. Va.	West Virginia
>	Greater Than

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West Virginia Supplement to the State Implementation Plan Revision for Clean Air Act §110(a)(2)(A) - (M) Requirements for the 2015 Ozone NAAQS with the Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I)

1.0. Introduction

On October 1, 2015, the United States Environmental Protection Agency (EPA) revised the primary and secondary National Ambient Air Quality Standard (NAAQS) for ozone to an 8-hour standard of 0.070 part per million (ppm) or 70 parts per billion (ppb).[1] Section 110(a)(1) of the Clean Air Act (CAA) requires states to submit to the EPA, within three years of the promulgation of any new or revised NAAQS, State Implementation Plans (SIPs) meeting the applicable requirements of Section 110(a)(2) providing for the implementation, maintenance, and enforcement of the new or revised NAAQS. Such revisions are commonly referred to as "infrastructure SIPs or iSIPs." One of these applicable requirements is found in Section 110(a)(2)(D)(i) which generally requires SIPs to contain adequate provisions to prohibit in-state emissions activities from having certain adverse air quality effects on other states due to interstate transport of pollution. There are four prongs within CAA Section 110(a)(2)(D)(i): Section 110(a)(2)(D)(i)(I) contains prongs 1 and 2, while Section 110(a)(2)(D)(i)(II) includes prongs 3 and 4. This action addresses the first two prongs under Section 110(a)(2)(D)(i)(I), otherwise known as the good neighbor provision. Under prongs 1 and 2 of the good neighbor provision, a state's SIP for a new or revised NAAQS must contain adequate provisions prohibiting any source or other type of emissions activity within the state from emitting air pollutants in amounts that will contribute significantly to nonattainment of the NAAQS in another state (prong 1) or from interfering with maintenance of the NAAQS in another state (prong 2). Under Section 110(a)(2)(D)(i)(I) of the CAA, the EPA gives independent significance to evaluating prong 1 and prong 2.

The West Virginia Department of Environmental Protection (DEP) addressed the infrastructure requirements of CAA §110(a)(2)(A) through (M), including prongs 3 and 4 of §110(a)(2)(D)(i)(II), in a separate SIP revision, *State Implementation Plan Revision for Clean Air Act § 110(a)(2)(A)-*

[1] 80 FR 65292, 26 OCT 2015.

(M) Requirements for 2015 8-Hour Ozone NAAQS (2015 Ozone iSIP), for which a public comment period commenced on July 27, 2018, and ended with a public hearing on August 28, 2018. The 2015 Ozone iSIP was submitted to EPA for approval on September 13, 2018.

2.0. Request

The State of West Virginia is requesting that the EPA conditionally approve the *West Virginia Supplement to the State Implementation Plan Revision for Clean Air Act §110(a)(2)(A)-(M) Requirements for the 2015 8-Hour Ozone NAAQS with the Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I)* as a SIP revision, to address the state's obligations under the CAA Section 110(a)(2)(D)(i)(I) (i.e., "good neighbor") requirements. This revision supplements DEP's 2015 Ozone iSIP submittal by addressing the "good neighbor" requirements and demonstrates that all reasonable measures, which have been identified as economically and technically feasible, have been implemented by West Virginia to address pollutant transport that may significantly contribute to downwind states' ozone maintenance and nonattainment problems.

DEP has proposed legislative rule, 45CSR43 - *Cross-State Air Pollution Rule to Control Annual Nitrogen Oxide Emissions, Annual Sulfur Dioxide Emissions and Ozone Season Nitrogen Oxide Emissions* - for the 2019 West Virginia legislative session. The proposed rule incorporates by reference the federal Cross-State Air Pollution Rule (CSAPR) and CSAPR Update Rule, limiting emissions of nitrogen oxides (NO_x) and sulfur dioxide (SO_2) through three emission trading programs under 40 CFR 97 subparts AAAAA (CSAPR NO_x Annual Trading Program), subpart CCCCC (CSAPR SO_2 Group 1 Trading Program), and subpart EEEEE (CSAPR NO_x Ozone Season Group 2 Trading Program). Upon authorization and promulgation, the rule will be submitted to EPA as a revision to the West Virginia SIP. That action, in concert with this SIP revision, will fully address the State's obligations under CAA §110(a)(2)(D)(i)(I).

3.0. Ozone

3.1. Ozone Formation and Precursors

Ground-level ozone, (O_3), is a gas that is not emitted directly into the air, but is a secondary pollutant formed by the reaction of oxides of nitrogen (NO_x) and volatile organic compounds

(VOCs) in the presence of sunlight. Many types of sources emit these precursor pollutants, including power plants and industrial facilities, on-road and off-road motor vehicles and engines, and smaller sources, collectively referred to as non-point (area) sources. Ozone is predominately a summertime pollutant; however, high ozone concentrations have been observed in cold months in a few high elevation areas. Ozone and ozone precursors (NO_x and VOCs) can be transported hundreds of miles.

3.2. EPA's Designation Process

On October 26, 2015, the EPA revised both the primary and secondary NAAQS for ozone to a level of 0.070 ppm; annual fourth-highest daily maximum 8-hour average concentration, averaged over three years.[2] EPA based the designations on the most recent three years of certified ozone air quality monitoring data (2014-2016) and on an evaluation of factors to assess contributions to nonattainment in nearby areas.[3] EPA designated most areas of the country, including 52 counties in West Virginia,[4] "attainment/unclassifiable" with respect to the 2015 primary and secondary ozone NAAQS on November 16, 2017, in accordance with the requirements of CAA Section 107(d). With the exception of eight counties in the San Antonio, Texas (TX) metropolitan area, EPA completed the designation process for all areas, including the three remaining counties in West Virginia,[5] on June 4, 2018. All counties in West Virginia were designated "attainment/unclassifiable" for the 2015 8-hour ozone NAAQS.[6] EPA completed the designation process for the remaining eight counties in the San Antonio, TX metropolitan area on July 25, 2018.[7]

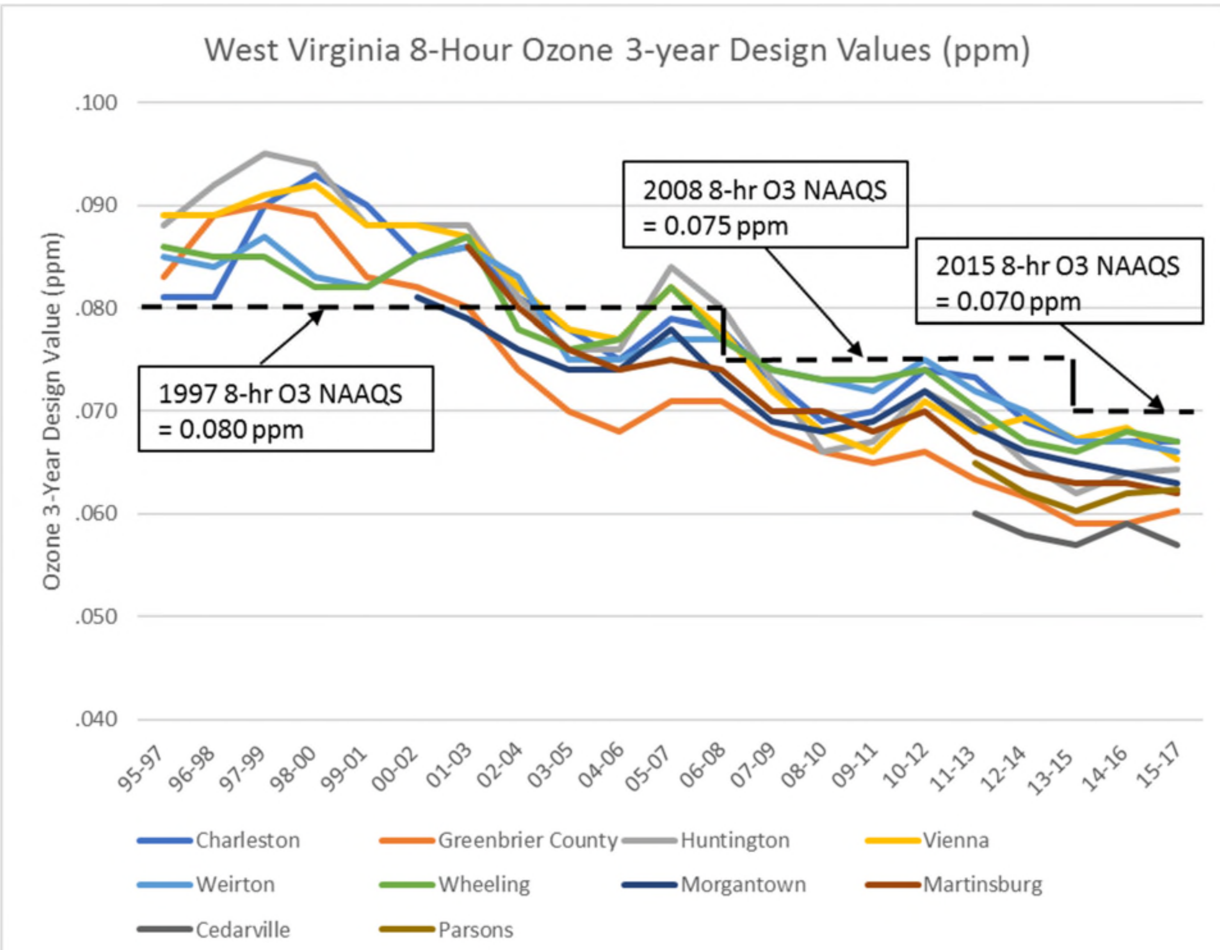
3.3. Ozone Design Value Trends in West Virginia

A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS.[8] For 8-hour ozone, a design value is the three-year average of the fourth-

[2] 80 FR 65292, 26 OCT 2015.
[3] 83 FR 25779, 4 JUN 2018.
[4] 82 FR 54232.
[5] 83 FR 25776.
[6] 83 FR 25843-25845, 4 JUN 2018.
[7] 83 FR 35136.
[8] https://www.epa.gov/air-trends/air-quality-design-values#definition

highest daily-maximum 8-hour averaged ozone. Design values are calculated at each ozone monitor and the monitor with the highest design value sets the design value for an area. Although the 8-hour ozone NAAQS is reported in ppm, design values can also be stated in ppb, 0.001 ppm is equivalent to 1 ppb.

Chart 1
West Virginia 8-hour ozone 3-year design values



As shown in Chart 1, ozone concentration levels have generally been decreasing in West Virginia over the past 25 years. All areas of West Virginia were designated attainment for both the 2008[9] and 2015[10] ozone standards.

3.4. Transport Modeling

EPA has undertaken multiple air quality modeling efforts using a 2011-base platform, to help states address the requirements of CAA Section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.

- *Air Quality Modeling for the 2015 Ozone NAAQS Transport Assessment (December 2016)*
- *Updated 2023 Transport Modeling for the 2008 Ozone NAAQS (October 2017)*
- *Updated 2023 Transport Modeling for the 2015 Ozone NAAQS (March 2018)*

Alpine Geophysics, LLC (Alpine), conducted modeling in December 2017[11] and June 2018[12], in accordance with a Modeling Protocol, which underwent EPA review, to help states address the requirements of CAA Section 110(a)(2)(D)(i)(I) for both the 2008 and 2015 ozone NAAQS. This modeling effort was undertaken working closely with states, local agencies, and stakeholder groups, including the Midwest Ozone Group (MOG), which provided funding for the project.

In addition to EPA and Alpine, the Lake Michigan Air Directors Consortium (LADCO) also conducted modeling in August 2018[13] to support the development of the LADCO states' iSIPs pursuant to the 2015 ozone NAAQS.

The analytic year 2023 was selected since it aligns with the anticipated attainment year for Moderate ozone nonattainment areas with respect to the 2015 ozone NAAQS. Each modeling

[9] 77 FR 30088, 21 MAY 2012.
[10] 82 FR 54232, 16 NOV 2017, and 83 FR 25843-25845, 4 JUN 2018.
[11] *"Good Neighbor" Modeling for the 2008 8-Hour Ozone State Implementation Plans*, Final Modeling Report, by Alpine Geophysics, LLC, December 2017, p.1. (http://midwestozonegroup.com/files/Ozone_Modeling_Results_Supporting_GN_SIP_Obligations_Final_Dec_2017_.pdf)
[12] *"Good Neighbor" Modeling Technical Support Document for 8-Hour Ozone State Implementation Plans*, by Alpine Geophysics, LLC, June 2018, p.5. (http://www.midwestozonegroup.com/files/FinalTSD-OzoneModelingSupportingGNSIPObligationsJune2018.pdf)
[13] *Interstate Transport Modeling for the 2015 Ozone National Ambient Air Quality Standard*, by LADCO, August 2018, p.1. (http://epa.ohio.gov/portals/27/SIP/App3A_2015O3Inf_LADCO_TSD_8-13-18.pdf)

exercise used a screening threshold of one percent (1%) of the NAAQS, which equates to 0.7 ppb to identify contributing upwind states warranting further review and analysis.

EPA developed a 4-step framework for addressing the requirements of the "Good Neighbor" provision in the CSAPR for the 1997 ozone NAAQS and the 1997 and 2006 $PM_{2.5}$ (particulate matter less than 2.5 microns in diameter) NAAQS:

(1) identify downwind receptors that are expected to have problems attaining or maintaining the NAAQS;
(2) determine which upwind states significantly contribute (or are "linked") to the downwind air quality problems;
(3) for states that are "linked", quantify the level of upwind emissions that need to be addressed to satisfy the "Good Neighbor" provision; and,
(4) adoption of permanent and enforceable emission reductions, in "linked" upwind states.

EPA has continued to apply this framework in regional transport modeling efforts for purposes of assisting states in development of SIPs to address CAA Section 110(a)(2)(D)(i)(I).

3.4.a. 2015 Ozone NAAQS Transport Assessment Modeling (December 2016)

In 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)*[14](NODA) (see Appendix A), preliminary interstate ozone transport modeling data and associated methods relative to the 2015 ozone NAAQS (i.e., 0.070 ppm) was available for public review and comment. Modeling projected ozone concentrations at individual receptors and estimated state-by-state contributions to the 2023 concentrations. A screening threshold at a significant impact level (SIL) of 1% of the 2015 ozone NAAQS (i.e., 0.70 ppb) was applied to those 2023 concentrations to determine which states are possibly "linked" to downwind receptors. The photochemical model simulations performed for this assessment used the Comprehensive Air Quality Model with Extensions (CAMx) version 6.30.[15] The updated electric generating unit (EGU) projections in the model included the implementation of the Clean Power Plan (CPP). Air

[14] 82 FR 1733, 6 Jan 2017.
[15] EPA, *Technical Support Document (TSD) Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2023,* December 2016.

quality modeling (in the NODA) was based on Integrated Planning Model (IPM) v5.16 projections[16].

The NODA modeling identified West Virginia's largest contribution to downwind 8-hour ozone nonattainment and maintenance receptors of 2.59 ppb and 0.92 ppb, respectively[17]. The NODA modeling suggested West Virginia was "linked" to three downwind 2023 nonattainment receptor and three maintenance receptors.[18] The future of the CPP is uncertain. The CPP was stayed by the Supreme Court in February 2016; followed by President Trump signing an Executive Order *Promoting Energy Independence and Economic Growth* on March 28, 2017 and EPA proposed repeal of said rule[19]. EPA proposed a replacement rule for the CPP, *Emission Guidelines for Greenhouse Gas Emissions From Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program*[20], which was published on August 31, 2018. Based on the delays, the proposed timeline in the CPP will change; making the modeling, including the CPP, moot. Therefore, the December 2016 modeling cannot be relied upon to help states develop Good Neighbor SIPs for the 2015 ozone standard.

3.4.b. Updated 2023 Transport Modeling (October 2017)

The EPA released an October 27, 2017 memorandum from Stephen D. Page entitled *Supplemental Information on the Interstate Transport State Implementation Plan Submissions for the 2008 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I)*[21] (see Appendix B), (2017 memorandum) which supplemented EPA's analysis in the October 26, 2016, CSAPR Update rule. EPA used CAMx v.6.40[22] for modeling the updated emissions in 2011 and 2023.[23] The EPA used outputs from the 2011 and 2023 model simulations to project base

[16] 82 FR 1736, 6 Jan 2017
[17] 82 FR 1739 and 82 FR 1740
[18] https://www.epa.gov/airmarkets/notice-data-availability-preliminary-interstate-ozone-transport-modeling-data-2015-ozone, 2015 Ozone NAAQS Preliminary Transport Assessment Design Values and Contributions
[19] 82 FR 48035, 16 Oct 2017
[20] 83 FR 44746, 31 Aug 2018
[21] https://www.epa.gov/airmarkets/memo-supplemental-information-interstate-transport-sips-2008-ozone-naaqs
[22] CAMx v6.40 was the most recent public release version of CAMx at the time the EPA updated its modeling in fall 2017. ("Comprehensive Air Quality Model with Extensions version 6.40 User's Guide" Ramboll Environ, December 2016. http://www.camx.com/.)
[23] For the updated modeling, the EPA used the construct of the modeling platform (i.e., modeling domain and non-emissions inputs) that we used for the NODA modeling, except that the photolysis rates files were updated to be

period 2009-2013 average and maximum ozone design values to 2023 at receptor sites nationwide. EPA provided future year ozone design values[24] for receptors in the U.S. based on updated air quality modeling (for 2023) and monitoring data. As noted in the memorandum, EPA's updated modeling indicates there are no monitoring sites, outside of California, that are projected to have nonattainment or maintenance problems in 2023 with respect to the 2008 ozone NAAQS.

3.4.c. Updated 2023 Transport Modeling (March 2018)

The EPA released a March 27, 2018 memorandum from Peter Tsirigotis entitled *Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I)*[25] (see Appendix C), (2018 memorandum) which supplements EPA's analysis in the January 2017 NODA for the 2015 ozone NAAQS[26] and builds upon information provided in the 2017 memorandum[27]. EPA again used CAMx v.6.40 for modeling the updated emissions in 2011 and 2023. The EPA used outputs from the 2011 and 2023 model simulations to project base period 2009-2013 average and maximum ozone design values to 2023 at receptors nationwide. EPA provided 2023 ozone design values for receptors in the U.S. based on the "3 x 3" approach and a modified "3 x 3" approach in which model predictions in grid cells that are predominately water and that do not contain receptors are excluded from the projection calculations. As noted in the 2018 memorandum, EPA's updated modeling indicates there are, outside of California, 11 monitoring sites projected to have nonattainment issues and 14 monitoring sites are projected to have maintenance problems in 2023 with respect to the 2015 ozone NAAQS. West Virginia's largest identified contribution to downwind 8-hour ozone nonattainment and maintenance receptors was 1.14 ppb and 2.78 ppb,

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consistent with CAMx v6.40. The NODA Air Quality Modeling Technical Support Document describing the modeling platform is available at https://www.epa.gov/airmarkets/notice-data-availability-preliminary-interstateozone-transport-modeling-data-2015-ozone.

[24] https://www.epa.gov/airmarkets/october-2017-memo-and-supplemental-information-interstate-transport-sips-2008-ozone-naaqs

[25] https://www.epa.gov/sites/production/files/2018-03/documents/transport_memo_03_27_18_1.pdf

[26] 82 FR 1733, 6 Jan 2017.

[27] EPA, memorandum from Stephen D. Page, *Supplemental Information on the Interstate Transport State Implementation Plan Submissions for the 2008 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I), October 27, 2017*
https://www.epa.gov/airmarkets/memo-supplemental-information-interstate-transport-sips-2008-ozone-naaqs

respectively. West Virginia was projected to be "linked" to only three downwind 2023 nonattainment receptors and two maintenance receptors.

3.4.d. "Good Neighbor" Modeling by Alpine (December 2017)

In December 2017, Alpine released its report *"Good Neighbor" Modeling for the 2008 8-hour Ozone State Implementation Plans*[28] (see Appendix D) (Alpine 2017 report) which was undertaken working closely with states, other local agencies, and stakeholder groups, including the MOG, which provided funding for the effort.

The ozone simulation study, using the 12-km grid based on EPA's 2023en modeling platform and preliminary source contribution assessment, was created by incorporating the Weather Research and Forecasting Model (WRF), Sparse Matrix Operator Kernel Emissions (SMOKE), MOVES2014 – EPA's latest on-road mobile source emissions model, Biogenic Emission Inventory System (BEIS) version 3.61, CAMx, and the Ozone Source Apportionment Technique/Anthropogenic Precursor Culpability Assessment (OSAT/APCA) tool to project ozone concentrations at downwind receptors. The "Good Neighbor" Modeling Report concluded: "Through this modeling analysis, all upwind state identified in the final CSAPR Update demonstrated compliance with CAA Section 110(a)(2)(D)(i)(I) for the 2008 Ozone National Ambient Air Quality Standard."

Alpine also used results of this modeling effort to address the 2015 ozone NAAQS. (See below)

3.4.e. "Good Neighbor" Modeling by Alpine (June 2018)

In June 2018, Alpine released its report *"Good Neighbor" Modeling Technical Support Document for 8-Hour Ozone State Implementation Plans* (Alpine 2018 TSD) (See Appendix E),[29] which was undertaken working closely with states, other local agencies, and stakeholder groups, including the MOG, which provided funding for the effort. This modeling effort includes the ozone

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[28] "Good Neighbor" Modeling for the 2008 8-Hour Ozone State Implementation Plans, Final Modeling Report, by Alpine Geophysics, LLC, December 2017. (http://midwestozonegroup.com/files/Ozone_Modeling_Results_Supporting_GN_SIP_Obligations_Final_Dec_2017_.pdf)

[29] "Good Neighbor" Modeling Technical Support Document for 8-Hour Ozone State Implementation Plans, Final Technical Support Document, by Alpine Geophysics, LLC, June 2018. (http://www.midwestozonegroup.com/files/FinalTSD-OzoneModelingSupportingGNSIPObligationsJune2018.pdf)

simulation study using a 12-km grid based on EPA's 2023en modeling platform and preliminary source contribution assessment from the December 2017 "Good Neighbor" Modeling Report, supplemented with two (2) additional nested 4-km modeling domains over the Mid-Atlantic region and Lake Michigan.

OSAT modeling was conducted for the Mid-Atlantic 4-km region, but not the Lake Michigan 4-km domain. Modeling for the Mid-Atlantic 4-km region indicates there is one receptor projected to have nonattainment issues and nine receptors projected to have maintenance problems in 2023 with respect to the 2015 ozone NAAQS. West Virginia's largest identified contribution to downwind 8-hour ozone nonattainment and maintenance receptors was 2.52 ppb and 1.63 ppb, respectively. West Virginia was projected to be "linked" to the only downwind 2023 nonattainment receptor and three (3) maintenance receptors in the Mid-Atlantic 4-km region.

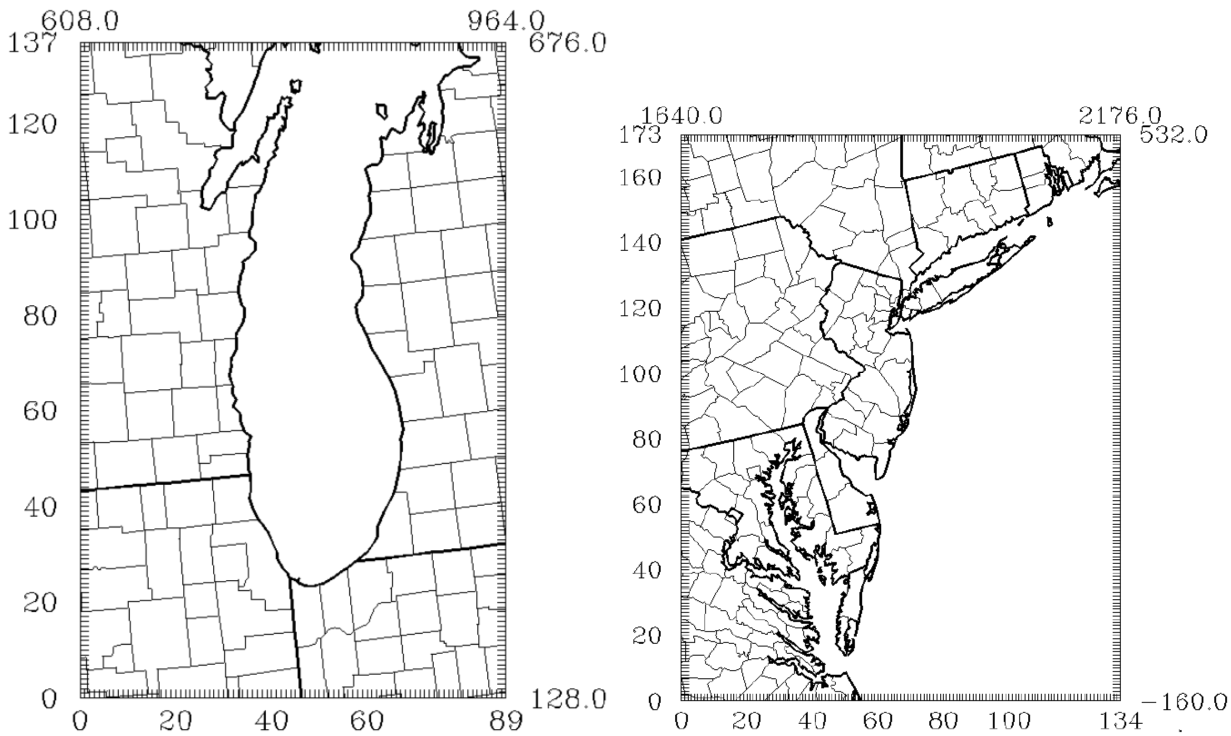

Figure 1. Maps of 4km CAMx modeling domains. Lake Michigan (left) and Mid-Atlantic (right).[30]

[30] Id., pg. 17. (http://www.midwestozonegroup.com/files/FinalTSD-OzoneModelingSupportingGNSIPObligationsJune2018.pdf)

This modeling demonstrates:

- many of the eastern state receptors demonstrate modeled attainment using a finer grid 4-km modeling domain (compared to 12-km results),
- the significance of international transport,
- emissions activities within some states will not significantly contribute to nonattainment or interfere with maintenance of the 2008 or 2015 ozone NAAQS in a neighboring state, and
- there may be options available to states that demonstrate significant contribution at air quality monitoring sites that qualify as nonattainment or maintenance.[31]

3.4.f. LADCO Transport Modeling (August 2018)

In August 2018, LADCO released its report *Interstate Transport Modeling for the 2015 Ozone National Ambient Air Quality Standard*[32] (See Appendix F) to support the development of the LADCO states' iSIPs pursuant to the 2015 ozone NAAQS. EPA identified in the 2018 memorandum the "use of alternative power sector modeling consistent with EPA's emissions inventory guidance" as a flexibility to consider in preparing a Good Neighbor SIP. The 2023 emissions data for this study were based on EPA's 2011v6.3en emissions modeling platform. The LADCO 2023 CAMx simulation is an example of an alternative power sector modeling flexibility. The only configuration difference between these simulations is in the EGU emissions used with CAMx to project future year air quality.[33] LADCO replaced the EGU emissions in EPA "en" platform with 2023 EGU forecasts estimated from the Eastern Regional Technical Advisory Committee (ERTAC) EGU Tool version 2.7. (ERTAC EGU 2.7 integrated state-reported information on EGU operations and forecasts as of May 2017.)

The LADCO simulation that used ERTAC EGU emissions projections forecasted lower 2023 DVs than the EPA 2023en simulation. Where six monitors were projected nonattainment monitors in

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[31] Id., p, 8.
(http://www.midwestozonegroup.com/files/FinalTSD-OzoneModelingSupportingGNSIPObligationsJune2018.pdf)
[32] *Interstate Transport Modeling for the 2015 Ozone National Ambient Air Quality Standard*, by LADCO, August 2018.
(http://epa.ohio.gov/portals/27/SIP/App3A_2015O3Inf_LADCO_TSD_8-13-18.pdf)
[33] *Interstate Transport Modeling for the 2015 Ozone National Ambient Air Quality Standard*, by LADCO, August 2018, p. 67.

the EPA simulation, the LADCO simulation predicted only three to be in nonattainment.[34] The three nonattainment monitors are in Babylon, NY, Westport, CT, and Edgewood, MD.[35]

3.5. Selection of Appropriate Modeling

West Virginia considered the 2023 modeling conducted by EPA, Alpine, and LADCO, which were based on the 2023en platform, and the guidance provided in EPA's 2018 memorandum.

- In reference to EPA's updated 2023 modeling, EPA concluded in their 2018 memorandum that "States may consider using this national modeling to develop SIPs that address requirements of the good neighbor provision for the 2015 ozone NAAQS."[36]
- EPA further recommended that "states include in any such submission state-specific information to support their reliance on the 2023 modeling data."[37]
- EPA went on to conclude that "States may also choose to use other information to identify nonattainment and maintenance receptors relevant to development of their good neighbor SIPs."[38]

West Virginia reviewed the 2011en and 2023en emissions inventory data and noted EPA had included projections in the 2023en inventory for some major facilities which have shut down since 2011; as well as, the omission of some new major facilities that have been constructed since 2011. These are identified in Appendix G. West Virginia concluded that the 2023en inventory was a conservative projection of future emissions and was an appropriate inventory to use for modeling.

Alpine conducted an operational model performance evaluation and found the 4-km modeling domains performed similarly to EPA's 12-km model performance evaluation for the 2011en platform. The model performance results, therefore, demonstrate the scientific credibility of the 4-km domains used for the analysis, and provide confidence that the results provide a reasonable projection of expected future year ozone concentrations and contributions over the 4-km grids.[39]

[34] Id., p. 68.
[35] Id. p. 74.
[36] Tsirigotis, Peter (EPA), *Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I),* March 27, 2018. p. 6.
[37] Ibid.
[38] Ibid.
[39] Id., p. 27.

West Virginia considered the various modeling studies and concluded the “Good Neighbor” Modeling by Alpine (June 2018), using the nested 4-km grid is the most appropriate, robust modeling available to identify the nonattainment and maintenance receptors to which West Virginia significantly contributes.

3.6. West Virginia’s Contributions to Nonattainment and Maintenance Receptors

As noted in Alpine’s June 2018 “Good Neighbor” Modeling, West Virginia is projected to be “linked” to the only downwind 2023 nonattainment receptor (Harford, MD) and three maintenance receptors (Gloucester, NJ; Richmond, NY; and Philadelphia, PA) in the Mid-Atlantic 4-km region. The Harford County, Maryland monitor is located in the Baltimore, MD Nonattainment Area; the Gloucester, NJ and Philadelphia, PA monitors are located in the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Nonattainment Area; and the Richmond, NY monitor is located in the New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area. Table 1 shows Alpine’s Mid-Atlantic 4-km “Good Neighbor” Modeling results, with respect to West Virginia’s contribution to the nonattainment and maintenance receptors and the in-state contribution (contribution of the state to its own nonattainment and maintenance monitors). As shown in Table 1 on the following page, Maryland’s contribution to the Harford, MD receptor is 23.97 ppb, 33.7% of the projected 2023 average design value.

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Table 1
West Virginia Contribution to Nonattainment and Maintenance Receptors identified in Alpine's Mid-Atlantic 4-km Region based on the "Good Neighbor" Modeling Results[40]

Monitor ID	State	County	2011 DVb	2023 DVf (Avg)	2023 DVf (Max)	In-State Contribution (ppb)	WV Contribution (ppb)
Nonattainment Receptor							
240251001	Maryland	Harford	90.0	71.1	73.5	23.97	2.52
Maintenance Receptors							
90010017	Connecticut	Fairfield	80.3	69.2	71.5	6.36	0.52
90013007	Connecticut	Fairfield	84.3	69.7	73.6	5.19	0.44
90019003	Connecticut	Fairfield	83.6	69.9	72.7	4.97	0.53
90099002	Connecticut	New Haven	85.7	70.3	73.0	9.60	0.35
90110124	Connecticut	New London	80.3	68.2	71.3	9.89	0.32
340150002	New Jersey	Gloucester	84.3	68.8	71.0	4.51	1.63
360850067	New York	Richmond	81.3	69.6	71.0	3.19	0.71
361030002	New York	Suffolk	83.3	70.7	72.1	10.10	0.65
421020024	Pennsylvania	Philadelphia	83.3	68.0	71.0	14.70	1.21

Note: a value of 70.9 ppb (or less) is considered to be in attainment of the 2015 ozone NAAQS, and a value of 71.0 ppb (or higher) is considered to be in violation of the 2015 ozone NAAQS.
Contributions shown in RED identify monitors to which WV is "linked."

4.0. Flexibilities

Attachment A of EPA's 2018 memorandum provided a *Preliminary List of Potential Flexibilities Related to Analytical Approaches for Developing a Good Neighbor State Implementation Plan*[41] (Potential Flexibilities). In considering the modeled contribution to nonattainment and maintenance monitors, West Virginia identified several potential flexibilities for consideration.

4.1. HYSPLIT Back-Trajectories

In the Potential Flexibilities EPA identified several guiding principles for states to consider including: "The potential value of considering different modeling tools or analyses in addition to

[40] Alpine Geophysics, LLC, "Good Neighbor" Modeling Technical Support Document for 8-Hour Ozone State Implementation Plans, Final Technical Support Document, June 2018, p. 35. (http://www.midwestozonegroup.com/files/FinalTSD-OzoneModelingSupportingGNSIPObligationsJune2018.pdf)
[41] Tsirigotis, Peter (EPA), *Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I)*, March 27, 2018, p. A-1.

EPA's, provided that any alternative modeling is performed using a credible modeling system which includes "state-of-the-science" and "fit-for-purpose" models, inputs, and techniques that are relevant to the nature of the ozone problem. The use of results from each alternative technique should be weighed in accordance with the scientific foundation, construct and limitations of the individual techniques."[42]

West Virginia analyzed the 2015 - 2017 air monitoring data[43] for the one nonattainment receptor and three maintenance receptors to which West Virginia was linked based on Alpine's 4-km modeling. The monitoring data was obtained from EPA's Outdoor Air Quality Data website.

Table 2
Nonattainment Receptors – Exceedance Days 2015 - 17

Date	Concentration (ppm)	Date	Concentration (ppm)	Date	Concentration (ppm)
Harford, Maryland – Monitor 240251001					
6/11/15	0.074	5/25/16	0.079	5/17/17	0.076
8/31/15	0.072	5/26/16	0.080	5/18/17	0.073
9/2/15	0.088	6/20/16	0.079	6/12/17	0.077
9/3/15	0.074	7/21/16	0.072	6/13/17	0.088
9/4/15	0.074	7/22/16	0.082	7/19/17	0.072
		7/25/16	0.076	7/20/17	0.086
		7/27/16	0.079		
		9/14/16	0.077		
		9/23/16	0.080		

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[42] Id.
[43] www.epa.gov/outdoor-air-quality-data/download-daily-data

Table 3
Maintenance Receptors – Exceedance Days 2015 - 17

Date	Concentration (ppm)	Date	Concentration (ppm)	Date	Concentration (ppm)
Gloucester, New Jersey – Monitor 340150002					
6/11/15	0.080	5/25/16	0.083	5/17/17	0.071
7/28/15	0.079	6/11/16	0.074	5/18/17	0.076
8/23/15	0.075	6/20/16	0.077	6/12/17	0.073
9/1/15	0.076	7/8/16	0.076	6/13/17	0.078
9/2/15	0.077	7/22/16	0.074	7/19/17	0.076
		7/27/16	0.071	7/20/17	0.071
		9/23/16	0.079		
Richmond, New York – Monitor 360850067					
5/5/15	0.075	5/25/16	0.086	5/17/17	0.081
5/15/15	0.073	5/26/16	0.078	5/18/17	0.074
6/11/15	0.080	5/28/16	0.074	6/10/17	0.071
7/19/15	0.073	6/11/16	0.071	6/12/17	0.079
7/28/15	0.079	7/6/16	0.075	6/13/17	0.072
8/15/15	0.075	7/15/16	0.071	7/22/17	0.072
8/16/15	0.072	7/21/16	0.077	8/1/17	0.072
8/17/15	0.074	7/22/16	0.081		
9/3/15	0.081	7/28/16	0.071		
9/17/15	0.085	7/29/16	0.073		
Philadelphia, Pennsylvania – Monitor 421010024					
5/8/15	0.073	5/25/16	0.084	4/11/17	0.073
6/11/15	0.089	5/26/16	0.079	5/17/17	0.086
7/19/15	0.074	6/11/16	0.074	5/18/17	0.092
7/28/15	0.075	6/20/16	0.073	6/10/17	0.073
7/29/15	0.074	7/21/16	0.076	6/12/17	0.075
8/15/15	0.080	7/22/16	0.081	6/13/17	0.076
8/30/15	0.071	8/31/16	0.080	6/22/17	0.080
9/2/15	0.079	9/23/16	0.078	7/18/17	0.074
9/16/15	0.076			7/19/17	0.073
9/17/15	0.086			7/27/17	0.072
9/18/15	0.078			8/1/17	0.074
				9/25/17	0.071

West Virginia used the National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory's HYSPLIT[44] model to analyze all exceedance days in the 2015 – 17 period for the nonattainment and maintenance receptors to which West Virginia was linked. The HYSPLIT model is a complete system for computing simple air parcel trajectories, as well as complex transport, dispersion, chemical transformation, and deposition simulations. A common application is a back-trajectory analysis to determine the origin of air masses and establish source-receptor relationships.

The HYSPLIT back trajectory analyses demonstrate that on the majority of the days on which ozone exceedances occurred at the subject receptors the origin of the air masses impacting the receptors did not originate within, or pass through, West Virginia's borders in the 48 hours preceding the exceedance. Of the 97 HYSPLIT model runs, each representing three vertical heights for each exceedance, for a total of 291 separate vertical wind heights, only 77 heights (26%) crossed West Virginia's borders. Although these heights may have crossed West Virginia's borders, only 50 (17%) crossed an industrialized area of the state where air emissions are more predominate.

The HYSPLIT results are contained in Appendix H.

4.2. Downwind Air Quality Context

The Alpine 2018 nested 4-km modeling projects nonattainment with the 2015 ozone NAAQS for the Baltimore, MD area due to a projected 2023 average design value of 71.1 ppb for the Harford, Maryland (MD) receptor. The Alpine nested 4-km modeling projects attainment of the 2015 ozone NAAQS for the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE area with projected 2023 average design values of 68.8 and 68.0 ppb for the Philadelphia, PA and Gloucester, NJ monitors, respectively. The area is projected to be a maintenance area due to a projected maximum 2023 design value of 71.0 ppb for both the Philadelphia, PA and Gloucester, NJ monitors. The Alpine modeling also projects attainment for the New York-Northern New Jersey-Long Island, NY-NJ-CT area with a projected 2023 average design value of 69.6 ppb at the Richmond, NY monitor.

[44] https://www.arl.noaa.gov/hysplit/hysplit/

The area is projected to be a maintenance area due to a projected maximum 2023 design value of 71.0 ppb at the Richmond, NY monitor.

West Virginia analyzed various factors, including air quality, emissions data, population, traffic, vehicle miles traveled (VMT), and meteorology for the projected nonattainment area, Baltimore, MD; and the two projected maintenance areas, Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE, and New York-Northern New Jersey-Long Island, NY-NJ-CT, to which West Virginia is projected to contribute greater than 0.70 ppb in 2023.

Figure 2 shows an interstate map of the northeast, with the ozone monitors color coded by 2014-2016 design values, and the 2015 8-hour ozone nonattainment areas shaded in green. The map clearly shows that the monitors which exceed the 2015 ozone NAAQS follow the I-95 corridor.

Figure 2. 2015 Ozone Nonattainment Areas in the Northeast Overlaid with Interstate Map[45]

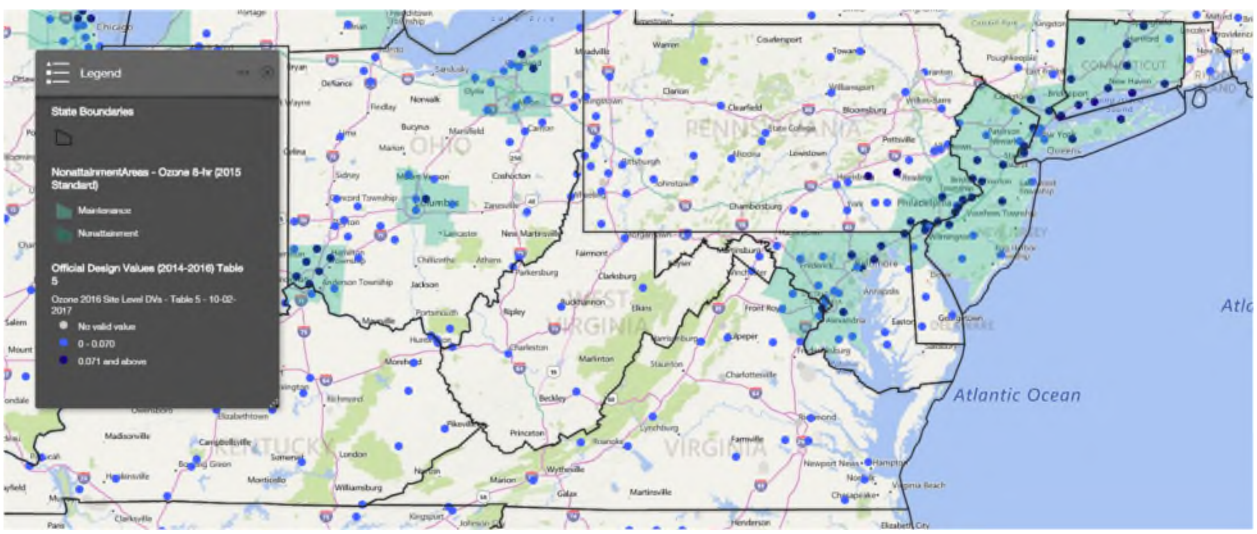


Figure 3 shows the population density by county for the northeast. A comparison of Figures 2 and 3 show that the high population areas closely correspond to the nonattainment areas. The population in 2015 for the Baltimore nonattainment area was 2,748,503, the population of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area was 8,143,598, and

[45] EPA Ozone Designations Mapping Tool https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=6a89e7170dd147b1852ec11ccb3880e8

the population of the New York-Northern New Jersey-Long Island, NY-NY-CT area was 23,887,759. In contrast, the population for the entire state of West Virginia was 1.84 million.

Figure 3. Population Density in the Northeast

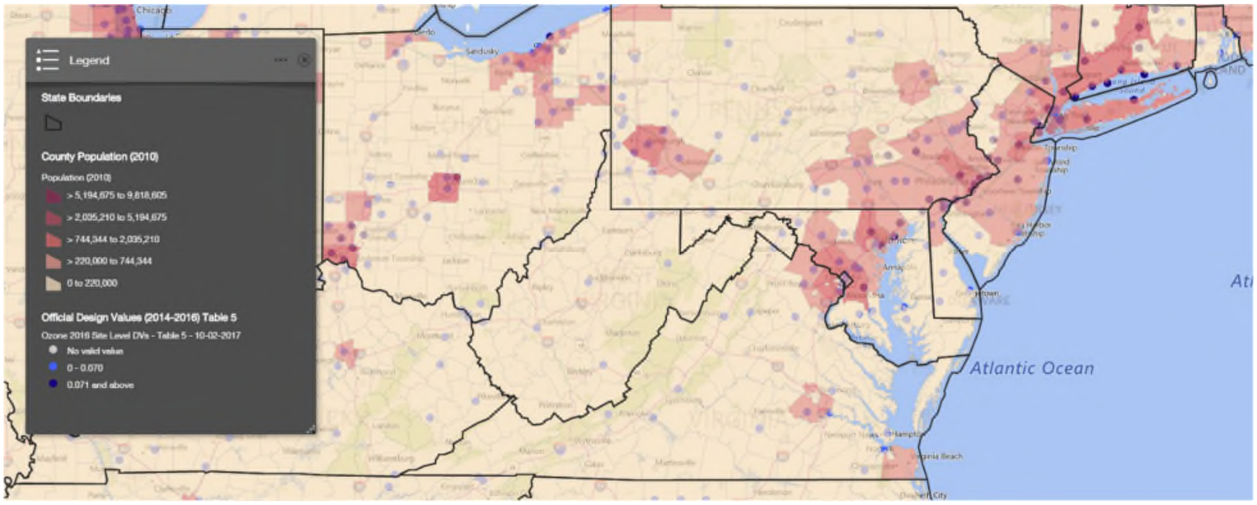
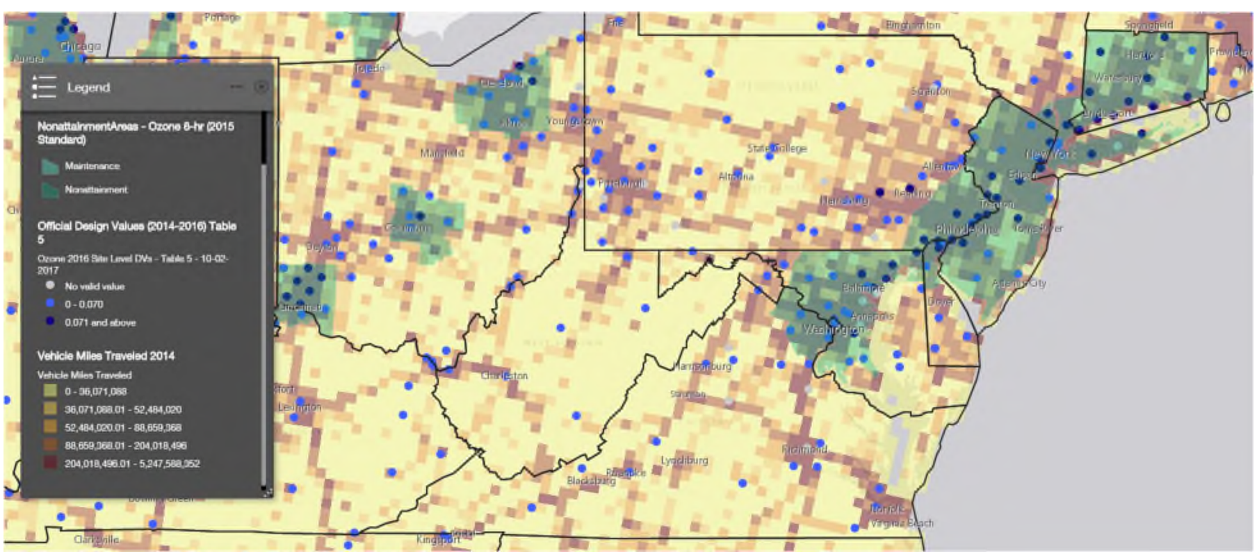


Figure 4 shows the ozone monitors, the 2014 VMT and the 2015 ozone nonattainment areas. A comparison of Figures 2, 3 and 4 clearly show that the high population density, and high VMT closely correlate to high ozone concentrations.

Figure 4. 2015 Ozone Nonattainment Areas overlaid with 2014 Vehicle Miles Traveled



Emissions in the areas were also considered. NO_x emissions from mobile sources, both onroad and nonroad, accounted for 62 percent of total NO_x emissions in the Baltimore area. In the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE area, mobile source emissions accounted for 59 percent of total NO_x emissions. In the New York-Northern New Jersey-Long Island, NY-NJ-CT area, mobile source emissions accounted for 62 percent of total NO_x emissions.

The detailed analysis is contained in Appendix I.

4.3. International Emissions

CAA Section 179B (b) states:

> Notwithstanding any other provision of law, any State that establishes to the satisfaction of the Administrator that, with respect to an ozone nonattainment area in such State, such State would have attained the national ambient air quality standard for ozone by the applicable attainment date, but for emissions emanating from outside of the United States, shall not be subject to the provisions of section 7511(a)(2) or (5) of this title or section 7511d of this title.

Section 179B allows the EPA to approve prospective attainment plans if the demonstration shows the area would attain "but for emissions emanating from outside the U.S.", and not reclassify an area upon a determination that an area would have attained by its attainment date "but for emissions emanating from outside the U.S."

In the 2018 Memorandum, EPA recognized "that a number of non-U.S. and non-anthropogenic sources contribute to downwind nonattainment and maintenance receptors."[46] The modeling results reported in the 2018 memorandum indicate that six of the 11 receptors projected to be nonattainment in 2023 would be attainment but for the international emissions from Canada and Mexico.

As noted in the Alpine 2018 TSD, for the Harford, MD receptor "by accounting for the anthropogenic contribution of emissions from Canada and Mexico (tracked as a single tag), both

[46] Tsirigotis, Peter, March 27, 2018, p. A-1.

scenarios [EPA's 12-km and Alpine's 4-km modeling] demonstrate attainment with the 2015 ozone NAAQS (<71 ppb). This step allows a state to stop at Step 1 of the four-factor process."[47]

5.0. Contributions to "Link" Upwind State to Downwind Nonattainment and Maintenance Receptors

The EPA applied a four-step framework in the original CSAPR[48] to address the good neighbor provision for the 1997 ozone NAAQS, the 1997 and 2006 $PM_{2.5}$ NAAQS, and the CSAPR Update for the 2008 ozone NAAQS.[49] EPA in the 2018 memorandum summarizes the four-step framework as follows:

> EPA, working in partnership with states, established the following four-step framework to address the requirements of the good neighbor provision for ozone and fine particulate matter ($PM_{2.5}$) NAAQS: (1) identify downwind air quality problems; (2) identify upwind states that contribute enough to those downwind air quality problems to warrant further review and analysis; (3) identify the emissions reductions necessary (if any), considering cost and air quality factors, to prevent an identified upwind state from contributing significantly to those downwind air quality problems; and (4) adopt permanent and enforceable measures needed to achieve those emission reductions.[50]

5.1. Step 1

Alpine's 4-km "Good Neighbor" modeling projected two nonattainment receptors and 10 maintenance receptors under Step 1. Two nonattainment receptors were identified – Harford, MD, and Sheboygan, Wisconsin (WI) – West Virginia is linked to the Harford, MD receptor. Ten maintenance receptors were identified under Step 1 – three in Fairfield, Connecticut (CT), one each in New Haven and New London, CT, and one each in Allegan, Michigan (MI), Gloucester, New Jersey (NJ), Richmond, New York (NY), Suffolk, NY and Philadelphia, Pennsylvania (PA) – West Virginia is linked to the NY, NJ, and PA maintenance receptors. The tables below show

[47] Alpine Geophysics, June 2018, p. 38.
[48] 76 FR 48208, 08 AUG 2011.
[49] 81FR74504, 26 OCT 2016.
[50] Tsirigotis, March 27, 2018, p. 2-3.

EPA's modeling results and Alpine's 4-km modeling results for Alpine's projected nonattainment and maintenance receptors.

Table 4. Alpine 4-km Modeling-identified nonattainment monitors in the 4-km domain.[51]

Monitor	State	County	Ozone Design Values (ppb)					
				EPA "No Water" 12-km modeling		Alpine 4-km Modeling		2014-2016 DV
			DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	
240251001	MD	Harford	90.0	70.9	73.3	71.1	73.5	73
551170006	WI	Sheboygan	84.3	72.8	75.1	71.7	74.0	79

Table 5. Alpine 4 -km Modeling-identified maintenance monitors in the 4-km domains.[52]

Monitor	State	County	Ozone Design Values (ppb)					
				EPA "No Water" 12-km modeling		Alpine 4-km Modeling		2014-2016 DV
			DVb (2011)	DVf (2023) Ave	DVf 2023 Max	DVf (2023) Ave	DVf 2023 Max	
90010017	CT	Fairfield	80.3	68.9	71.2	69.2	71.5	80
90013007	CT	Fairfield	84.3	71.0	75.0	69.7	73.6	81
90019003	CT	Fairfield	83.7	73.0	75.9	69.9	72.7	83
90099002	CT	New Haven	85.7	69.9	72.6	70.3	73.0	76
90110124	CT	New London	80.3	67.3	70.4	68.2	71.3	72
260050003	MI	Allegan	82.7	69.0	71.7	70.3	73.1	75
340150002	NJ	Gloucester	84.3	68.2	70.4	68.8	71.0	74
360850067	NY	Richmond	81.3	67.1	68.5	69.6	71.0	76
361030002	NY	Suffolk	83.3	74.0	75.5	70.7	72.1	72
421010024	PA	Philadelphia	83.3	67.3	70.3	68.0	71.0	77

5.2. Step 2

Step 2 involves determining which upwind states contribute to the identified problem areas in amounts sufficient to "link" them to the downwind air quality problems. In the CSAPR Update, the EPA identifies such states as those contributing one percent of the NAAQS, (i.e., > 0.70 ppb). Based on the Alpine 4-km modeling, West Virginia is "linked" to the downwind 8-hour ozone

[51] Alpine Geophysics, June 2018, p. 30.
[52] Id.

nonattainment receptor at Harford, MD, with a 2.52 ppb contribution. West Virginia was also "linked" to three maintenance receptors – Gloucester, NJ, Richmond, NY, and Philadelphia, PA, with contributions of 1.63, 0.71, and 1.21 ppb, respectively. Therefore, further review and analysis relevant to those areas is also warranted.

5.3. Step 3

In Step 3, for states that are "linked" to downwind air quality problems, it is necessary to identify the emissions reductions necessary (if any), considering cost and air quality factors, to prevent the identified upwind state from contributing significantly to downwind air quality problems.

5.3.a. West Virginia NO_x Emissions

The National Emissions Inventory (NEI) is a comprehensive and detailed estimate of air emissions of criteria pollutants, criteria precursors, and hazardous air pollutants from air emissions sources. The NEI is released every three (3) years (i.e., 2008, 2011, 2014 . . .) based primarily upon data provided by State, Local, and Tribal (SLT) air agencies for point, non-point, and mobile sources in their jurisdictions and supplemented by data developed by the EPA. The NEI is built using the Emissions Inventory System (EIS) first by collecting the data from SLT air agencies and then blending that data with other air emission data sources.

The EPA also maintains a database of current emissions trends data, which includes annual data estimates for Tier 1 Categories from 1990 through 2017. Off year trends data, such as 2015 and 2016, are estimated by the EPA and are not based on actual SLT submitted data for those years.

The 2008, 2011, 2014, and 2017 NO_x emissions provided below in Table 6 were last updated on August 2, 2018 from the NEI Air Pollutant Emissions Trends Data website.[53] The methodology for estimating emissions is continually changing with the advancement of knowledge regarding emissions from sources and revisions to the EPA's emission estimating tools. West Virginia reviewed this data for potential errors, facility and process shutdowns, new facilities and processes,

[53] EPA, Air Pollutant Emissions Trends Data, https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data

and updated emission calculations. West Virginia updated the data for 2017 in Table 6, as described below and in Appendix J.

The Tier 1 Category emissions were revised to reflect known 2017 emissions. Facility point source emissions for 2017 were submitted to the EPA's EIS on June 25, 2018. The Tier 1 emissions were also revised with actual 2017 West Virginia natural gas production and exploration data, using the EPA's Oil and Gas Tool, and default factors using the EPA's MOVES2014a for non-road emissions. NO_x emissions per source classification code (SCC) are shown in Appendix K.

Table 6
West Virginia
Tier 1 Criteria Pollutant: NO_x

TIER 1 CATEGORY	NO_x Emissions (x 1,000 tons)				% of 2017 NOx
	2008	2011	2014	2017	
Fuel Comb. Elec. Util.	99.373	54.289	70.695	40.843	29.5%
Fuel Comb. Industrial	19.261	16.592	17.735	12.675	9.1%
Fuel Comb. Other	8.706	8.661	7.642	6.630	4.8%
Chemical & Allied Product Mfg.	0.836	0.402	0.313	0.268	0.2%
Metals Processing	1.432	1.806	1.560	1.380	1.0%
Petroleum & Related Industries	0.690	22.041	25.885	31.578*	22.8%
Other Industrial Processes	7.739	2.464	2.398	2.018	1.5%
Solvent Utilization	0	0	0	0	0.0%
Storage & Transport	0.002	0.004	0.001	0.001	0.0%
Waste Disposal & Recycling	1.162	1.152	0.850	0.860	0.6%
Highway Vehicles	51.846	41.879	40.880	29.812	21.5%
Off-Highway	22.442	22.397	16.774	10.508**	7.6%
Miscellaneous	0.008	0.027	0.013	0.013	0.0%
Wildfires	0.188	0.516	1.146	1.146	0.8%
Prescribed Fired	1.537	0.752	0.819	0.819	0.6%
Totals	**215.222**	**172.982**	**186.710**	**138.551**	**100.0%**

*NO_x emissions (x 1,000 tons) from DAQ based on EPA's Oil & Gas tool using actual production, active well counts, and exploration. Note that the emissions are not necessarily comparable across years due to changes in EPA's Oil & Gas Tool.
**NO_x emissions (x 1,000 tons) from a DAQ MOVES2014a EPA default run.

An analysis of the Tier 1 categories shows that the six (6) categories, highlighted in yellow in the table above, (Fuel Comb. Elec. Util.; Fuel Comb. Industrial; Fuel Comb. Other; Petroleum & Related Industries; Highway Vehicles; and Off-Highway) accounted for approximately 95 percent of the state's NO_x emissions in 2017, while the remaining nine Tier 1 categories account for less than 5 percent. Mobile sources – Highway Vehicles and Off-Highway – are regulated at the federal level not the state level, therefore, these were not considered for potential additional reductions beyond those required at the federal level.

The Petroleum and Related Industries Category has been a growing source category in West Virginia in past years and has been leveling off in the last couple of years. West Virginia's SIP approved permitting program ensures that new or modified sources will not cause or contribute to a violation of the NAAQS. West Virginia's permitting programs are discussed below in Section 6.1, New Source Review Permitting Programs.

The construction or modification of a major source requires a permit under state rules 45CSR14 Prevention of Significant Deterioration (PSD) or 45CSR19 (Nonattainment New Source Review (NNSR)). 45CSR14 requires the application of BACT (best available control technology) and 45CSR19 requires the application of LAER (lowest achievable emission rate), which are both more stringent than the RACT/RACM (reasonably available control technology/reasonably available control measures) required in nonattainment areas.

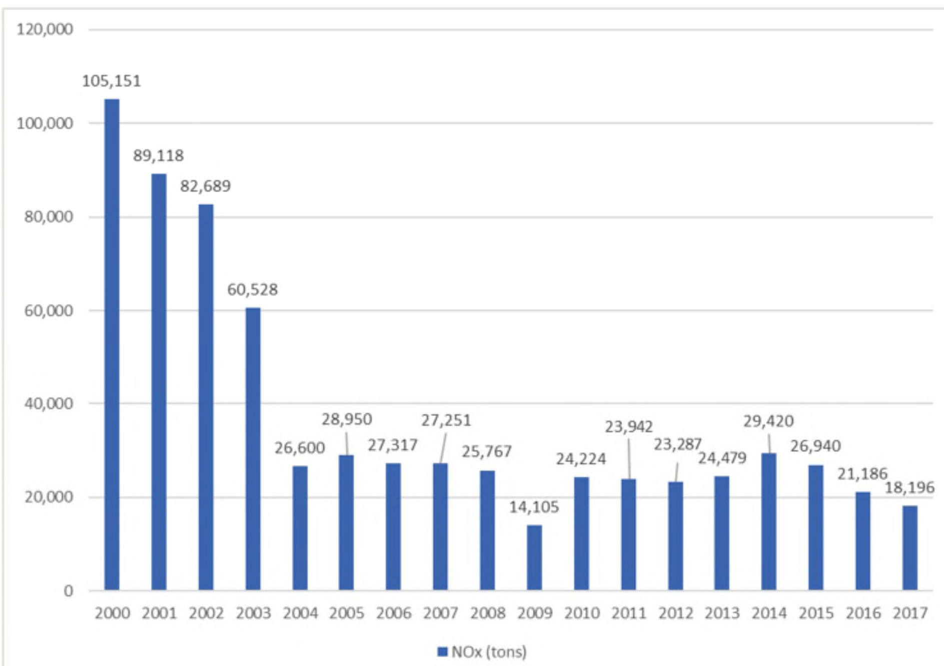
The remaining three 95 percent source categories are related to fuel combustion – electric utility, industrial and other. To assess the available control options, West Virginia reviewed EPA's preliminary analysis, the purpose of which was to characterize whether there are non-EGU source groups with a substantial amount of available cost-effective NO_x emissions reductions achievable. The results of EPA's preliminary analysis are provided in the *Assessment of Non-EGU NO_x Emission Controls, Cost of Controls, and Time for Compliance Final TSD*[54] for the CSAPR Update Rule. The results of the review are discussed below and in greater detail in Appendix L.

NO_x emissions declined dramatically under the Acid Rain Program (ARP), NO_x Budget Trading Program (NBP), Clean Air Interstate Rule (CAIR), and CSAPR program; with the majority of reductions coming from coal-fired units. These reductions have occurred while electricity demand (measured as heat input) remained relatively stable, indicating that the emission reductions were not driven by decreased electric generation. These emission reductions are a result of an overall

[54] EPA, *Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD*, August 2016. (Docket ID No. EPA-HQ-OAR-2015-0500-0508)
https://www.regulations.gov/searchResults?rpp=25&po=0&s=EPA-HQ-OAR-2015-0500-0508&dct=SR

increase in the efficiency at affected sources as power generators installed controls, ran their controls year-round, switched to lower emitting fuels, or otherwise reduced their NO_x emissions while meeting relatively steady electric demand.[55] Since 1997, power plants affected by these programs, along with other regional and state NO_x emission control programs, have cut ozone season NO_x emissions by over 75 percent, a reduction of almost 2 million tons. During the 2000 – 2015 time-period, average ozone concentrations across the U.S. have fallen by approximately 17 percent.[56] West Virginia ozone season EGU NO_x emissions have decreased 83 percent from 2000 – 2017, while emissions from Non-EGU sources subject to the NO_x SIP Call have decreased by 97 percent over the same period.[57]

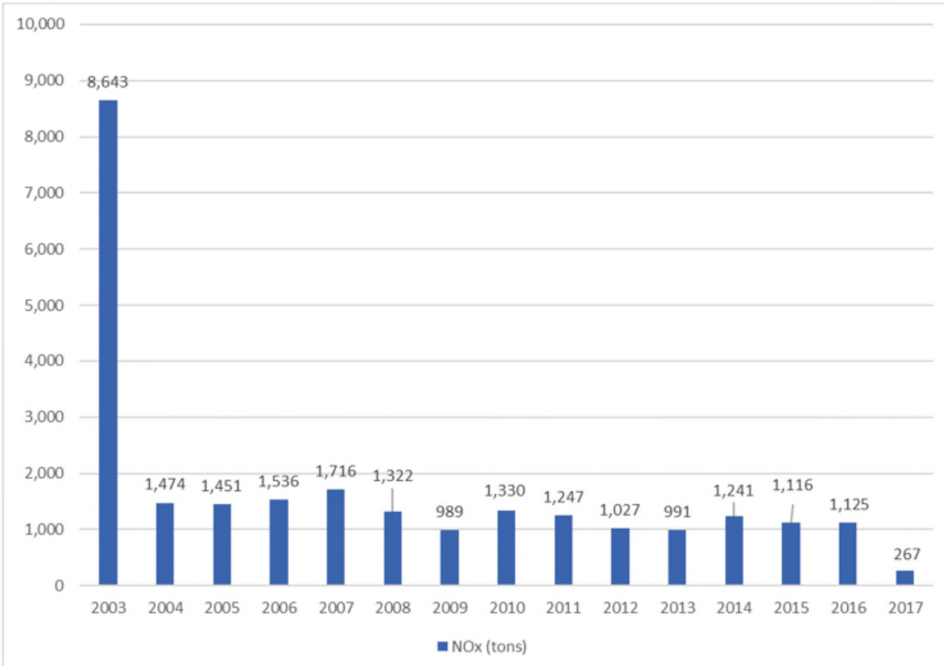
Chart 2
West Virginia Ozone Season EGU NO_x Emissions
2000-2017



Data source: https://ampd.epa.gov/ampd/

[55] https://www3.epa.gov/airmarkets/progress/reports/pdfs/index.html, EPA, 2015 Program Progress – Cross-State Air Pollution Rule and Acid Rain Program, p. 23.
[56] Fact Sheet Final Cross-State Air Pollution Rule Update for the 2008 NAAQS, p.2. https://www3.epa.gov/airmarkets/CSAPRU/FINAL_FinalCSAPRUR_Factsheet.pdf
[57] https://ampd.epa.gov/ampd/. EPA Air Markets Program Data

Chart 3
West Virginia Ozone Season non-EGU NO_x Emissions
(as reported to CAMD)
2003-2017



Data source: https://ampd.epa.gov/ampd/

5.3.b. EGU Controls

The Tier 1 category Fuel Combustion – Electric Utility accounted for 30.2 percent of the state's NO_x emissions in 2017. Therefore, potential controls for EGUs were evaluated.

Six coal-fired power plants in West Virginia have retired since the 2011 base year. Three plants, consisting of seven units with a total generating capacity of 655 MW, retired in September 2012. An additional three plants, consisting of 10 units with a total generating capacity of 2,080 MW, retired in June 2015. Documentation regarding EGUs, as of June 1, 2015, is provided in Appendix M.

As noted earlier, 2023 was selected as the future analytic year since it aligns with the anticipated attainment year for Moderate ozone nonattainment areas with respect to the 2015 ozone NAAQS. EPA stated, with respect to applying the 4-step framework, in the proposed *Determination*

Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard (Determination for 2008 Ozone NAAQS):

> In step 3, the EPA quantified the upwind emissions that significantly contribute to nonattainment or interfere with maintenance. The EPA quantified significantly contributing emissions from upwind states by evaluating levels of uniform NO_x control stringency, represented by an estimated marginal cost per ton of NO_x reduced. The EPA applied a multi-factor test to evaluate cost, available emissions reductions, and downwind air quality impacts to determine the appropriate level of uniform NO_x control stringency that addressed the impacts of interstate transport on downwind nonattainment or maintenance receptors. The EPA used this multi-factor assessment to gauge the extent to which emissions reductions should be implemented beginning in 2017 and to ensure those reductions do not represent over-control. . . .
>
> The multi-factor test generated a "knee in the curve," i.e., a point at which the cost-effectiveness of the emissions reductions is maximized, so named for the discernable turning point observable in a cost curve. See 81 FR 74550. In the CSAPR Update this was at the point where emissions budgets reflected a control stringency with an estimated marginal cost of $1,400 per ton of NO_x reduced. This level of stringency in emissions budgets represented the level at which incremental EGU NO_x reduction potential and corresponding downwind ozone air quality improvements were maximized—relative to other cost levels evaluated—with respect to marginal cost. That is, the ratio of emissions reductions to marginal cost and the ratio of ozone improvements to marginal cost were maximized relative to the other emissions budget levels evaluated. . . .[58]

In evaluating EGU controls for the CSAPR Update, EPA considered the optimization of existing controls. West Virginia's EGUs, their NO_x controls, 2017 and 2018 ozone season NO_x emission rates are identified in the table below.

[58] 83 FR 31921-31922, 10 JUL 2018.

Table 7
West Virginia EGUs, Controls and 2017 and 2018 Ozone Season NO_x Emission Rates

Plant	Unit	MW	Fuel	NO_x Control	2017 Ozone Season NO_x Emission Rate* (lb/MMBtu)	2018 Ozone Season NO_x Emission Rate* (lb/MMBtu)
Ft. Martin	1	550	Pulverized Coal	SNCR Trim	0.3016	0.2627
	2	550	Pulverized Coal	SNCR Trim	0.3118	0.2728
Grant Town	1A	84	Coal Refuse	SNCR	0.3141	0.2927
	1B		Coal Refuse	SNCR	0.3141	0.2906
MEA	CFB1	60	Coal Refuse	SNCR	0.3334	0.3384
	CFB2		Coal Refuse	SNCR	0.3332	0.3376
Harrison	1	640	Pulverized Coal	SCR	0.1062	0.0843
	2	640	Pulverized Coal	SCR	0.0885	0.0864
	3	640	Pulverized Coal	SCR	0.0761	0.1161
John Amos	1	800	Pulverized Coal	SCR	0.0838	0.0771
	2	800	Pulverized Coal	SCR	0.0760	0.0761
	3	1,300	Pulverized Coal	SCR	0.1135	0.1087
Mitchell	1	80	Pulverized Coal	SCR	0.0834	0.0795
	2	800	Pulverized Coal	SCR	0.0909	0.0823
Mountaineer		1,300	Pulverized Coal	SCR	0.0991	0.0880
Mt. Storm	1	530	Pulverized Coal	SCR	0.0684	0.0899
	2	530	Pulverized Coal	SCR	0.0913	0.0887
	3	520	Pulverized Coal	SCR	0.0810	0.0831
Pleasants	1	650	Pulverized Coal	SCR	0.0887	0.0778
	2	650	Pulverized Coal	SCR	0.1328	0.1555
Longview		700	Pulverized Coal	SCR	0.0581	0.0599
Big Sandy Peaker Plant	GS01		Natural Gas	Water Injection	0.1241	0.2981
	GS02		Natural Gas	Water Injection	0.1111	0.3644
	GS03		Natural Gas	Water Injection	0.1280	0.2732
	GS04		Natural Gas	Water Injection	0.1027	0.3444
	GS05		Natural Gas	Water Injection	0.1278	0.2792
	GS06		Natural Gas	Water Injection	0.0911	0.3426
	GS07		Natural Gas	Water Injection	0.1287	0.2766
	GS08		Natural Gas	Water Injection	0.1069	0.3523
	GS09		Natural Gas	Water Injection	0.1098	0.3066
	GS10		Natural Gas	Water Injection	0.0931	0.3246
	GS11		Natural Gas	Water Injection	0.1131	0.2883
	GS12		Natural Gas	Water Injection	0.1138	0.3437
Ceredo Generating Station	1		Natural Gas	Fuel Reburning	0.1200	0.1332
	2		Natural Gas	Fuel Reburning	0.1147	0.1286
	3		Natural Gas	Fuel Reburning	0.1141	0.1407
	4		Natural Gas	Fuel Reburning	0.1202	0.1476
	5		Natural Gas	Fuel Reburning	0.1223	0.1507
	6		Natural Gas	Fuel Reburning	0.1096	0.1534
Pleasants Energy	1		Natural Gas	Water Injection	0.0374	0.0378
	2		Natural Gas	Water Injection	0.0463	0.0424

*2017 NO_x emission rate data from EPA's AMPD website[59]

[59] https://ampd.epa.gov/ampd/

For the CSAPR Update, considering the optimization of existing controls on EGUs, EPA determined West Virginia's final 2017 EGU NO_x ozone season emission budget to be 17,815 tons, with a variability limit of 3,741 tons, and an assurance level of 21,566 tons.[60] As stated in the proposed *Determination for the 2008 Ozone NAAQS*, "the EPA considers the turning on and optimizing of existing SCR controls and the installation of combustion controls to be NO_x control strategies that have already been appropriately evaluated and implemented in the final CSAPR Update."[61]

Therefore, because all identified highly cost-effective emission reductions have already been implemented with respect to EGUs, WV finds that no additional highly cost-effective reductions are available for EGUs for the 2015 ozone NAAQS.

5.3.c. Non-EGU Controls

The EPA performed a preliminary analysis to characterize whether there are non-EGU source groups with a substantial amount of available cost-effective NO_x emissions reductions achievable, the results of that preliminary analysis are provided in the *Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD* (TSD)[62] for the CSAPR Update Rule. As EPA noted:

> For the purpose of identifying a list of non-EGU NO_x source groups with controls available, the EPA ran CoST for non-EGU point sources for the 37 eastern U.S. with NO_x emissions of greater than 25 tons/year in 2017. The analysis using CoST was a basis for the review of NO_x control measures for non-EGUs undertaken by two different contractors for EPA. Through a contractual agreement with EPA, SRA International and RTI International provided reports within which CoST examined a number of source categories of non-EGUs with annualized control costs up to $10,000 per ton (in 2011 dollars). These reports are included in the Appendices of this TSD. CoST selected particular control technologies based on application of a least-cost criterion for control measures applied as part of the control strategy. Other

[60] 81 FR 74567, 26 Oct 2016.
[61] 83 FR 31927, 8 JUN 2018.
[62] EPA, *Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD*, August 2016. (Docket ID No. EPA-HQ-OAR-2015-0500-0508)
https://www.regulations.gov/searchResults?rpp=25&po=0&s=EPA-HQ-OAR-2015-0500-0508&dct=SR

> NO_x control measures are available for some of these categories, but on average, annualized costs for these measures were at higher cost.[63]

SRA International (SRA) was provided with the outputs from EPA's Control Strategy Tool (CoST) scenario identifying sources for which NO_x controls were available at a cost-effectiveness level of less than $10,000 per ton. Source identifiers, control technology, baseline emissions and estimates of NO_x emission reductions were included in the CoST outputs. The CoST results were divided into two groups – greater than (>) 100 tons per year (tpy), and 25 to 100 tpy. There were 547 sources in the > 100 tpy group, and 1,280 sources in the 25 to 100 tpy group. EPA included two spreadsheets in the docket for the CSAPR Update Rule, which identify the sources in the >100 tpy[64] and the 25 to100 tpy[65] groups.

The TSD identified nine sources[66] (emission units) in West Virginia in the > 100 tpy group, and 21 sources[67] (emission units) in the 25 to 100 tpy group. The West Virginia sources identified in the >100 tpy group and the 25 to 100 tpy group are listed in Tables 8 and 9 below. Based on the preliminary review in the TSD EPA recommended reductions of 793 tons/O_3 season for sources in the > 100 tpy reduction group and 334 tons/O_3 season for sources in the 25 to 100 tpy reduction group.

Of the nine sources identified in the >100 tpy group, four have permanently shutdown, two sources are subject to a Consent Order which requires them to be shut down by December 31, 2021, and one source is subject to a Consent Order which establishes a 0.2 lb/MMBtu NO_x limit during the ozone season. For the remaining two sources, EPA determined that one source was controlled, and one did not have any technically and economically available controls. Therefore, all nine sources in the group have been addressed. Emissions of NO_x from these nine sources decreased from 4,451 tons in 2011 to 1,933 tons in 2017, a 56.6 percent reduction. Of the 2,518 tons of reduction, 1,628 tons (36.6%) were due to the shutdown of the four sources, and an additional

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[63] Ibid., p. 9.
[64] Docket ID No. EPA-HQ-OAR-2015-0500-0090
[65] Docket ID No. EPA-HQ-OAR-2015-0500-0089
[66] Ibid, Appendix B, p. 15.
[67] Ibid, Appendix B, p. 30.

reduction of 780 tons (17.5% from 2011 levels) are expected by December 31, 2021 due to the required shutdown of two additional sources.

Of the 21 sources identified in the 25 to 100 tpy group, six sources have permanently shutdown, and three are subject to a Consent Order which requires them to be shut down by December 31, 2021. These 21 sources emitted 1,391 tons of NO_x in 2011. The six sources that have shutdown accounted for 214 tons (15.4%). An additional three sources are required to shutdown by December 31, 2021 and account for 232 tons (16.7%) of the 2011 emissions. In 2017 the 21 sources emitted 977 tons of NO_x emissions, with the three sources required to shutdown by December 31, 2021 accounting for 171 tons (17.5%).

A discussion of these 30 sources, their controls, copies of permits, Consent Orders and documentation of shutdowns are contained in Appendix N.

The shutdown of the identified 10 sources; the required shutdown of the additional five sources; and the current level of control on the remaining 20 sources, in conjunction with the implementation of the Control Measures programs listed in Section 6, represent the implementation of reasonable control measures in West Virginia.

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Table 8
West Virginia Sources in the >100 tpy Group

Facility ID	Facility Name	Unit	Source Category	SRA/RTI Recommended Control Technology	2011 NO_x Emissions (tons)	2017 NO_x Emissions (tons)	WV Comments
54-003-00006	Argos USA, formerly Essroc, Capitol Cement	Kiln	Cement Kiln	Already controlled	1,495	1,005	Preheater/Precalciner kiln with LNB
54-009-00002	Mountain State Carbon	Battery #8	By-Product Coke Manufacturing	Control technically or economically infeasible	425	216	Battery uses under firing, no additional control feasible
54-029-00001	Arcelor Mittal	Boiler 5	ICI Boilers - Natural Gas	LNB and FGR	140	0	Shutdown
54-039-00007	Bayer Crop Science	Boiler 10	ICI Boilers - Coal	LNB and SCR	494	13	Shutdown
54-039-00007	Bayer Crop Science	Boiler 11	ICI Boilers - Coal	LNB and SCR	492	0	Shutdown
54-039-00007	Bayer Crop Science	Boiler 12	ICI Boilers - Coal	LNB and SCR	502	0	Shutdown
54-039-00001	Chemours – Belle	Boiler 10	ICI Boilers - Natural Gas	LNB and FGR	124	80	CO-R40-C-2016-30, 0.20 lb/MMBtu NO_x limit
54-107-00001	Chemours – Washington Works	#5 Boiler	ICI Boilers – Coal/Stoker	SNCR	318	269	Consent Order to shutdown by 12/31/21
54-107-00001	Chemours – Washington Works	#6 Boiler	ICI Boilers – Coal/Stoker	SNCR	462	350	Consent Order to shutdown by 12/31/21

Table 9
West Virginia Sources in the 25 to 100 tpy Group

Facility ID	Facility Name	Unit	Source Category	Revised Control Technology Recommendation	2011 NO_x Emissions (tons)	2017 NO_x Emissions (tons)	WV Comments
54-007-00100	Columbia Frametown	04501	Gas Turbine – Natural Gas	Low NO_x Burners (LNB)	52	0	Emergency Standby Unit
54-011-00009	SWVA	Reheat Furnace #1	Mills - Reheating	LNB and FGR	29	27	No control
54-011-00009	SWVA	Reheat Furnace #2	Mills - Reheating	LNB and FGR	42	44	No control
54-029-00001	Arcelor Mittal	Boiler 4	ICI Boilers – Natural Gas	LNB and FGR	61	0	Permanently Shutdown
54-037-00007	Ox Paperboard	001	ICI Boilers – Coal/Stoker	SNCR	53	67	Current Max 40% capacity factor, dry sorbent injection, a baghouse; Scheduled shutdown by 2019
54-039-00001	Chemours Belle	Boiler 6	ICI Boilers – Natural Gas	LNB and FGR	91	3	No NOx control, ICI Boiler MACT
54-039-00001	Chemours Belle	Boiler 14	ICI Boilers – Natural Gas	LNB and FGR	26	98	No NOx control, ICI Boiler MACT
54-039-00001	Chemours Belle	Boiler 15	ICI Boilers – Natural Gas	LNB and FGR	73	31	No NOx control, ICI Boiler MACT
54-039-00007	Bayer Crop Science	040	ICI Boilers – Natural Gas	LNB and FGR	32	0	Permanently Shutdown
54-049-00019	Marion County Mine	008	Thermal Dryer – Fluidized Bed	LNB	134	147	Cyclone, Scrubber
54-049-00043	Fibrek	001	ICI Boilers – Natural Gas	LNB and FGR	25	0	Existing controls: LNB and FGR

Facility ID	Facility Name	Unit	Source Category	Revised Control Technology Recommendation	2011 NO_x Emissions (tons)	2017 NO_x Emissions (tons)	WV Comments
54-051-00009	COVESTRO	22A	ICI Boilers – Natural Gas	LNB and FGR	53	38	No NOx control, ICI Boiler MACT
54-057-00011	Naval Sea Systems	034	ICI Boilers – Coal/Stoker	SNCR	2	0	Permanently Shutdown
54-061-00016	Monongalia County Mine	008	Thermal Dryer – Fluidized Bed	LNB	95	75	Cyclone, Scrubber
54-099-00013	Columbia Ceredo	0509	Gas Turbines – Natural Gas	LNB	116	75	Permanently Shutdown
54-107-00010	SABIC	BH4	ICI Boilers – Natural Gas	LNB and FGR	42	0	Permanently Shutdown
54-107-00001	Chemours, Washington Works	#2 Boiler	ICI Boilers – Coal/Stoker	SNCR	44	11	Consent Order to shutdown by 12/31/21
54-107-00001	Chemours, Washington Works	#3 Boiler	ICI Boilers – Coal/Stoker	SNCR	103	98	Consent Order to shutdown by 12/31/21
54-107-00001	Chemours, Washington Works	#4 Boiler	ICI Boilers – Coal/Stoker	SNCR	85	61	Consent Order to shutdown by 12/31/21
54-109-00013	Kepler Processing Plant	006	Thermal Dryer – Fluidized Bed	LNB	97	67	Venturi and wet scrubber, 15% NO_x control
54-109-00006	Pinnacle Mining	001	Thermal Dryer – Fluidized Bed	LNB	135	134	Venturi and wet scrubber, 15% NO_x control

5.4. Step 4

In Step 4, for States that are found to have emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind, must implement reasonable control measures, which may include regional emission allowance trading programs, to reduce the identified upwind emissions. Section 6 identifies the reasonable control measures which have been implemented in West Virginia.

6.0. Control Measures

This section addresses programs that are established to control air pollution emissions, including ozone precursors, for existing and potential new sources located in West Virginia, without regard to the contribution analysis. The programs discussed below are organized by permitting programs, stationary source control measures, and mobile source control measures. This section also discusses the mechanism by which West Virginia has primacy of the stationary source control program, or will have, primacy of the program with respect to CSAPR and CSAPR Update.

6.1. New Source Review (NSR) Permitting Programs

West Virginia's permit program includes review of applications, determination of permit applicability and issuance of permits for both minor and major sources. Minor sources are primarily permitted under the minor source rule found at 45CSR13 – *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation*. Major sources are primarily permitted under the new source review rules found at 45CSR14 – *Permits for the Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration* and 45CSR19 – *Permits for Construction and Major Modification of Major Stationary Sources Which Cause or Contribute to Nonattainment Areas*. Major sources are also issued operating permits under the authority of 45CSR30 – *Requirements for Operating Permits*, which is the implementing rule of Title V of the 1990 Federal Clean Air Act Amendments.

6.1.a. 45CSR13 – Minor Source NSR

West Virginia's permitting program requires the construction or modification of a source with the potential to emit six or more pounds per hour and 10 tons per year, or greater than 144 pounds per calendar day, of a regulated pollutant, including the ozone precursors NO_x and VOCs, to obtain a permit under state rule 45CSR13 – *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation* (minor source NSR). 45CSR13 §5.7 requires the Secretary to consider whether the "proposed construction, modification, registration or relocation will violate applicable emission standards, will interfere with attainment or maintenance of an applicable ambient air quality standard, cause or contribute to a violation of an applicable air quality increment, or be inconsistent with the intent and purpose of this rule or W. Va. Code § 22-5-1, et seq., in which case the Secretary shall issue an order denying such construction, modification, relocation and operation." 45CSR13 is the mechanism under which NSPS, are applied to a given minor source. Reductions from sources subject to NSPS are assumed to be equivalent to RACT/RACM (reasonably available control technology/reasonably available control measures).

West Virginia has had a minor source NSR program as part of its SIP since 1972. 45CSR13 sets forth the procedures for stationary source reporting, and the criteria for obtaining a permit to construct and operate a new stationary source which is not a major stationary source, to modify a non-major stationary source, to make modifications which are not major modifications to an existing major stationary source, to relocate non-major stationary sources within the state of West Virginia, and to set forth procedures to allow facilities to commence construction in advance of permit issuance. Such construction, modification, relocation, and operation without a required permit is a violation of this rule. This rule also establishes the requirements for obtaining an administrative update to an existing permit, a temporary permit, or a general permit registration, and for filing notifications and maintaining records of changes not otherwise subject to the permit requirements of this rule. This rule does not apply to non-road engines, non-road vehicles, motor vehicles, or other emission sources regulated under Subchapter II of the CAA; however, the Secretary may regulate such sources pursuant to another rule promulgated for that purpose. The

EPA last approved 45CSR13 as a SIP revision effective August 20, 2014[68]. West Virginia submitted the current version of 45CSR13, effective June 1, 2017, to the EPA as a SIP revision on June 7, 2017. The EPA has not yet acted on this revision.

6.1.b. 45CSR14 - PSD

Legislative rule 45CSR14 – *Permits for the Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration,* satisfies the prevention of significant deterioration permit program requirements under Part C of Title I of the CAA.

New major sources and major modifications are subject to a comprehensive PSD permit program as set forth in SIP approved rule 45CSR14[69]. The PSD program governs the preconstruction review and permitting of any new major stationary sources or major modification with respect to all regulated NSR pollutants, including greenhouse gases, under the CAA, as well as any precursors to the formation of such pollutants when identified for regulation by EPA.

45CSR14 regulates future growth and provides for continued maintenance of the 2015 8-hour ozone NAAQS. This rule includes specific federal requirements which ensure that new or modified sources do not interfere with measures to prevent significant deterioration of air quality by providing a mechanism to prevent the development of any new nonattainment problems. 45CSR14 requires the evaluation of sources of air pollutants to preclude the construction or relocation of any major stationary source or major modification in any area classified as attainment/unclassifiable with the NAAQS to prevent the significant deterioration of air quality.

Pursuant to CAA §165(a)(3), the DAQ is authorized to implement the existing PSD permit program to ensure the construction and modification of major stationary sources will not cause or contribute to a violation of the 2015 8-hour ozone NAAQS (or any NAAQS or increment) in West Virginia or another state, as set forth in the source impact analysis requirements of 45CSR§ 14-9.1 and 40 CFR §51.166(k).

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[68] 79 FR 42212
[69] 81 FR 53008, August 11, 2016

As set forth in 45CSR14-4, ambient air quality increments and ceilings are not confined to a state boundary. Pursuant to the public review procedures set forth in 45CSR §14-17.5, West Virginia must provide notice to any state affected by a proposed source or modification. The DAQ must send a copy of the advertisement to the applicant, to the Administrator, and to officials and agencies having cognizance over the location where the proposed construction would occur as follows: any other State or local air pollution control agencies, the chief executives of the city and county where the source would be located; any comprehensive regional land use planning agency, any State, and any Federal Land Manager, whose lands may be affected by emissions from the source or modification.

The EPA last approved 45CSR14, effective June 1, 2016, as a SIP revision effective September 12, 2016[70]. On June 7, 2017, West Virginia submitted to the EPA a SIP revision which included updates to 45CSR14, effective June 1, 2017. The EPA has not yet acted on this revision.

6.1.c. 45CSR19 – Nonattainment NSR

Legislative rule 45CSR19 – *Permits for Construction and Major Modification of Major Stationary Sources Which Cause or Contribute to Nonattainment Areas*, satisfies the nonattainment area nonattainment new source review (NNSR) permit program requirements under Part D of the CAA.

West Virginia's SIP approved[71] NNSR program under 45CSR19, has a state effective date of June 1, 2014. West Virginia has had a SIP approved NNSR program under 45CSR19 since EPA first approved the program[72].

In-state sources not subject to PSD for one or more regulated pollutants because they are located in a nonattainment area for a NAAQS related to the nonattainment pollutant(s) may also have the potential to interfere with PSD in an attainment/unclassifiable area of another state. New or major sources and major modifications in nonattainment areas are subject to the NNSR program under 45CSR19. 45CSR19 contains a significance level for ozone of 40 tpy of VOC or NO_x. The significant impact level (µg/m3) for NO_2 for annual averaging time (hours) of ambient air

[70] 81 FR 53008
[71] 80 FR 29972, effective June 25, 2015
[72] 50 FR 27247, effective August 1, 1985

concentration increase is 1.0. A NNSR permit may be granted if the source meets LAER, emission offset requirements, and additional requirements. West Virginia does not have any nonattainment areas for ozone.

6.2. Stationary Source Control Measures

6.2.a. New Source Performance Standards (40 CFR Part 60)

Section 111 of the CAA authorizes the EPA to develop technology-based standards which apply to specific categories of stationary sources. These standards are referred to as new source performance standards (NSPS) and are found in 40 CFR Part 60. The NSPS apply to new, modified, and reconstructed affected facilities in specific source categories such as EGUs, industrial-commercial-institutional steam generating units (boilers), manufacturers of glass, cement, rubber tires and wool fiberglass.

Section 111(c) of the CAA directs EPA to delegate to each State, when appropriate, the authority to implement and enforce standards of performance for new stationary sources located in such State. West Virginia first received delegation for the NSPS program on December 14, 1984[73] and has automatic delegation of authority to enforce the NSPS program in accordance with EPA's delegation of authority letters dated March 19, 2001 and January 8, 2002. All emission limitations and standards of performance for NO_x and VOCs promulgated under 40 CFR Part 60 are incorporated by reference under legislative rule 45CSR16 – *Standards of Performance for New Stationary Sources,* with limited exception. Under the terms of the delegation agreement, the DEP must legally adopt each standard. The DEP revises 45CSR16 on an annual basis to incorporate by reference the NSPS promulgated by EPA in the preceding year. The DEP is also required to provide notification to the EPA that it has adopted by reference the standards and that it intends to enforce the standards in conformance with the terms of the delegation. The DEP provides this notification to EPA on an annual basis following the annual incorporation by reference of the NSPS under 45CSR16. The last notification to EPA was sent June 5, 2018 regarding the latest revision to 45CSR16, effective June 1, 2018.

[73] 49 FR 48692

6.2.b. Acid Rain Program

The Acid Rain Program (ARP), which began in 1995, covers fossil fuel fired power plants across the contiguous U.S. and is designed to reduce sulfur dioxide (SO_2) and NO_x emissions, the primary precursors of acid rain. The ARP's market-based SO_2 cap and trade program sets an annual cap on the total amount of SO_2 that may be emitted by EGUs. The final annual SO_2 emissions cap was set at 8.95 million tons in 2010, a level of about one-half of the emissions from the power sector in 1980. NO_x reductions under the ARP are achieved through a rate-based approach that applied to a subset of coal-fired EGUs.[74]

West Virginia implements the ARP through 45CSR33 – *Acid Rain Provisions and Permits*, which incorporates by reference the CAA Title IV Acid Rain Program as part of the state's Title V requirements, which were approved on December 15, 1995 with the interim approval of the state's Title V program.

6.2.c. NO_x SIP Call

In October 1998, EPA finalized the *Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone* — commonly called the NO_x SIP Call. In response to the NO_x SIP Call the NO_x Budget Program (NBP) was designed to mitigate significant transport of NO_x. The NBP was a cap and trade program created to reduce the regional transport of NO_x emissions from power plants and other large combustion sources in the eastern U.S. The NBP began in 2003 and was designed to reduce NO_x emissions during the warm summer months (i.e., ozone season), when ground-level ozone concentrations are highest. The NBP was a central component of the NO_x SIP Call, which was implemented from 2003 to 2008.[75]

West Virginia implemented the NO_x SIP Call through the adoption of 45CSR1 – *NO_x Budget Trading Program as a Means of Control and Reduction of Nitrogen Oxides from Non-Electric Generating Units (Rule 1)* and 45CSR26 – *NO_x Budget Trading Program as a Means of Control*

[74] https://www3.epa.gov/airmarkets/progress/reports/pdfs/2015_full_report.pdf. EPA, 2015 Program Progress – Cross-State Air Pollution Rule and Acid Rain Program, p. 7.
[75] https://www.epa.gov/airmarkets/nox-budget-trading-program

and Reduction of Nitrogen Oxides from Electric Generating Units (Rule 26). Both rules were approved as a revision to the SIP in 2002[76] and were subsequently repealed in 2009 when replaced with the Clean Air Interstate Rule (CAIR). EPA approved the repeal of 45CSR1 and 45CSR26 [75 FR 6305] effective February 9, 2010, as a revision to the SIP.

6.2.d. Clean Air Interstate Rule

Beginning in 2009, the NBP was effectively replaced by the ozone season NO_x program under the CAIR, which required further summertime NO_x reductions from the power sector. EPA's CAIR addressed regional interstate transport of soot (fine particulate matter) and smog (ozone). CAIR required 28 eastern states to make reductions in SO_2 and NO_x emissions that contribute to unhealthy levels of fine particle and ozone pollution in downwind states. CAIR was replaced by CSAPR as of January 1, 2015.[77]

West Virginia implemented the CAIR through the adoption of three state rules, which were approved as revisions to the SIP[78]:

- 45CSR39 – *Control of Annual Nitrogen Oxide Emissions to Mitigate Interstate Transport of Fine Particulate Matter and Nitrogen Oxides*;
- 45CSR40 – *Control of Ozone Season Nitrogen Oxide Emissions to Mitigate Interstate Transport of Fine Particulate Matter and Nitrogen Oxides*; and
- 45CSR41 – *Control of Annual Sulfur Dioxide Emissions to Mitigate Interstate Transport of Fine Particulate Matter and Sulfur Dioxide.*

CAIR was replaced by the Cross-State Air Pollution Rule (CSAPR) as of January 1, 2015;[79] therefore, 45CSR39 and 45CSR41 were repealed, effective July 1, 2016. EPA approved the repeal of 45CSR39 and 45CSR41[80] as a revision to the SIP.

[76] 67 FR 31733
[77] https://archive.epa.gov/airmarkets/programs/cair/web/html/index.html
[78] 74 FR 38536, effective August 4, 2009
[79] https://archive.epa.gov/airmarkets/programs/cair/web/html/index.html
[80] 83 FR 5540, effective March 12, 2018

Also due to the replacement of the CAIR program with the federal CSAPR, 45CSR40 was revised, effective July 1, 2016, removing the EGU CAIR requirements and retaining the non-EGU requirements from the NO_x SIP call. The DEP submitted 45CSR40 as a SIP revision on July 13, 2016 and subsequently submitted additional information including a non-EGU NO_x SIP Call Demonstration. On December 4, 2018, EPA approved 45CSR40, effective January 3, 2019[81].

The CSAPR became effective January 1, 2015, as set forth in an October 23, 2014 decision by the U.S. Court of Appeals for the D.C. Circuit.

6.2.e. Cross-State Air Pollution Rule

On July 6, 2011, the EPA finalized the Cross-State Air Pollution Rule (CSAPR) as a federal implementation plan (FIP), limiting the interstate transport of emissions of NO_x and SO_2 that contribute to harmful levels of $PM_{2.5}$ and ozone in downwind states. The CSAPR requires 28 states in the eastern U.S. to reduce SO_2, annual NO_x and ozone season NO_x emissions from fossil fuel-fired power plants that affect the ability of downwind states to attain and maintain compliance with the 1997 and 2006 $PM_{2.5}$ NAAQS and the 1997 ozone NAAQS.

The CSAPR achieved these reductions through emissions trading programs, Phase 1 began in January 2015 for the annual programs and May 2015 for the ozone season program. Phase 2 began in January 2017 for the annual programs and May 2017 for the ozone season program.

The total emissions allowed in each compliance period under CSAPR equals the sum of the affected state emission budgets in the program. The budget for each program in 2015 was:

- SO_2 Group 1 – 2.55 million tons
- SO_2 Group 2 – 917,787 tons
- Annual NO_x – 1.27 million tons
- Ozone Season NO_x – 628,392 tons[82]

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[81] 83 FR 62470, 04 Dec 2018

[82] https://www3.epa.gov/airmarkets/progress/reports/pdfs/2015_full_report.pdf. EPA, 2015 Program Progress – Cross-State Air Pollution Rule and Acid Rain Program, p. 8.

As noted earlier, DEP has proposed legislative rule 45CSR43 – *Cross-State Air Pollution Rule to Control Annual Nitrogen Oxide Emissions, Annual Sulfur Dioxide Emissions and Ozone Season Nitrogen Oxide Emissions* for West Virginia legislative approval during the 2019 Legislative Session. Upon legislative approval and signature by the Governor, 45CSR43 will be submitted to EPA as a SIP revision. 45CSR43 incorporates by reference the 40 CFR Part 97, Subparts AAAAA and CCCCC, the CSAPR NO_x Annual and SO_2 Group 1 trading programs, respectively.

6.2.f. CSAPR Update

On September 7, 2016, the EPA revised the CSAPR ozone season NO_x emission program by finalizing the CSAPR Update for the 2008 ozone NAAQS.[83] Starting in May 2017, the CSAPR Update began reducing summertime (May - September) NO_x emissions from power plants in 22 states in the eastern U.S., including West Virginia. The CSAPR Update reduces air quality impacts of ozone pollution that crosses state lines and helps downwind areas meet and maintain the 2008 ozone air quality standard.[84] The combined state emission budgets in the CSAPR Update equals 316,464 tons of ozone season NO_x emissions in 2017 and 313,626 tons of emissions for 2018 and later years.[85] The Final 2017 EGU NO_x ozone season emission budget for West Virginia is 17,815 tons, with a variability limit of 3,741 tons, for an assurance level of 21,556 tons[86]. West Virginia's CSAPR Update Budget of 17,815 is a reduction of 7,468 tons (29.5%) and 5,476 tons (23.5%), respectively, of the budgeted amounts, in CSAPR, of 25,283 tons for 2012-2013 and 23,291 tons for 2014 and beyond[87].

EPA's Clean Air Markets Division's (CAMD) AMPD shows that actual ozone season NO_x emissions in the 22 states subject to the CSAPR Update dropped by 26.5% from 2015 to 2017, from 401,403 tons to 295,208 tons, a reduction of 106,195tons.[88] EPA's AMPD shows West Virginia's 2017 ozone season emissions were 18,187 tons, which is below the CSAPR assurance level of 21,556 tons for West Virginia.

[83] https://www.epa.gov/csapr/cross-state-air-pollution-rule-csapr-regulatory-actions-and-litigation
[84] https://www.epa.gov/airmarkets/final-cross-state-air-pollution-rule-update
[85] https://www3.epa.gov/airmarkets/progress/reports/pdfs/2015_full_report.pdf. EPA, 2015 Program Progress – Cross-State Air Pollution Rule and Acid Rain Program, p. 8.
[86] 81 FR 74508, 26 Oct 2016
[87] 76 FR 48263, 08 Aug 2011
[88] https://ampd.epa.gov/ampd/

As noted earlier, DEP has proposed legislative rule 45CSR43 – *Cross-State Air Pollution Rule to Control Annual Nitrogen Oxide Emissions, Annual Sulfur Dioxide Emissions and Ozone Season Nitrogen Oxide Emissions* for West Virginia legislative approval during the 2019 Legislative Session. Upon legislative approval and signature by the Governor, 45CSR43 will be submitted to EPA as a SIP revision. 45CSR43 incorporates by reference the 40 CFR Part 97, Subpart EEEEE, the CSAPR ozone season NO_x trading program.

6.2.g. Solid Waste Combustion Rules (40 CFR Part 60)

Section 129 of the CAA directs the Administrator to develop regulations under Section 111 of the Act limiting emissions of nine air pollutants, including NO_x, from four categories of solid waste incineration units: municipal solid waste; hospital, medical and infectious solid waste; commercial and industrial solid waste; and other solid waste.

Section 111 of the CAA authorizes the EPA to develop technology-based standards which apply to specific categories of stationary sources. New Source Performance Standards (NSPS) are found in 40 CFR Part 60 and apply to new, modified, and reconstructed affected facilities in specific source categories. Emission Guidelines (EG) are found in 40 CFR Part 60 and apply to existing affected facilities in specific source categories.

West Virginia legislative rule 45CSR18 – *Control of Air Pollution from Combustion of Solid Waste* adopts standards of performance, and establishes emission guidelines and compliance times pursuant to §§ 111(d) and 129 of the CAA for the control of certain designated pollutants from the following categories of solid waste combustors, combustion units, incinerators and incineration units in West Virginia:

(a) Large municipal waste combustors subject to the standards of performance under Subpart Eb;
(b) Small municipal waste combustion units subject to the standards of performance under Subpart AAAA;
(c) Hospital/ medical/ infectious waste (HMIWI) incinerators subject to the standards of performance under Subpart Ec and the emission guidelines and compliance times under Subpart Ce;

(d) Commercial and industrial solid waste incineration (CISWI) units subject to the standards of performance under Subpart CCCC and the emission guidelines and compliance times under Subpart DDDD;

(e) Other solid waste incineration units subject to the standards of performance under Subpart EEEE, and

(f) Sewage sludge incineration units subject to the standards of performance under Subpart LLLL.

The effective date of the latest revision to 45CSR18 is June 1, 2018. As previously described, West Virginia has automatic delegation of the NSPS program. The most recent communication to EPA regarding the incorporation of the NSPS under 45CSR18 was August 15, 2018. The CISWI and HMIWI State Plans for existing facilities were approved by EPA[89]. DEP submitted revisions to the CISWI State Plans on November 21, 2016 and August 15, 2018. There has been no action taken by EPA regarding the latest CISWI State Plan revision submittals.

6.2.h. Maximum Achievable Control Technology (MACT) Program (40 CFR Part 63)

The first NESHAPs were originally required by the 1970 CAA. These standards were developed for sources and source categories that were determined to pose adverse risk to human health by the emission of hazardous air pollutants (HAPs). The EPA Administrator was directed to set the standard "at the level which in his judgment provides an ample margin of safety to protect the public health from such hazardous air pollutants". These risk-based NESHAPs are in 40 CFR 61 and incorporated by reference in 45CSR34. The NESHAPs applies to all existing and new/modified sources.

Congress directed EPA to develop a program to further the regulation of HAPs in section 112 of the 1990 Clean Air Act Amendments (CAAA). While the standards for major sources of HAPs developed per this section are also designated as NESHAPs, they are established in accordance with MACT requirements. MACT is a technology-based standard, as opposed to the original conception of NESHAPs as a risk-based standard. These technology-based NESHAPs are located

[89] 68 FR 17738, effective June 10, 2003 and 77 FR 3389, effective March 26, 2012, respectively

at 40 CFR 63 and incorporated by reference in 45CSR34. The last effective date of 45CSR34 is June 1, 2018.

West Virginia implements the MACT rules through the adoption of 45CSR34 – *Emission Standards for Hazardous Air Pollutants*, which incorporates by reference federal NESHAPs for source categories as set forth in 40 CFR Parts 61 and 63. This is a delegated program for which the state received partial delegation effective March 19, 2001 and full delegation effective June 3, 2002. While the purpose of 45CSR34 is the control of HAPs, there may also be a co-beneficial reduction in the emissions of NO_x and/or VOCs.

6.3. Mobile Source Control Measures

6.3.a. 2007 Heavy-Duty Highway Rule (40 CFR Part 86, Subpart P)

In this regulation, EPA set a particulate matter (PM) emission standard for new heavy-duty engines of 0.01 grams per brake horsepower-hour (g/bhp-hr), which took effect for diesel engines in the 2007 model year. This rule also included standards for NO_x and non-methane hydrocarbons (NMHC) of 0.20 g/bhp-hr and 0.14 g/bhp-hr, respectively. The diesel engine NO_x and NMHC standards were successfully phased in together between 2007 and 2010. The rule also required that sulfur in diesel fuel be reduced to facilitate the use of modern pollution control technology on these trucks and buses. The EPA required a 97 percent reduction in the sulfur content of highway diesel fuel – from levels of 500 ppm (low sulfur diesel) to 15 ppm (ultra-low sulfur diesel). These requirements were successfully implemented on the timeline in the regulation.

6.3.b. Tier 2 Vehicle and Gasoline Sulfur Program (40 CFR Part 80, Subpart H; 40 CFR Part 85, 40 CFR Part 86)

The EPA's Tier 2 fleet averaging program for on-road vehicles, modeled after the California low emission vehicle (LEV) II standards became effective in the 2005 model year. The Tier 2 program allows manufacturers to produce vehicles with emissions ranging from relatively dirty to very clean, but the mix of vehicles a manufacturer sells each year must have average NO_x emissions below a specified value. Mobile emissions continue to benefit from this program as motorists replace older, more polluting vehicles with cleaner vehicles.

6.3.c. Tier 3 Motor Vehicle Emission and Fuel Standards (40 CFR Parts 79, 80, 85, 86, 600, 1036, 1037, 1039, 1042, 1048, 1054, 1065, and 1066)

The Tier 3 program is part of a comprehensive approach to reducing the impacts of motor vehicles on air quality and public health by considering the vehicle and its fuel as an integrated system, setting new vehicle emissions standards and a new gasoline sulfur standard beginning in 2017. The vehicle emissions standards will reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. The gasoline sulfur standard will enable more stringent vehicle emissions standards and will make emissions control systems more effective.

The Tier 3 standards include new light- and heavy-duty vehicle emission standards for exhaust emissions of VOC (specifically, non-methane organic gases, or NMOG), NO_x, and PM, as well as new evaporative emissions standards. The fully phased-in standards for light-duty vehicle, light-duty truck, and medium-duty passenger vehicle tailpipe emissions are an 80 percent reduction in fleet average NMOG+NO_x compared to current standards, and a 70 percent reduction in per-vehicle PM standards. The fully phased-in Tier 3 heavy-duty vehicle tailpipe emissions standards for NMOG+NO_x and PM are about 60 percent lower than current standards. Finally, the fully phased-in evaporative emissions standards represent a 50 percent reduction from the earlier standards.[90]

6.3.d. Tier 4 Vehicle Standards

On May 11, 2004, EPA signed the final rule introducing Tier 4 emission standards, which were phased-in from 2008-2015. Engine manufacturers were required to produce new engines with advanced emission control technologies. Exhaust emissions from these engines were predicted to decrease by more than 90%. When the full inventory of older non-road engines are replaced by Tier 4 engines, annual emission reductions are estimated at 738,000 tons of NO_x and 129,000 tons of PM.

[90] 79FR23417, 28APR2014.

6.3.e. Nonroad Diesel Emissions Program (40 CFR Part 89)

The EPA adopted standards for emissions of NO_x, hydrocarbons, and carbon monoxide (CO) from several groups of non-road engines, including industrial spark-ignition engines and recreational non-road vehicles. Industrial spark-ignition engines power commercial and industrial applications and include forklifts, electric generators, airport baggage transport vehicles, and a variety of farm and construction applications. Non-road recreational vehicles include snowmobiles, off-highway motorcycles, and all-terrain vehicles. These rules were initially effective in 2004 and were fully phased in by 2012.

The non-road diesel rule sets standards that reduced emissions by more than 90 percent from non-road diesel equipment.

7.0. Conclusion

The Final TSD[91] for the CSAPR Update Rule focused on emissions and control measures for sources of NO_x other than EGUs. The TSD evaluated whether non-EGU emissions could be reduced in a cost-effective manner for specific categories, assessed available NO_x emission reductions from such categories, and presented the category-by-category emissions reduction potential. Based on contractor review of the CoST results, EPA identified 30 sources in West Virginia with potential cost-effective controls. Based on their preliminary analysis EPA determined there were potential cost-effective reductions of 793 tons/O_3 season for sources in the > 100 tons per year reduction group and 334 tons/O_3 season for sources in the 25 to 100 tons per year reduction group.

In the review of EPA's preliminary analysis of the 30 sources identified by EPA in the CSAPR Update TSD, West Virginia identified permanent non-EGU NO_x emissions reductions from 2011 emissions of 1,842 tons resulting from 10 source shutdowns and expected reductions of 1,012 tons due to the required shutdown of five sources by December 31, 2021.

[91] EPA, *Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD*, August 2016.

West Virginia's SIP approved permitting program ensures that new or modified sources will not cause or contribute to a violation of the NAAQS. West Virginia's permitting program requires the construction or modification of a source with the potential to emit more than six pounds per hour and 10 tons per year, or greater than 144 pounds per calendar day, of a regulated pollutant which includes NO_x, to obtain a permit under state rule 45CSR13 (minor source NSR). 45CSR13 §5.7 requires the Secretary to consider whether the "proposed construction, modification, registration or relocation will violate applicable emission standards, will interfere with attainment or maintenance of an applicable ambient air quality standard, cause or contribute to a violation of an applicable air quality increment, or be inconsistent with the intent and purpose of this rule or W. Va. Code § 22-5-1, et seq., in which case the Secretary shall issue an order denying such construction, modification, relocation and operation". 45CSR13 is the mechanism under which NSPS, NESHAPs, including MACT standards, are applied to a given minor source. Reductions from existing sources subject to NSPS and NESHAP are assumed to be equivalent to RACT/RACM.

The construction or modification of a major source requires a permit under state rules 45CSR14 (PSD) and/or 45CSR19 (nonattainment NSR). 45CSR14 requires the application of BACT and 45CSR19 requires the application of LAER, which are both more stringent than RACT/RACM.

Based on this analysis, West Virginia concludes that, upon incorporation of 45CSR43 into the SIP, no additional highly cost-effective reductions are available for the 2015 ozone NAAQS. The State of West Virginia is requesting that the EPA conditionally approve the *West Virginia Supplement to the State Implementation Plan Revision for Clean Air Act §110(a)(2)(A)-(M) Requirements for the 2015 8-Hour Ozone NAAQS with the Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I)* as a SIP revision, to address the state's obligations under the CAA Section 110(a)(2)(D)(i)(I) (i.e., "Good Neighbor") requirements, contingent upon the State's adoption of the emission reduction requirement pursuant to 40 CFR 97 subpart EEEEE, the CSAPR NO_x Ozone Season Group 2 Trading Program as described above (Section 2.0).

Response to Comments

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West Virginia Supplement to the State Implementation Plan Revision for Clean Air Act §110(a)(2)(A) - (M) Requirements for the 2015 8-Hour Ozone NAAQS with the Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I)

RESPONSE TO COMMENTS

On September 7, 2018, the West Virginia Department of Environmental Protection (DEP), Division of Air Quality (DAQ) commenced the public comment period on the proposed *West Virginia Supplement to the State Implementation Plan Revision for Clean Air Act §110(a)(2)(A) - (M) Requirements for 2015 8-Hour Ozone NAAQS with the Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I).* A public hearing was held at 6:00 PM on October 9, 2018, to accept oral comments on the proposed SIP revision, in the Dolly Sods Conference Room of the West Virginia DEP Headquarters Building located at 601 57th Street, SE in Charleston, WV. No oral comments were received. Written comments were accepted through the end of the public comment period, which closed at the conclusion of the public hearing. Written comments were received from the Midwest Ozone Group (MOG), the New York State Department of Environmental Conservation, and the Maryland Department of the Environment. DAQ addresses the written comments below.

I. COMMENTER: Midwest Ozone Group

Comment 1:

> **MOG supports the conclusion that no additional emissions reductions beyond existing and planned controls are necessary to comply with CAA Section 110(a)(2)(D)(i)(I).**
>
> The issue being addressed in the proposed Good Neighbor SIP, is whether these existing measures also satisfy the Good Neighbor requirements of Section 110(a)(2)(D)(i)(I) which prohibits a state from significantly contributing to nonattainment or interfering with maintenance of any primary or secondary NAAQS in another state.
>
> As was identified in the March 27, 2018, memorandum of EPA's Peter Tsirigotis[1], a four-step process is to be used by EPA to address Good Neighbor requirements. These four steps are:
>
> > Step 1: identify downwind air quality problems;
> >
> > Step 2: identify upwind states that contribute enough to those downwind air quality problems to warrant further review and analysis;

[1] *Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I)*, prepared by Peter Tsirigotis, March 27, 2018. https://www.epa.gov/airmarkets/march-2018-memo-and-supplemental-information-regarding-interstate-transport-sips-2015.

Step 3: identify the emissions reductions necessary to prevent an identified upwind state from contributing significantly to those downwind air quality problems; and

Step 4: adopt permanent and enforceable measure needed to achieve those emission reductions.

Central to DEP's proposal is its reliance on the 4km modeling work performed by Alpine Geophysics on behalf of the MOG. With respect to the Alpine Geophysics modeling, DEP notes on page 12 of its proposal:

West Virginia considered the various modeling studies and concluded the "Good Neighbor" Modeling by Alpine (June 2018), using the nested 4-km grid is the most appropriate, robust modeling available to identify the nonattainment and maintenance receptors to which West Virginia significantly contributes.

Among the additional factors addressed by the DEP in the proposal that go beyond modeling are the following:

- HYSPLIT Back-Trajectories;
- Downwind air quality context;
- downward emission trends in West Virginia;
- an assessment of EGU and no-EGU controls; and
- the need to consider international emissions.

The ultimate conclusion by DEP as stated on page 49 of its proposal is as follows:

West Virginia concludes that, upon incorporation of 45CSR43 into the SIP, no additional highly cost-effective reductions are available for the 2015 ozone NAAQS. The State of West Virginia is requesting that the EPA conditionally approve the West Virginia Supplement to the State Implementation Plan Revision for Clean Air Act §110(a)(2)(A)-(M) Requirements for the 2015 8-Hour Ozone NAAQS with the Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I) as a SIP revision, to address the state's obligations under the CAA Section 110(a)(2)(D)(i)(I) (i.e., "Good Neighbor" requirements, contingent upon the State's adoption of the emission reduction requirement pursuant to 40 CFR 97 subpart EEEEE, the CSAPR NO_x Ozone Season Group 2 Trading Program as described above (Section 2.0).

MOG not only supports DEP' s conclusion but will point out in these comments that such a conclusion is very conservative. MOG will offer in these comments additional data and comments that we believe will further support the conservative nature of the conclusion that no further emission requirements are necessary to satisfy the requirements of CAA section 110(a)(2)(D)(i)(I).

Response 1:

No response required.

Comment 2:

Independent State-of-the-Art Modeling by Alpine Geophysics on behalf of MOG shows that all monitors in the Northeast are at or near attainment of the 2015 ozone NAAQS in 2023.

Beyond the modeling work performed by EPA and LADCO, DEP has relied upon modeling work performed by Alpine Geophysics on behalf of MOG. This modeling by Alpine Geophysics was undertaken to address the concerns about whether modeling with a 12 km grid utilized by EPA is sufficiently refined to address the land/water interface issues. Accordingly, MOG undertook to run EPA's modeling platform at a finer 4km grid. A copy of the Technical Support Document[2] containing these results of this modeling is set forth as an attachment to the proposal being advanced by DEP.

Modeling of this type using a finer grid is specifically recommended under existing EPA guidance which states:

> *The use of grid resolution finer than 12 km would generally be more appropriate for areas with a combination of complex meteorology, strong gradients in emissions sources, and/or land-water interfaces in or near the nonattainment area(s).[3] Emphasis added.*

Accordingly, when state-of-the-art modeling is used to assess air quality downwind of West Virginia at the appropriate attainment date, all monitors are in attainment except for a single monitor at Harford Maryland with a MOG predicted average DV in 2023 of only 71.1 ppb (0.2 ppb above the concentration that would define attainment of the 2015 ozone NAAQS). Remarkably, LADCO's predicted average design value for this monitor using its "water" data is 71.0 ppb (0.1 ppb above the concentration that would show attainment of the 2015 ozone NAAQS), LADCO's "no water" data show this monitor to have an average design value of 70.5 ppb (shows attainment of the 2015 ozone NAAQS) and EPA's predicted average design value for the same monitor is 70.9 ppb (also shows attainment of the 2015 ozone NAAQS). It is clear from these various modeling results that the Harford monitor is at or near attainment of the 2015 ozone NAAQS.

Additionally, the Alpine Geophysics prediction for MOG shows that the Sheboygan monitor could be expected to have an average design value of 71.7 ppb. While this value shows this monitor to be in nonattainment, the value predicted in the MOG modeling is lower than the average design value predicted by EPA which is 72.8 ppb. It is worth noting that when the average design value for this monitor was determined by LADCO in its

[2] http://www.midwestozonegroup.com/files/FinalTSD-OzoneModelingSupportingGNSIPObligationsJune2018.pdf
[3] http://www3.epa.gov/scram001/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

modeling[4], a value of 70.5 ppb was obtained putting it into attainment of the 2015 ozone NAAQS. As will be discussed elsewhere in these comments, West Virginia is not linked to the Sheboygan monitor at a significance threshold of 1% or higher.

Even though there are modeling platforms that predict Harford to be in attainment of the 2015 ozone NAAQS, DEP conducted thoughtful and careful analysis of this monitor as part of its conservative demonstration that the West Virginia SIP contains adequate provisions to prevent sources and other types of emissions activities within the state from contributing significantly to nonattainment in any other state with respect to the 2015 ozone NAAQS.

Response 2:

No response required.

Comment 3:

Emission trends in the CSAPR Update region have been decreasing for many years and will continue to do so in the immediate future adding assurance that there will be no interference with any downwind maintenance areas.

Beyond the data provided by DEP on the reduction on NOx emissions that have occurred in West Virginia in recent years and are expected to continue to decline in the future, we note that NOx emissions across the CSAPR region have also been dramatically reduced in recent years. These NOx emission reductions will continue as the result of "on-the-books" regulatory programs already required by states on their own sources, "on-the-way" regulatory programs that have already been identified by state regulatory agencies as efforts that they must undertake as well as from the effectiveness of a variety of EPA programs including the CSAPR Update Rule.

Set forth below are tables developed from EPA modeling platform summaries[5] illustrating the estimated total anthropogenic emission reduction and EGU-only emission reduction in the several eastern states. As can be seen in the first table, total annual anthropogenic NOx emissions are predicted to decline by 29% between 2011 and 2017 over the CSAPR domain and by 43% (an additional 1.24 million tons) between 2011 and 2023.

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[4] https://protect-us.mimecast.com/s/o6GECG690VcJq2gwcK5t5z?domain=ladco.org
[5] 83 Fed. Reg. 7716 (February 22, 2018).

Final CSAPR Update Modeling Platform Anthropogenic NOx Emissions (Annual Tons).

	Annual Anthropogenic NOx Emissions (Tons)			Emissions Delta		Emissions Delta	
State	**2011**	**2017**	**2023**	**Tons**	**%**	**Tons**	**%**
Alabama	359,797	220,260	184,429	139,537	-39%	175,368	-49%
Arkansas	232,185	168,909	132,148	63,276	-27%	100,037	-43%
Illinois	506,607	354,086	293,450	152,521	-30%	213,156	-42%
Indiana	444,421	317,558	243,954	126,863	-29%	200,467	-45%
Iowa	240,028	163,126	124,650	76,901	-32%	115,377	-48%
Kansas	341,575	270,171	172,954	71,404	-21%	168,621	-49%
Kentucky	327,403	224,098	171,194	103,305	-32%	156,209	-48%
Louisiana	535,339	410,036	373,849	125,303	-23%	161,490	-30%
Maryland	165,550	108,186	88,383	57,364	-35%	77,167	-47%
Michigan	443,936	296,009	228,242	147,927	-33%	215,694	-49%
Mississippi	205,800	128,510	105,941	77,290	-38%	99,859	-49%
Missouri	376,256	237,246	192,990	139,010	-37%	183,266	-49%
New Jersey	191,035	127,246	101,659	63,789	-33%	89,376	-47%
New York	388,350	264,653	230,001	123,696	-32%	158,349	-41%
Ohio	546,547	358,107	252,828	188,439	-34%	293,719	-54%
Oklahoma	427,278	308,622	255,341	118,656	-28%	171,937	-40%
Pennsylvania	562,366	405,312	293,048	157,054	-28%	269,318	-48%
Tennessee	322,578	209,873	160,166	112,705	-35%	162,411	-50%
Texas	1,277,432	1,042,256	869,949	235,176	-18%	407,482	-32%
Virginia	313,848	199,696	161,677	114,152	-36%	152,171	-48%
West Virginia	174,219	160,102	136,333	14,117	-8%	37,886	-22%
Wisconsin	268,715	178,927	140,827	89,788	-33%	127,888	-48%
CSAPR States	**8,651,264**	**6,152,990**	**4,914,012**	**2,498,274**	**-29%**	**3,737,252**	**-43%**

When looking exclusively at the estimated EGU emissions used in these modeling platforms, even greater percent decrease is noted between 2011 and 2017 (40% reduction CSAPR-domain wide) and between 2011 and 2023 (51% reduction). These reductions are particularly significant since the CSAPR Update Rule focus exclusively on EGU sources.

Final CSAPR Update Modeling Platform EGU NOx Emissions (Annual Tons).

	Annual EGU			Emissions Delta		Emissions Delta	
State	**2011**	**2017**	**2023**	**Tons**	**%**	**Tons**	**%**
Alabama	64,008	23,207	24,619	40,800	-64%	39,388	-62%
Arkansas	38,878	24,103	17,185	14,775	-38%	21,693	-56%
Illinois	73,689	31,132	30,764	42,557	-58%	42,926	-58%
Indiana	119,388	89,739	63,397	29,649	-25%	55,991	-47%
Iowa	39,712	26,041	20,122	13,671	-34%	19,590	-49%
Kansas	43,405	25,104	14,623	18,301	-42%	28,781	-66%
Kentucky	92,279	57,520	42,236	34,759	-38%	50,043	-54%
Louisiana	52,010	19,271	46,309	32,740	-63%	5,701	-11%
Maryland	19,774	6,001	9,720	13,773	-70%	10,054	-51%
Michigan	77,893	52,829	33,708	25,064	-32%	44,186	-57%
Mississippi	28,039	14,759	13,944	13,280	-47%	14,095	-50%
Missouri	66,170	38,064	44,905	28,106	-42%	21,265	-32%
New Jersey	7,241	2,918	5,222	4,323	-60%	2,019	-28%
New York	27,379	10,191	16,256	17,188	-63%	11,123	-41%
Ohio	104,203	68,477	37,573	35,727	-34%	66,630	-64%
Oklahoma	80,936	32,366	21,337	48,570	-60%	59,599	-74%
Pennsylvania	153,563	95,828	49,131	57,735	-38%	104,432	-68%
Tennessee	27,000	14,798	11,557	12,201	-45%	15,442	-57%
Texas	148,473	112,670	103,675	35,804	-24%	44,799	-30%
Virginia	40,141	7,589	20,150	32,553	-81%	19,992	-50%
West Virginia	56,620	63,485	46,324	(6,865)	12%	10,296	-18%
Wisconsin	31,881	15,374	15,419	16,507	-52%	16,462	-52%
CSAPR States	**1,392,682**	**831,466**	**688,175**	**561,216**	**-40%**	**704,508**	**-51%**

Importantly, these estimated 2017 emissions used in the EPA modeling are inflated as compared to the actual 2017 CEM-reported EGU emissions. As can be seen in the following table, when the CSAPR-modeled 2017 annual EGU emissions are compared to the actual CEM-reported 2017 annual EGU emissions, it becomes apparent that there is a significant domain-wide overestimation (129,000 annual tons NOx) of the predicted emissions from this source category. The modeled values from state-to-state vary between over- and under-estimated, domain-wide, CEM-reported annual NOx ranging from 158% overestimation (2017 actual emissions are 61% of modeled emissions) for Pennsylvania to 54% underestimation (2017 actual emissions are 118% of modeled emissions) for Virginia with a domain-wide overestimation of 18% (129,553 tons) of annual NOx emissions from EGUs.

Final CSAPR Update Modeling Platform EGU NOx Emissions Compared to CEM-Reported EGU NOx Emissions (Annual Tons).

	Annual EGU NOx Emissions			Emissions Delta 2017 CEM-2017 EPA	
State	**2011 EPA**	**2017 EPA**	**2017 CEM**	**Tons**	**%**
Alabama	64,008	23,207	24,085	878	4%
Arkansas	38,878	24,103	27,500	3,397	14%
Illinois	73,689	31,132	33,066	1,934	6%
Indiana	119,388	89,739	63,421	(26,318)	-29%
Iowa	39,712	26,041	22,564	(3,477)	-13%
Kansas	43,405	25,104	13,032	(12,072)	-48%
Kentucky	92,279	57,520	46,053	(11,467)	-20%
Louisiana	52,010	19,271	29,249	9,978	52%
Maryland	19,774	6,001	6,112	111	2%
Michigan	77,893	52,829	37,739	(15,090)	-29%
Mississippi	28,039	14,759	12,162	(2,597)	-18%
Missouri	66,170	38,064	49,692	11,628	31%
New Jersey	7,241	2,918	3,443	524	18%
New York	27,379	10,191	11,253	1,062	10%
Ohio	104,203	68,477	57,039	(11,438)	-17%
Oklahoma	80,936	32,366	21,761	(10,606)	-33%
Pennsylvania	153,563	95,828	37,148	(58,680)	-61%
Tennessee	27,000	14,798	18,201	3,402	23%
Texas	148,473	112,670	109,914	(2,756)	-2%
Virginia	40,141	7,589	16,545	8,957	118%
West Virginia	56,620	63,485	44,079	(19,406)	-31%
Wisconsin	31,881	15,374	17,856	2,482	16%
CSAPR States	**1,392,682**	**831,466**	**701,913**	**(129,553)**	**-16%**

These data conclusively demonstrate that annual anthropogenic NOx emissions in the CSAPR Update region are projected to be significantly reduced through 2017, with overall actual EGU 2017 emissions being even lower than these estimates. Emission trends for these states have been decreasing for many years and will continue to decrease through at least 2023 as the result of nothing more than on-the-books controls.

Response 3:

No response required.

Comment 4:

Had current air modeling projections taken into account the significant emission reduction programs that are legally mandated to occur prior to 2023, even better air quality would have been demonstrated.

The State of Maryland has identified[6] nine such programs that have been recommended by the OTC for implementation by its member states to reduce both NOx and VOC. These programs (set out below) have the potential to reduce a total of nearly 27,000 tons of ozone season NOx and 22,000 tons of ozone season VOC emission reductions.

NOx and VOC Reduction Programs

OTC Model Control Measures	Regional Reductions (tons per year)	Regional Reductions (tons per day)
Aftermarket Catalysts	14,983 (NOx) 3,390 (VOC)	41 (NOx) 9 (VOC)
On-Road Idling	19,716 (NOx) 4,067 (VOC)	54 (NOx) 11 (VOC)
Nonroad Idling	16,892 (NOx) 2,460 (VOC)	46 (NOx) 7 (VOC)
Heavy Duty I & M	9,326 (NOx)	25 (NOx)
Enhanced SMARTWAY	2.5%	
Ultra-Low NOx Burners	3,669 (NOx)	10 (NOx)
Consumer Products	9,729 (VOC)	26 (VOC)
AIM	26,506 (VOC)	72 (VOC)
Auto Coatings	7,711 (VOC)	21 (VOC)

Most recently, Maryland's 75 ppb Ozone Transport SIP dated July 25, 2018[7], confirms the additional emissions-reduction measures that Maryland has applied to such NOx sources as mobile sources, and industrial sources as well as several sources of VOCs. In addition, Maryland lists a series of "Voluntary/Innovative Control Measures" that it identifies as assisting in "the overall clean air goals in Maryland" although these measures have not been quantified.

[6] http://midwestozonegroup.com/files/MOG_May_7_Final__050515.pptx

[7] https://mde.maryland.gov/programs/Air/AirQualityPlanning/Documents/OzoneTransportSIP_2008/Proposed_MD0.075ppmOzoneTransportSIP%20.pdf

There are several on-the-books NOx emission reductions programs that have not yet been included in the current modeling efforts related to 2023 ozone predictions. These programs, both individually and collectively, will have a material effect on predicted air quality, particularly in the East and in combination with other local control programs discussed elsewhere in these comments will almost certainly improve ozone predictions in 2023. Accounting for the programs and the related emission reductions at this time offers additional support for DEP's conclusion that on-the-books control programs are all that is needed to address the 2015 ozone NAAQS.

Response 4:

DAQ agrees that the inclusion of NO_x emission reduction programs that have not yet been included in the current modeling efforts related to 2023 ozone predictions will influence predicted air quality and almost certainly improve ozone predictions for 2023.

Comment 5:

Controls on local sources must be addressed first before any additional emission reductions can be imposed on sources in West Virginia.

DEP very properly has undertaken a review of monitors in each of Harford Maryland and the Philadelphia-Wilmington-Atlantic City area. This analysis notes the significant impact of mobile sources including the very large amount of vehicle miles traveled.

When an area is measuring nonattainment of a NAAQS, as is the case with the areas linked to West Virginia, the Clean Air Act (CAA) requires that the effects and benefits of local controls on all source sectors be considered first, prior to pursuing controls of sources in upwind states. CAA §107(a) states that "[e]ach State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State." In addition, CAA §110(a)(1) requires that a state SIP "provides for implementation, maintenance, and enforcement" of the NAAQS "in each air quality control region . . . within such State." Moreover, by operation of law, additional planning and control requirements are applicable to areas that are designated to be in nonattainment.

This issue is important because upwind states must be confident this has occurred as they prepare to submit approvable Good Neighbor state implementation plans to address the 2015 ozone NAAQS. EPA's current interstate transport modeling platforms fails to incorporate local emission reductions programs that are required to improve ambient ozone concentration by 2023. Only through a full assessment of these local emissions reductions can EPA determine whether there are any bases for the imposition of additional emissions controls in upwind states. This is because additional control requirements in upwind states can only be legally imposed if, after consideration of local controls, there is a continuing nonattainment issue in downwind areas.[8]

[8] *EME Homer et.al, v EPA*, 134 S. Ct. at 1608

The CAA addresses the affirmative obligations of the states to meet the deadlines for submittal and implementation of state implementation plans designed to specifically address their degree of nonattainment designation. Review of Section 172(c)(1) of the CAA provides that State Implementation Plans (SIPs) for nonattainment areas shall include "reasonably available control measures", including "reasonably available control technology" (RACT), for existing sources of emissions. Section 182(a)(2)(A) requires that for Marginal Ozone nonattainment areas, states shall revise their SIPs to include RACT. Section 182(b)(2)(A) of the CAA requires that for Moderate Ozone nonattainment areas, states must revise their SIPs to include RACT for each category of VOC sources covered by a CTG document issued between November 15, 1990, and the date of attainment. CAA section 182(c) through (e) applies this requirement to States with ozone nonattainment areas classified as Serious, Severe and Extreme.

The CAA also imposes the same requirement on States in ozone transport regions (OTR). Specifically, CAA Section 184(b) provides that a state in the Ozone Transport Region (OTR) must revise their SIPs to implement RACT with respect to all sources of VOCs in the state covered by a CTG issues before or after November 15, 1990. CAA Section 184(a) establishes a single OTR comprised of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and the Consolidated Metropolitan Statistical Area (CMSA) that includes the District of Columbia.

MOG's has previously documented that downwind states have many options to reduce their own NOx and VOC contributions.[9]

Maryland has already recognized the need to adopt and implement programs to control emissions from local sources in Maryland and the Northeast. For example, as recently as December 2017[10], the Maryland Department of the Environment identified a series of local controls that it believed would further reduce ozone concentration in the Northeast. Specifically, Maryland has urged that "even deeper NOx and VOC reductions" should be taken in areas "just upwind of OTC problem areas" - "Mostly upwind of Connecticut right now – A little Maryland" Among the new control programs called for by Maryland are such local control programs as:

- New rules by New York on small distributed generators;
- New Ozone Transport Commission initiatives involving idle reduction;
- Reducing mobile source NOx through such measures as aftermarket catalysts and electric and other zero emission vehicles;

[9] Alpine Geophysics "Relative Impact of State and Source Category NOx Emissions on Downwind Monitors Identified Using the 2017 Cross State Air Pollution Rule Modeling Platform", Alpine Geophysics, LLC, January, 2016. http://www.midwestozonegroup.com/files/RelativeImpactofStateandSourceCategoryNOxEmissionsonDownwindMonitor sIdentifiedUsingthe2017CrossStateAirPollutionRuleModelingPlatform.pdf .
[10] See: "A Path Forward for Reducing Ozone in Maryland and the Mid-Atlantic States, Driving With Science," Tad Aburn, Air Director, MDE, December 11, 2017 (slides 60 and 61). http://midwestozonegroup.com/files/Final_Path_Forward_2017_AQCAC_121117.pptx

- Maryland RACT rules on municipal waste combustors; and
- Maryland's Idle Free Initiative.

In addition, it is significant that the Connecticut Department of Energy and Environmental Protection, Bureau of Air Management has reached the conclusion[11] that attainment in the Northeast cannot be achieved without addressing HEDD units in each of the states of New York, New Jersey and Connecticut as is illustrated by the following statement:

> *To reach attainment in the NY-NJ-CT nonattainment area, HEDD emissions need to be addressed in all three state portions of the area.*
>
> ...
>
> *In sum, to address Connecticut's ozone nonattainment, and Connecticut's good neighbor obligations to downwind states, peak day emissions must be reduced. Thus, "beyond RACT" measures may be warranted for HEDD units on HEDD to meet the state obligation of attainment of the ozone NAAQS as expeditiously as possible.*

The New York State Department of Environmental Conservation has actually conducted an air quality assessment of the regulation of small generators in which it concluded[12] that ozone concentrations could be reduced by as much as 4.8 ppb – an extremely significant improvement in ozone air quality in a portion of the East that has historically had high ozone concentrations.

Significantly, at the OTC/MANE-VU Joint Committee Meeting held on September 21, 2018, the Stationary and Area Sources ("SAS") Committee conducted an analysis of the operation of simple cycle combustion turbine EGUs that operate on HEDD days and reached several conclusions about the merit of imposing additional NOx controls on these units. Based on an analysis of New Jersey, the OTC reached the following conclusions that appear on slide 15 of the presentation[13]:

- Simple cycle turbines operate on high ozone days.
- Control of NOx or replacement of old units is cost effective based on ozone day benefit.
- There are 200 simple cycle units in OTR with very high NOx emissions – approximately 10 times most boiler NOx rates and greater than 100 times most combined cycle NOx rates.

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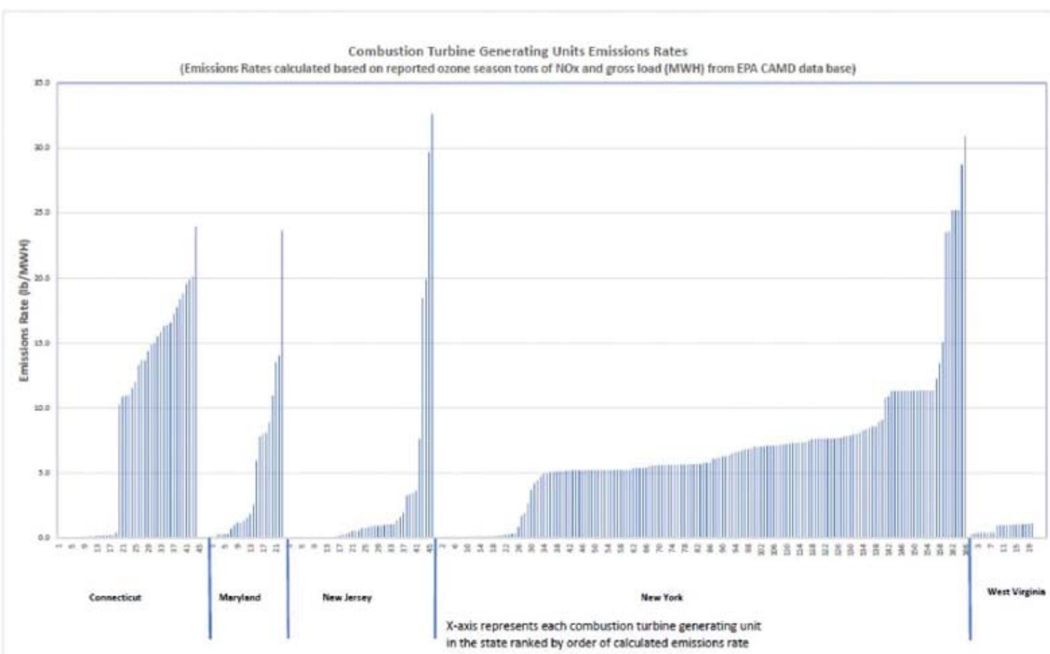
[11] "Reasonably Available Control Technology Analysis under the 2008 8-Hour Ozone National Ambient Air Quality Standard", dated July 17, 2014, http://www.ct.gov/deep/lib/deep/air/ozone/ozoneplanningefforts/ract_2008_naaqs/2014-07-17_-ct final ract sip revision.pdf

[12] "Background, High Electric Demand Day (HEDD) Initiative", New York Department of Environmental Conservation, undated but presumed to be in 2017. http://midwestozonegroup.com/files/New_York_Peakers.pptx

[13] OTC/MANE-VU Stationary and Area Sources Committee presentation, September 21, 2018. http://www.midwestozonegroup.com/files/MOG OTC SAS Public 09212018.pdf

- Simple cycle units significantly increase, and can dominate EGU NOx emissions on high ozone days.
- Approximately 40% of simple cycle units have low NOx rates, showing that much lower NOx from simple cycle units is readily achievable and is already occurring.

From the chart set out below you will note that states within the OTC and specifically New York, New Jersey, Connecticut and Maryland have a much greater reliance on the use of simple cycle combustion turbines with very high emissions rates than is the case with West Virginia. In fact, for the 2017 ozone season, only 20 combustion turbine electric generating units in West Virginia reported operations operating at emissions rates from 0.3 to 1.1 lb/MWH while there were 175 units in CT, MD, NJ, and NY that operated at emissions rates of 5.0 lb/MWH or greater and 59 units operating at 10.0 lb/MWH or greater. While MOG has not reviewed (or seen) the basis for the OTC conclusion that control or replacement of "old" units is "cost effective," such a strategy may indeed be cost-effective within the OTC, but would not be cost-effective for West Virginia or other states that do not have the same degree of reliance on high emitting combustion turbines as apparently is the case in OTC states. This comparison between units in these OTC states and those located in West Virginia is illustrated in the following chart.



Given the significance of the need for and cost effectiveness of local controls in the states of New York, New Jersey, Connecticut and Maryland, MOG urges that DEP emphasize that no further emission requirements are necessary from West Virginia to satisfy the requirements of CAA section 110(a)(2)(D)(i)(I) unless and until additional local controls in these Northeast states are satisfactorily addressed.

Response 5:

While DAQ agrees with MOG that additional local controls in New York, New Jersey, Connecticut, and Maryland have not satisfactorily been addressed, the DEP demonstration that no additional cost effective controls by West Virginia are required to comply with CAA §110(a)(2)(D)(i)(I) is not contingent on local controls by these Northeast states.

As DAQ noted in the May 15, 2017 comments on EPA's *Response to December 9, 2013, Clean Air Act Section 176A Petition from Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island and Vermont*, Ozone Transport Region (OTR) states are not fully implementing required OTR and other ozone controls.

The Ozone Transport Commission website (www.otcair.org) identifies multiple states in the OTR that have not yet taken action on promulgating regulations based on OTC mobile source model rules and OTC 2009-2014 model rules. No action had been taken by DE, DC, MA, NH, NJ, PA or VA on the catalytic converter mobile source model rule, or by DE, NY, PA, VA or VT on the nonroad anti-idling model rule (as of 10/02/16, the most recent data reported). And no action had been taken by ME, MA, RI, VT or VA on any of the seven the OTC 2009-2014 model rules (as of 4/25/17, the most recent data available).

EPA found that 15 states and the District of Columbia failed to submit SIP revisions to satisfy certain requirements for the 2008 ozone NAAQS that apply to nonattainment areas and/or states in the OTR on February 3, 2017 [82 FR 9158]. Upon promulgation of the 2008 ozone NAAQS, states in the OTR were required to submit a SIP revision for RACT. The only state in the OTR not included in the finding was New York.

Comment 6:

Consideration of international emissions also adds support to the conclusion that there is no further obligation to reduce emissions.

As an integral part of the consideration of this proposal, MOG supports consideration of the impact of natural and manmade international emissions on the ultimate question of whether the downwind monitors can be properly considered either nonattainment or maintenance monitors.

The CAA addresses international emissions directly. Section 179(B)(a) states that

(a) Implementation plans and revisions

Notwithstanding any other provision of law, an implementation plan or plan revision required under this chapter shall be approved by the Administrator if—

> *(1) such plan or revision meets all the requirements applicable to it under the [14] chapter other than a requirement that such plan or revision demonstrate attainment and maintenance of the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this chapter, or in a regulation promulgated under such provision, and*
> *(2) the submitting State establishes to the satisfaction of the Administrator that the implementation plan of such State would be adequate to attain and maintain the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this chapter, or in a regulation promulgated under such provision, but for emissions emanating from outside of the United States.*

In addition, addressing international emissions is particularly important to upwind states as they implement the requirements of CAA section 110(a)(2)(D)(i)(I).

The U.S. Supreme Court has ruled that it is essential that Good Neighbor states be required to eliminate only those amounts of pollutants that contribute to the nonattainment of NAAQS in downwind States. Specifically, the Supreme Court stated: "EPA cannot require a State to reduce its output of pollution by more than is necessary to achieve attainment in every downwind State. . ." EPA v. EME Homer City Generation, 134 S. Ct. 1584, 1608 (2014).

In addition, the D.C. Circuit has commented that ". . . the good neighbor provision requires upwind States to bear responsibility for their fair share of the mess in downwind States."[15] However, this "mess" seems to be related to international emissions for which upwind states and sources have no responsibility.

The D.C. Circuit has also stated "section 110(a)(2)(D)(i)(I) gives EPA no authority to force an upwind state to share the burden of reducing other upwind states' emissions," *North Carolina*, 531 F.3d at 921. Given this ruling by the Court it seems logical that the CAA would not require upwind states to offset downwind air-quality impacts attributable to other *countries*' emissions. Simply put, EPA over-controls a state if the state must continue reducing emissions *after* its linked receptors would attain in the absent of international emissions.

The Projected 2023 ozone design values (ppb) excluding the contribution from boundary condition, initial condition, Canadian and Mexican emission sources) shown below was prepared by Alpine Geophysics for MOG and depicts the projected 2023 8-hour ozone Design Values across the U.S. excluding the international emissions sector. The exclusion of international emissions was executed for all such emissions whether from international border areas or beyond. Note that this projection shows all monitors in the continental U.S. with a design value equal to or less than 56.6 ppb when international

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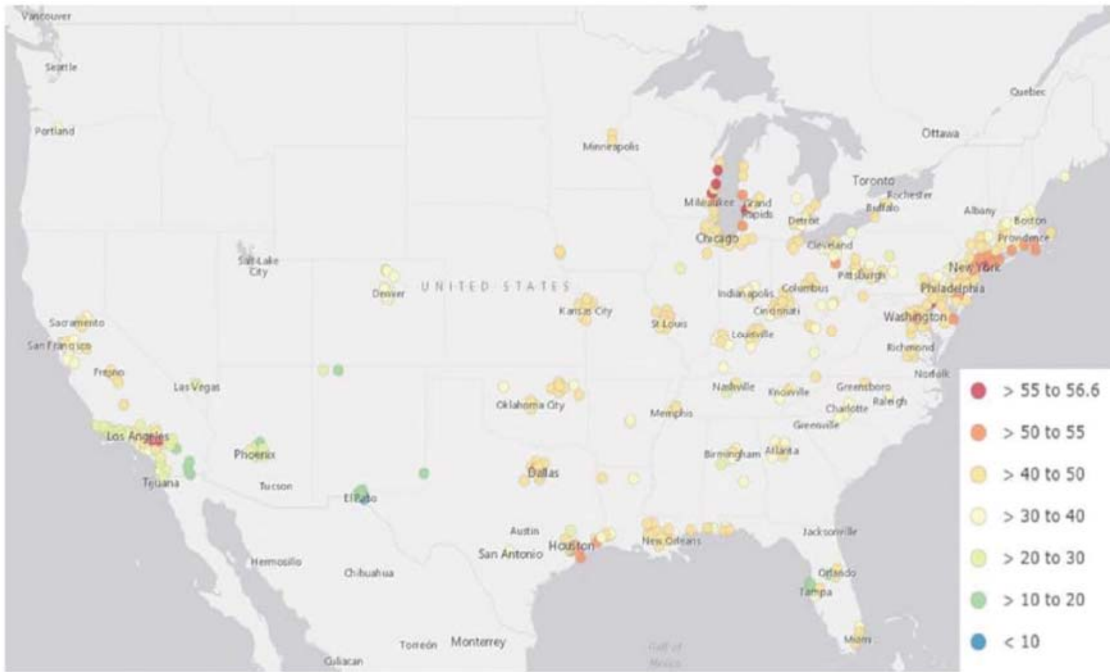
[14] So in original. Probably should be "this".
[15] *EME Homer City Generation, L.P. v EPA*, 696 F3.3d 7, 13 (D.C. Cir. 2012).

emissions are excluded. Modeling the U.S. emissions inventory projected to 2023 but without the impact of uncontrollable international emissions demonstrates that the CAA programs in the U.S. are performing as intended.

Projected 2023 ozone design values (ppb) excluding the contribution from boundary condition, initial condition, Canadian and Mexican emission sources

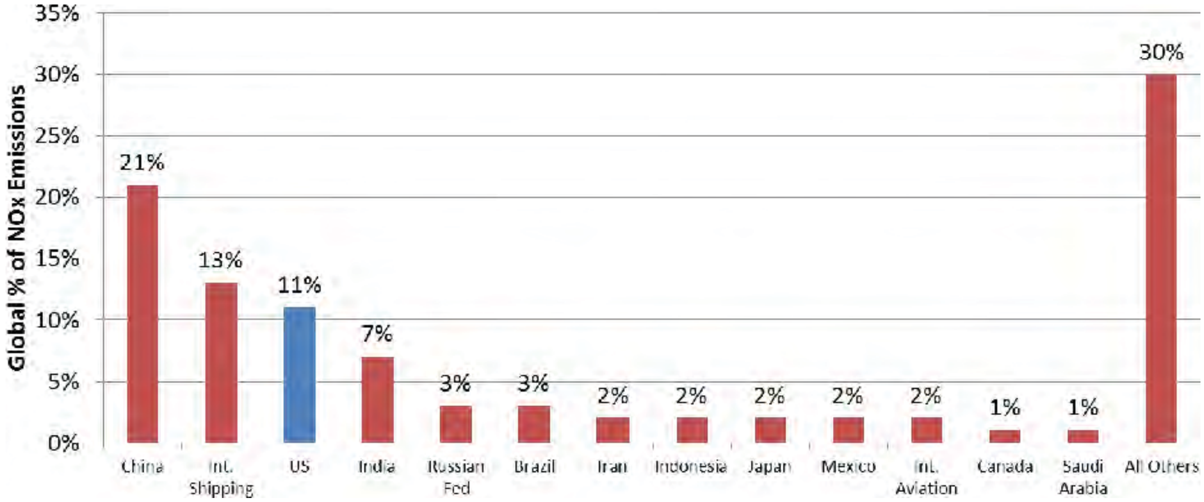


In addition to changing emissions resulting from growth and control in the continental U.S., EPA has identified updated projected emissions in both Canada and Mexico that have been integrated into the modeling platform used in this modeling.[16] EPA's modeling boundary conditions, however, have been held constant at 2011 levels. This is inconsistent with recent publications that indicate emissions from outside of the U.S., specifically contributing to international transport, are on the rise.[17]

In support of conclusion that boundary conditions are significantly impacted by international emissions, the following chart illustrates that 89% of the emissions being modeled to establish boundary conditions are related to international sources.[18]

[16] EPA-HQ-OAR-2016-0751-0009.
[17] Atmos. Chem. Phys., 17, 2943-2970 (2014).
[18] European Commission, Joint Research Centre (JRC)/PBL Netherlands Environmental Assessment Agency. Emission Database for Global Atmospheric Research (EDGAR), https://protect-us.mimecast.com/N-G6CERPwV13vMWjhNVQlp?domain=edgar.jrc.ec.europa.eu

Relative International NOx Emissions (% of Total) Used to Inform Global Model Boundary Concentrations of Ozone



There can be no doubt that international emissions have a significant impact on ozone measurements at all monitors related to this proposal. MOG supports the conclusion reached by DEP on pages 19 and 20 of its proposal that consideration of the Canada/Mexico component of the Alpine Geophysics modeling is all that is needed to bring the Harford Maryland monitor into attainment, and that consideration of international emissions would bring other monitors into attainment as well.

Response 6:

No response required.

Comment 7:

Mobile sources have the most significant impact on ozone concentrations at the problem monitors identified in the DEP's proposal.

As DEP points out in its proposal, it must be recognized that it is emissions from mobile, including both on-road and non-road, and local area sources that have the most significant impact on ozone concentrations and the problem monitors identified in this proposal.

EPA itself recently recognized the significance of mobile source emissions in preamble to its full remedy proposal. There EPA stated:

> *Mobile sources also account for a large share of the NOx emissions inventory (i.e., about 7.3 million tons per year in the 2011 base year, which represented more than 50% of continental U.S. NOx emissions), and the EPA recognizes*

that emissions reductions achieved from this sector as well can reduce transported ozone pollution. The EPA has national programs that serve to reduce emissions from all contributors to the mobile source inventory (i.e., projected NOx emissions reductions of about 4.7 million tons per year between the 2011 base year and the 2023 future analytical year). A detailed discussion of the EPA's mobile source emissions reduction programs can be found at www.epa.gov/otaq.

In light of the regional nature of ozone transport discussed herein, and given that NOx emissions from mobile sources are being addressed in separate national rules, in the CSAPR Update (as in previous regional ozone transport actions) the EPA relied on regional analysis and required regional ozone season NOx emissions reductions from EGUs to address interstate transport of ozone.

83 Federal Register 31918.

We strongly agree that mobile source emissions are the dominant contributor to predicted ozone concentrations across the nation. At the request of MOG, Alpine Geophysics has examined not only the relative contribution of mobile and local area sources to problem monitors but also how a small reduction in these emissions could bring about significant additional reductions in ozone concentrations.

The following table presents the annual mobile source NOx emission totals (onroad plus nonroad) for eastern states as presented in the final CSAPR update emission summary files[19]. As can been seen in this table, consistent with EPA's national assessment of mobile source emissions, annual mobile source NOx emissions in this region comprise 51%, 41%, and 33% of the annual anthropogenic emission totals for 2011, 2017, and 2023, respectively.

[19] ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/

Eastern State Mobile Source NOx Emissions (Annual Tons).

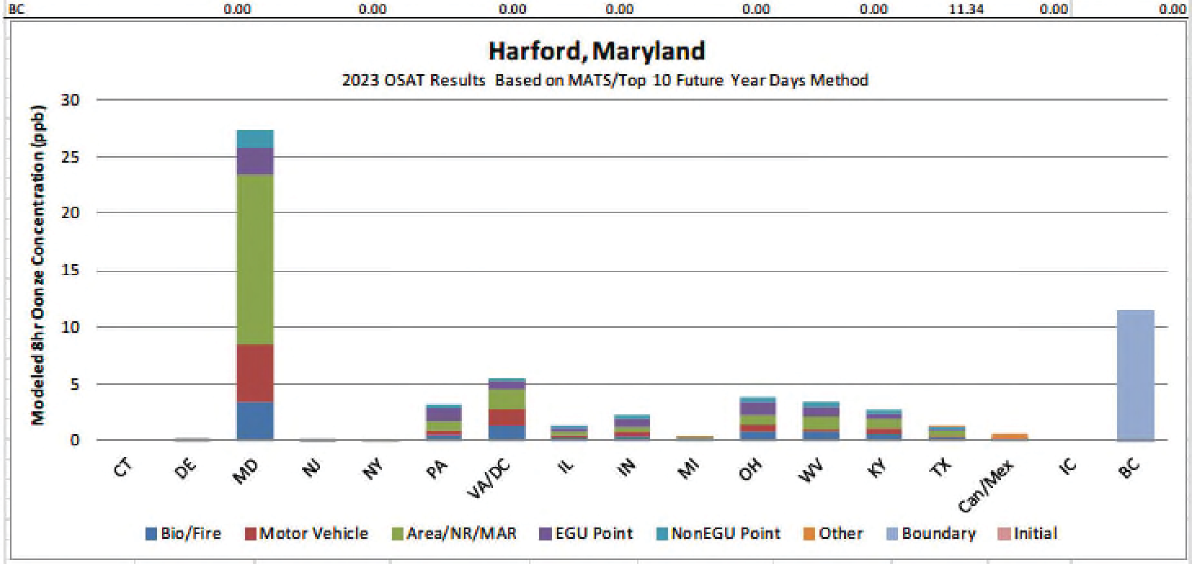
	Annual Anthropogenic NOx Emissions (Tons)			Annual Mobile Source NOx Emissions (Tons)			Mobile Sources as % of All Annual Emissions (%)		
State	**2011**	**2017**	**2023**	**2011**	**2017**	**2023**	**2011**	**2017**	**2023**
Alabama	359,797	220,260	184,429	175,473	88,094	54,104	49%	40%	29%
Arkansas	232,185	168,909	132,148	113,228	68,949	44,583	49%	41%	34%
Connecticut	72,906	46,787	37,758	49,662	26,954	18,718	68%	58%	50%
Delaware	29,513	18,301	14,511	17,788	10,387	6,819	60%	57%	47%
District of Columbia	9,404	6,052	4,569	7,073	3,947	2,500	75%	65%	55%
Florida	609,609	410,536	323,476	406,681	232,319	153,275	67%	57%	47%
Georgia	451,949	295,397	236,574	267,231	147,690	90,541	59%	50%	38%
Illinois	506,607	354,086	293,450	261,727	166,393	114,243	52%	47%	39%
Indiana	444,421	317,558	243,954	218,629	122,633	76,866	49%	39%	32%
Iowa	240,028	163,126	124,650	132,630	82,212	53,712	55%	50%	43%
Kansas	341,575	270,171	172,954	115,302	68,491	43,169	34%	25%	25%
Kentucky	327,403	224,098	171,194	139,866	80,244	50,633	43%	36%	30%
Louisiana	535,339	410,036	373,849	117,529	67,331	43,962	22%	16%	12%
Maine	59,838	42,918	32,186	34,933	18,380	12,240	58%	43%	38%
Maryland	165,550	108,186	88,383	103,227	60,164	38,922	62%	56%	44%
Massachusetts	136,998	90,998	73,082	83,398	45,031	30,508	61%	49%	42%
Michigan	443,936	296,009	228,242	250,483	135,434	88,828	56%	46%	39%
Minnesota	316,337	216,925	174,797	176,424	102,728	65,868	56%	47%	38%
Mississippi	205,800	128,510	105,941	108,198	57,751	34,561	53%	45%	33%
Missouri	376,256	237,246	192,990	219,505	122,137	75,380	58%	51%	39%
Nebraska	217,427	159,062	119,527	88,985	55,067	35,556	41%	35%	30%
New Hampshire	36,526	22,413	18,794	24,919	14,780	10,322	68%	66%	55%
New Jersey	191,035	127,246	101,659	133,073	75,538	51,231	70%	59%	50%
New York	388,350	264,653	230,001	224,454	130,023	92,171	58%	49%	40%
North Carolina	369,307	231,783	167,770	250,549	114,952	70,812	68%	50%	42%
North Dakota	163,867	135,009	128,864	57,289	37,071	23,956	35%	27%	19%
Ohio	546,547	358,107	252,828	311,896	168,799	100,058	57%	47%	40%
Oklahoma	427,278	308,622	255,341	139,550	79,830	50,525	33%	26%	20%
Pennsylvania	562,366	405,312	293,048	249,792	135,765	81,645	44%	33%	28%
Rhode Island	22,429	15,868	12,024	13,689	7,705	5,209	61%	49%	43%
South Carolina	210,489	134,436	104,777	132,361	73,359	44,886	63%	55%	43%
South Dakota	77,757	49,014	37,874	48,499	30,473	19,685	62%	62%	52%
Tennessee	322,578	209,873	160,166	213,748	122,738	77,135	66%	58%	48%
Texas	1,277,432	1,042,256	869,949	554,463	292,609	189,601	43%	28%	22%
Vermont	19,623	14,063	10,792	14,031	8,569	5,958	72%	61%	55%
Virginia	313,848	199,696	161,677	179,996	108,175	67,678	57%	54%	42%
West Virginia	174,219	160,102	136,333	48,294	27,487	17,494	28%	17%	13%
Wisconsin	268,715	178,927	140,827	167,753	100,814	67,201	62%	56%	48%
Eastern US Total	**11,455,243**	**8,042,552**	**6,411,386**	**5,852,332**	**3,291,024**	**2,110,555**	**51%**	**41%**	**33%**

Additionally, when source apportionment is applied to many of the problem monitors in the northeastern states, a distinct signal of mobile and local area source contribution to future year ozone concentrations is demonstrated.

Using the Harford, MD (240251001) monitor as an example and the 2023 4km modeling and source apportionment methods outlined elsewhere[20], it can be seen in the following table and figure that area, nonroad, marine/air/rail (MAR) and onroad mobile source emission from within Maryland itself dominate the relative contribution to projected nonattainment.

Relative Contribution of Source Regions and Categories to Harford, MD Monitor.

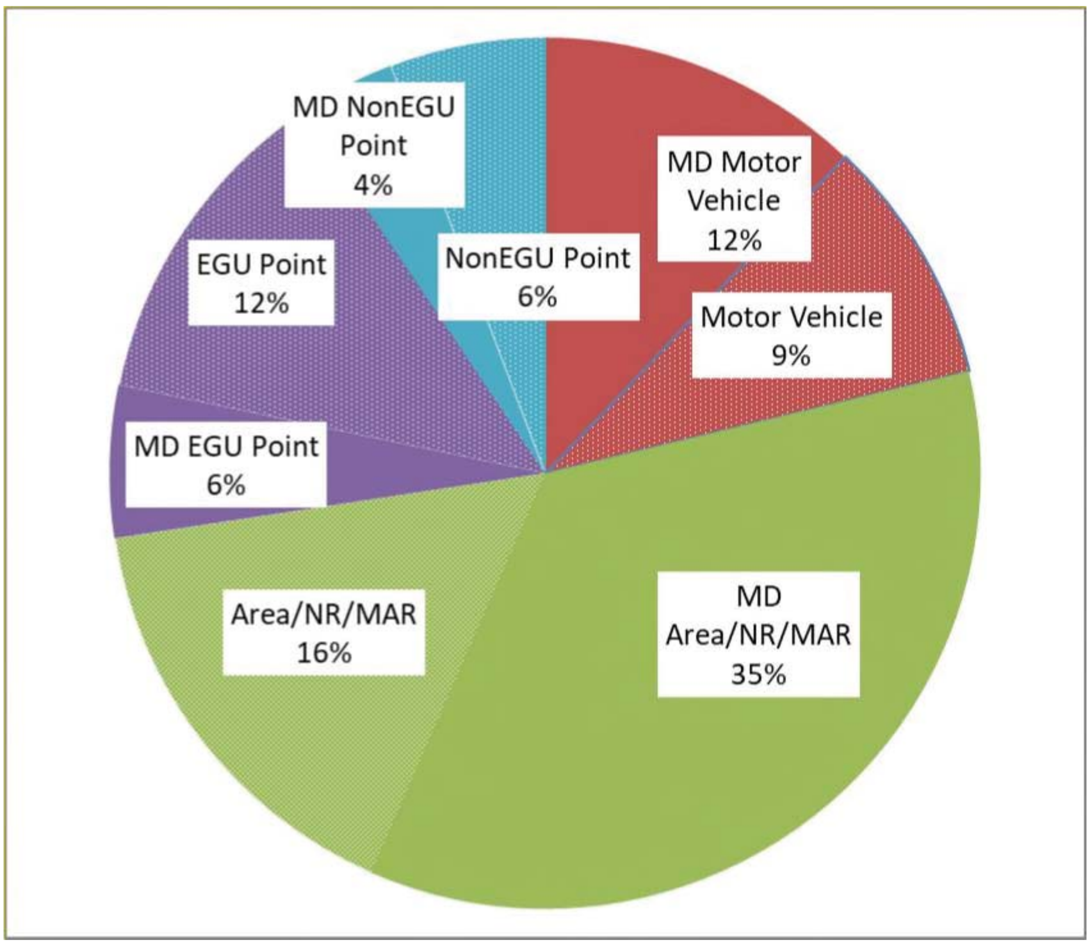
Monitor	240251001	Harford, Maryland				Final CSAPR DV			71.1
	2023 OSAT Results (Modeled ppb) – MATS/Top 10 Future Method								
Region	Bio/Fire	Motor Vehicle	Area/NR/MAR	EGU Point	NonEGU Point	Other	Boundary	Initial	Total Anthro
CT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DE	0.02	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.05
MD	3.41	5.09	14.93	2.39	1.55	0.00	0.00	0.00	23.96
NJ	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.04
NY	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.02
PA	0.53	0.34	0.92	1.13	0.32	0.00	0.00	0.00	2.71
VA/DC	1.37	1.40	1.79	0.67	0.27	0.00	0.00	0.00	4.13
IL	0.32	0.17	0.33	0.34	0.22	0.00	0.00	0.00	1.06
IN	0.41	0.40	0.44	0.68	0.32	0.00	0.00	0.00	1.84
MI	0.06	0.07	0.11	0.05	0.05	0.01	0.00	0.00	0.27
OH	0.77	0.66	0.86	1.12	0.40	0.00	0.00	0.00	3.03
WV	0.81	0.24	1.15	0.74	0.41	0.00	0.00	0.00	2.55
KY	0.62	0.53	0.84	0.38	0.34	0.00	0.00	0.00	2.09
TX	0.29	0.14	0.44	0.16	0.15	0.03	0.00	0.00	0.89
Can/Mex	0.14	0.01	0.01	0.01	0.01	0.40	0.00	0.00	0.04
IC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
BC	0.00	0.00	0.00	0.00	0.00	0.00	11.34	0.00	0.00



[20] "Good Neighbor" Modeling for the 2008 8-Hour Ozone State Implementation Plans, Final Modeling Report, by Alpine Geophysics, LLC, December 2017 (http://www.midwestozonegroup.com/files/Ozone_Modeling_Results_Supporting_GN_SIP_Obligations_Final_Dec 2017.pdf)

When focusing only on the anthropogenic contribution from the significant contributing states (1% of NAAQS or greater than or equal to 0.70 ppb), area/nonroad/MAR categories demonstrate more than half (51%; 35% from Maryland) of the total significant contribution from these states. As is shown in the following pie chart, an additional 21% of projected ozone from significant contributing state anthropogenic categories is estimated from onroad motor vehicle emissions. Of this 21%, 12% is estimated from onroad mobile source emissions originating in Maryland.

Relative Contribution of Anthropogenic Emission Categories in 2023 from Significant Contributing States to Harford, MD Monitor.



To further the assessment of which regions and categories have the greatest impact on this monitor's future year ozone concentration, a review of the modeling platform used in the 4km modeling develops relationships between the State-source category specific OSAT modeling and the seasonal NOx emissions used to develop the ozone concentrations. Using monthly, county and source category specific emissions published by EPA[21], relational "impact factors" were developed using these data.

[21] ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011en and 2023en/

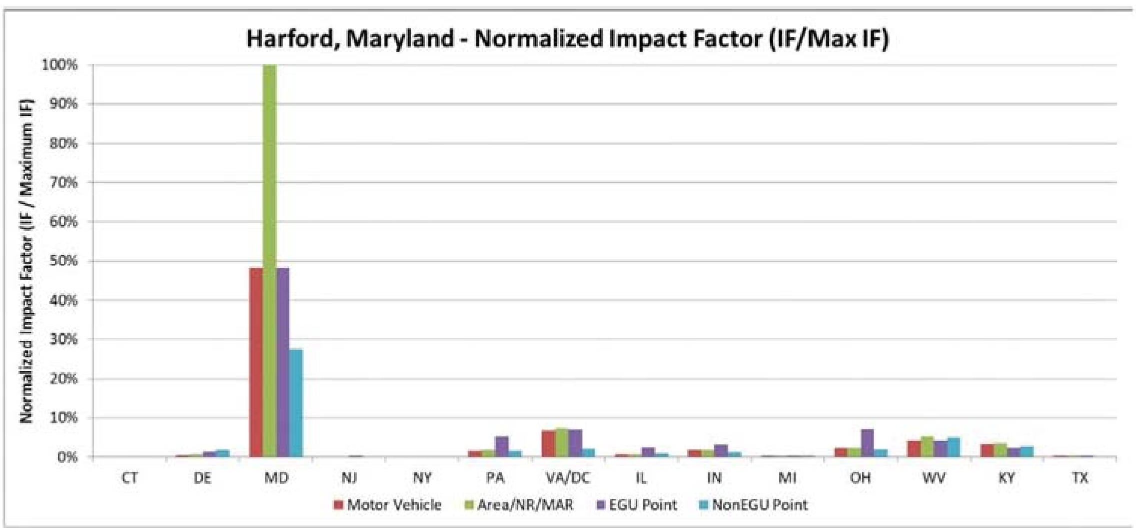
This value represents the relative contribution of modeled emissions (tons) to resultant ozone concentrations (in ppb).

Impact Factor (ppb/ton) = OSAT Contribution (ppb) / Emissions (tons)

A primary purpose for this calculation is to determine, at each monitor, from where and what source category, on a ppb per ton basis, we see the greatest relative contribution. In other words, to determine which source category, and from what state, has the greatest per ton NOx contribution to the monitor's modeled ozone concentrations.

After this calculation was conducted for each monitor, results to the maximum individual state/category contributor were normalized, so that in the comparisons, it could easily be identified the greatest ppb per ton state/source category and provide an easy way of determining which categories have greater relative impact compared to all others.

The chart below provides this normalized comparison of significant contributing state-category combinations to the Harford, MD monitor.



In addition to recognizing the usefulness of this impact factor in determining which states and categories are the largest ppb/ton contributors to each monitor, the results may be used to assist in the development of control strategies and their relative impact on ozone concentrations at various locations.

As a further example using these impact factor calculations, and similar to EPA methods[22] with the Air Quality Assessment Tool, assuming a linear relationship of NOx emissions to ozone concentrations at low emission changes, we estimate that a 1.5% NOx emission

[22] https://www.epa.gov/sites/production/files/2017-05/documents/ozone_transport_policy_analysis_final_rule_tsd.pdf

reduction in Maryland's area, nonroad, and MAR category (226 NOx tons per ozone season) would have enough associated ozone concentration reduction (0.20 ppb) to bring the noted monitor into attainment at 70.9 ppb. Similarly, a reduction of 4% (or 426 tons NOx/ozone season) from onroad mobile source NOx emissions in Maryland alone would have the same ozone concentration impact (0.20 ppb). This compares to a 7% reduction from EGUs in all the other non-Maryland significant contributing states (PA, VA, DC, IL, IN, OH, WV, KY, and TX) and would be equivalent to an estimated 11,887 tons NOx per ozone season reduction from these sources.

The regulation of mobile sources is specifically addressed in the CAA section 209, which provides guidance on the management roles of mobile sources for the federal government, California and other states. Section 209(a) opens with the statement concerning on-road engines and vehicles, "No State or any political subdivision thereof shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part." Relative to non-road engines or vehicles, CAA 209(e) provides similar language.

The exception to these prohibitions is set forth in CAA §177 for California and any other state that chooses to adopt an "EPA-approved California control on emissions of new motor vehicles or engines." Regulation of new mobile-source emissions has been principally federally- driven, but states continue to have a role. *Engine Mfrs. Ass'n v. EPA*, 88 F.3d 1075, 1079 (D.C. Cir. 1996). The CAA §209(d) preserves the authority of the states to control, regulate, or restrict the use, operations, or movement of registered or licensed motor vehicles. The D.C. Circuit has interpreted this as maintaining state power to regulate pollution from motor vehicles once they are no longer new; for instance, through in-use regulations such as car pools and other incentive programs. *Id.* In response to the D.C. Circuit opinion, EPA clarified its position relative to state non-road regulatory authority in 40 CFR 89, Subpart A, Appendix A - State Regulation of Nonroad Internal Combustion Engines as follows:

EPA believes that states are not precluded under section 209 from regulating the use and operation of nonroad engines, such as regulations on hours of usage, daily mass emission limits, or sulfur limits on fuel; nor are permits regulating such operations precluded, once the engine is no longer new. EPA believes that states are precluded from requiring retrofitting of used nonroad engines except that states are permitted to adopt and enforce any such retrofitting requirements identical to California requirements which have been authorized by EPA under section 209 of the Clean Air Act. [62 FR 67736, Dec. 30, 1997]

Given the dominant role of mobile sources in impacting on ozone air quality, MOG urges that the DEP offer as an additional basis for its SIP that additional local mobile source controls in downwind states are necessary before requiring additional emission reductions from upwind states such as West Virginia. We urge that downwind states take full advantage of all of the authority provided to each of them under the CAA and to reduce mobile source emissions appropriately to assure continued attainment with the 2015 ozone NAAQS.

Response 7:

The DAQ concurs with MOG's assessment of the dominant role of mobile sources in impacting ozone air quality and that additional local mobile source controls in downwind states are necessary before requiring additional emission reductions from upwind states such as West Virginia. However, DEP believes mobile source emissions are adequately addressed in Section 4.2 of the SIP narrative.

Comment 8:

2023 is the appropriate year for assessing Good Neighbor SIP requirements related to the 2015 ozone NAAQS.

It is appropriate for the modeling results relied upon by the DEP to have been based on 2023 as the future analytic year. That year was selected by EPA as the basis for its modeling "because it aligns with the anticipated attainment year for the Moderate ozone nonattainment areas".[23] Indeed, 2023 aligns with the last full ozone season before the attainment year for Moderate ozone nonattainment areas.

We note with interest the affidavit submitted by Assistant Administrator McCabe in the litigation involving the challenge to the Kentucky Good Neighbor SIP in which Assistant Administrator McCabe stated:

> In order to establish the appropriate future analytic year for purposes of the EPA's analysis, including the air quality modeling, the EPA considers several factors related to anticipated compliance timing of the rulemaking. It is essential to consider how best to align the future analytic year with compliance timing in order for the assessment of significant contribution to nonattainment and interference with maintenance to align with the identified air quality challenge. Compliance timing is informed by the D.C. Circuit's decision in *North Carolina*, where the court held that the EPA should align implementation of its interstate transport rules with a date by which states are required to demonstrate attainment with the applicable NAAQS. 531 F.3d at 911-12. However, the determination as to how to align implementation with the attainment is not ready-made. Rather, the EPA considers several factors including the relevant attainment dates for the NAAQS, timelines necessary for installing appropriate control technologies, whether or not emission reductions preceding the relevant attainment dates (if possible) would further assist downwind areas in demonstrating attainment and maintenance of the NAAQS, or in the event that emission reductions are not feasible by the

[23] Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I), prepared by Peter Tsirigotis, March 27, 2018, p. 3. https://www.epa.gov/airmarkets/march-2018-memo-and-supplemental-information-regarding-interstate-transport-sips-2015.

> relevant attainment deadline, what date is as soon as practicable for EPA to require reductions following the relevant attainment deadline.[24]

Equally significant is the following statement appearing in EPA's brief in the same litigation:

> Nonetheless, EPA is mindful of the need to align implementation of emission reductions in upwind states with the applicable attainment dates in downwind areas, as instructed by the court in *North Carolina v. EPA*, 531 F.3d 896, 911-12 (D.C. Cir. 2008).[25]

MOG strongly urges continued efforts to follow the court holding *North Carolina v. EPA*, 531 F.3d 896, 911-12 (D.C. Cir. 2008), and to assure alignment of the implementation of Good Neighbor SIPs with the date by which states are required to demonstrate attainment with the applicable NAAQS. There must be continued recognition that air quality will improve between the 2018 due date for Good Neighbor SIPs and the 2023 attainment deadline as a result of additional local controls in nonattainment areas as well as CAA programs including Federal Measures, federally mandated state RACT rules, nonattainment infrastructure SIPs, and Good Neighbor SIPs. While the Federal measures, state RACT rules, nonattainment infrastructure SIPs, and other control programs will all significantly improve air quality in many nonattainment areas, those programs will all be implemented after the Good Neighbor SIPs are due, which means that states will need to carefully consider how best to address those air quality improvements as part of their Good Neighbor SIP submittals.

The failure to include the benefits of these programs in Good Neighbor SIPs will result in over-control of upwind states, which is, of course, illegal given the Supreme Court decision in *EPA v. EME Homer City Generation* in which stands for the proposition that EPA cannot require an upwind state to reduce its output of pollution by more than necessary to achieve attainment in every downwind state. The Good Neighbor SIP is a "down payment" on attainment and not a stand-alone attainment program. Numerous control programs will take effect now and between the 2018 Good Neighbor SIP due date and the 2023 attainment deadline. The Good Neighbor SIPs that are due in 2018 must take into account the impact of legally mandated controls on air quality by the attainment date to avoid violating the CAA prohibition against over-control.

Response 8:

The DEP's conclusion that no additional emission reductions beyond existing and planned controls are necessary to comply with CAA §110(a)(2)(D)(i)(I) is consistent with MOG's concern that the 2018 Good Neighbor SIP consider the impact of legally mandated controls

[24] Declaration of Janet D. McCabe, at ¶81.
[25] Defendant EPA's Reply to Plaintiff's Opposition to EPA's Cross-Motion for Summary Judgment, Sierra Club v. EPA, Case No. 3:15-cv-JD, Sept. 22, 2015) ED No. 68, p. 7.

on air quality by the attainment date to avoid violating the CAA prohibition against over-control. No additional action is required.

Comment 9:

An alternative significance threshold should be used to determine whether West Virginia is linked to any downwind state.

For many months, EPA has had under consideration the appropriateness of the use of its 1% significance test to determine whether an upwind state significantly contributes to downwind non-attainment or interference with downwind maintenance areas. While EPA's March 27, 2018 memo related to interstate transport state implementation plan submission involving the 2015 ozone NAAQS provides a set of contributions by upwind states to downwind states, that data is not based on a particular significance threshold.[26] Indeed, that memo identifies the significance threshold as one of the flexibilities that a state may wish to consider in the development of its Good Neighbor SIP. Specifically, EPA offers the following description of this flexibility:

> "Consideration of different contribution thresholds for different regions based on regional differences in the nature and extent of the transport problem."

In commenting on this flexibility, states have made the point that the significant contribution threshold of 1% of the NAAQS (0.70 ppb for the 2015 ozone NAAQS) value is arbitrary and is not supported by scientific argument.[27]

On August 31, 2018, EPA issued significant new guidance in which it analyzed 1 ppb and 2 ppb alternatives to the 1% significance level that it has historically used.[28] In that memo, EPA offers the following statement:

> Based on the data and analysis summarized here, the EPA believes that a threshold of 1 ppb may be appropriate for states to use to develop SIP revisions addressing the good neighbor provisions for the 2015 ozone NAAQS.

In reaching its conclusion that a 2 ppb threshold was not recommended, EPA compared the 2 ppb alternative to the 1 ppb alternative using data which averaged all receptors outside California. In that circumstance, EPA determined that using a 1 ppb threshold captures 86

[26] *Id* at p. A-2.
[27] Georgia EPD Comments on EPA's March 27, 2018 Interstate Transport Memo, J.W. Boylan, Air Protection Branch, Georgia EPD, May 4, 2018. https://www.epa.gov/sites/production/files/2018-08/documents/ga_epd_comments_on_epa_march_27_2018_ozone_transport_memo.pdf
[28] Analysis of Contribution Thresholds for Use in Clean Air Act Section 110(a)(2)(D)(i)(I) Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards, Peter Tsirigotis August 31, 2018. https://www.epa.gov/sites/production/files/2018-09/documents/contrib_thresholds_transport_sip_subm_2015_ozone_memo_08_31_18.pdf

percent of the net contribution captured using a 1% threshold whereas a 2 ppb threshold captures only half of the net contribution using 1%. A different picture is presented, however, when the receptors east of the Mississippi River (involving the states of Connecticut, Maryland, Michigan, New York and Wisconsin) are considered separately from the states of Arizona, Colorado and Texas. In that case, use a 1 ppb threshold captures 92% of the net contribution captured using a 1% threshold compared with 78% for the 2 ppb threshold.

In the case of either a 1 ppb threshold or a 2 ppb threshold, a significant reduction in downwind linkages occurs.

The following chart compares all three alternatives when applied to EPA's modeling result:

			Ozone Concentration (ppb)						
EPA Identified Nonattainment Site ID	**State**	**County**	**2009-2013 Avg DV**	**2023 Avg DV**	**Contrib from Upwind 1%**	**Contrib from Upwind 1ppb**	**Contrib from Upwind 2ppb**	**% of 1ppb from 1%**	**% of 2ppb from 1%**
90013007	Connecticut	Fairfield	84.3	71	36.91	33.63	27.38	91%	74%
90019003	Connecticut	Fairfield	83.7	73	38.55	36.93	32.28	96%	84%
361030002	New York	Suffolk	83.3	74	22.31	18.74	15.74	84%	71%
480391004	Texas	Brazoria	88	74	7.48	4.8	3.8	64%	51%
484392003	Texas	Tarrant	87.3	72.5	4.2	3.42	0	81%	0%
550790085	Wisconsin	Milwaukee	80	71.2	28.45	23.61	22.39	83%	79%
551170006	Wisconsin	Sheboygan	84.3	72.8	31.62	29.02	24.9	92%	79%

The results of the same comparison when applied to the LADCO modeling results are set forth in the following chart:

			Ozone Concentration (ppb)					
LADCO Identified Nonattainment Monitor	**State**	**County**	**2023 Avg DV**	**Contrib from Upwind 1%**	**Contrib from Upwind 1ppb**	**Contrib from Upwind 2ppb**	**% of 1ppb from 1%**	**% of 2ppb from 1%**
90019003	Connecticut	Fairfield	71.4	36.15	34.51	28.21	0.95	0.78
240251001	Maryland	Harford	71	19.9	17.51	14.56	0.88	0.73
361030002	New York	Suffolk	71.6	20.85	17.42	14.6	0.84	0.7
480391004	Texas	Brazoria	74.1	7.45	4.65	3.62	0.62	0.49
484392003	Texas	Tarrant	72.6	4.99	3.4	0	0.68	0
482011039	Texas	Harris	71.7	8.14	5.64	4.5	0.69	0.55

The results of the same comparison for the MOG modeling results are set forth in the following chart:

			Ozone Concentration (ppb)						
MOG Identified Nonattainment Site ID	State	County	2009-2013 Avg DV	2023 Avg DV	Contrib from Upwind 1%	Contrib from Upwind 1ppb	Contrib from Upwind 2ppb	% of 1ppb from 1%	% of 2ppb from 1%
90010017	Connecticut	Fairfield	80.3	69.2	26.85	25.98	21.68	0.97	0.81
90013007	Connecticut	Fairfield	84.3	69.7	23.91	23.04	18.57	0.96	0.78
90019003	Connecticut	Fairfield	83.6	69.9	27.78	26.12	21.49	0.94	0.77
90110124	Connecticut	New London	80.3	68.2	19.6	17.86	12.98	0.91	0.66
90099002	Connecticut	New Haven	85.7	70.3	21.08	17.92	15.04	0.85	0.71
240251001	Maryland	Harford	90	71.1	17.99	17.09	14.23	0.95	0.79
340150002	New Jersey	Gloucester	84.3	68.8	30.27	30.27	20.92	1	0.69
360850067	New York	Richmond	81.3	69.6	30.27	26.64	20.29	0.91	0.7
361030002	New York	Suffolk	83.3	70.7	22.52	19.85	14.5	0.88	0.64
421010024	Pennsylvania	Philadelphia	83.3	68	18.65	15.91	8.54	0.85	0.46

In the case of West Virginia, EPA's modeling data below show that at the 1% threshold, West Virginia would be linked to 3 non-attainment monitors and 2 maintenance monitors. Applying the 1 ppb threshold to this data would reduce the linkage to non-attainment monitors to 2 and reduce to 2 the linkage to any maintenance monitor. Moving to the 2 ppb threshold would completely eliminate all linkage to any non-attainment monitor and reduce to 1 the linkage to any maintenance monitor.

			Ozone (ppb)		Significant Contribution (ppb)																	
EPA Identified Nonattainment Site ID	State	County	2009-2013 Avg DV (ppb)	2023 Avg DV (ppb)	AR	IL	IN	IA	KY	LA	MD	MI	MO	NJ	NY	OH	OK	PA	TX	VA	WV	WI
90013007	Connecticut	Fairfield	84.3	71.0	0.13	0.72	0.97	0.16	0.89	0.11	1.8	0.7	0.38	6.94	14.1	1.84	0.21	6.32	0.44	1.51	1.1	0.24
90019003	Connecticut	Fairfield	83.7	73.0	0.13	0.67	0.83	0.17	0.79	0.11	2.17	0.63	0.37	7.75	15.8	1.6	0.21	6.56	0.45	1.91	1.14	0.2
361030002	New York	Suffolk	83.3	74.0	0.12	0.64	0.69	0.2	0.49	0.13	1.24	0.94	0.39	8.88	18.1	1.76	0.34	6.86	0.6	0.99	0.81	0.25
480391004	Texas	Brazoria	88.0	74.0	0.9	1	0.32	0.4	0.14	3.8	0	0.22	0.88	0	0	0.06	0.9	0.01	26	0.02	0.02	0.4
484392003	Texas	Tarrant	87.3	72.5	0.78	0.29	0.18	0.19	0.13	1.71	0.01	0.13	0.38	0	0.01	0.1	1.71	0.05	27.64	0.05	0.05	0.13
550790085	Wisconsin	Miwaukee	80.0	71.2	0.4	15.1	5.28	0.79	0.77	0.72	0.03	2.01	0.93	0	0.02	0.87	0.76	0.33	1.22	0.12	0.59	13.39
551170006	Wisconsin	Sheboygan	84.3	72.8	0.51	15.7	7.11	0.45	0.81	0.84	0.03	2.06	1.37	0	0.02	1.1	0.95	0.41	1.65	0.1	0.64	9.09

			Ozone (ppb)		Significant Contribution (ppb)																				
EPA Identified Nonattainment Site ID	State	County	2009-2013 Max DV (ppb)	2023 Avg DV (ppb)	AR	CT	IL	IN	IA	KS	KY	LA	MD	MI	MS	MO	NJ	NY	OH	OK	PA	TX	VA	WV	WI
90010017	Connecticut	Faifield	83	71.2	0.07	8.7	0.39	0.44	0.11	0.09	0.34	0.05	1.18	0.5	0.03	0.21	6.24	17.31	1.04	0.15	5.11	0.3	1.27	0.68	0.26
90099002	Connecticut	New Haven	89	72.6	0.08	9.1	0.46	0.5	0.16	0.14	0.32	0.08	1.37	0.73	0.04	0.29	5.06	15.03	1.17	0.24	4.87	0.41	1.26	0.61	0.25
240251001	Maryland	Harford	93	73.3	0.17	0	0.84	1.35	0.23	0.23	1.52	0.19	22.6	0.79	0.08	0.59	0.07	0.16	2.77	0.35	4.32	0.74	5.05	2.78	0.24
260050003	Michigan	Allegan	86	71.7	1.64	0	19.6	7.11	0.77	0.77	0.58	0.7	0.01	3.32	0.4	2.61	0	0	0.19	1.31	0.05	2.39	0.04	0.11	1.95
261630019	Michigan	Wayne	81	71	0.27	0	2.37	2.51	0.44	0.44	0.65	0.22	0.02	20.4	0.09	0.92	0.01	0.06	3.81	0.62	0.18	1.12	0.16	0.23	1.08
360810124	New York	Queens	80	72	0.09	0.57	0.73	0.69	0.26	0.19	0.42	0.13	1.56	1.26	0.04	0.38	8.57	13.55	1.88	0.32	7.16	0.58	1.56	1.01	0.38
481210034	Texas	Denton	87	72	0.58	0	0.23	0.16	0.1	0.4	0.11	1.92	0.01	0.08	0.33	0.24	0	0.01	0.08	1.23	0.04	26.69	0.05	0.04	0.08
482010024	Texas	Harris	83	72.8	0.29	0	0.34	0.13	0.17	0.17	0.1	3.06	0	0.06	0.5	0.38	0	0	0.05	0.2	0.02	25.62	0.06	0.05	0.07
482011034	Texas	Harris	82	71.6	0.54	0	0.51	0.12	0.27	0.32	0.05	3.38	0	0.17	0.39	0.63	0	0	0.05	0.68	0.01	25.66	0.03	0.03	0.22
482011039	Texas	Harris	84	73.5	0.99	0	0.88	0.24	0.33	0.33	0.11	4.72	0	0.27	0.79	0.88	0	0	0.05	0.58	0.01	22.82	0.02	0.01	0.28

We urge DEP to carefully evaluate these additional flexibilities as further support for the conclusion that West Virginia has already satisfied the requirements of CAA section 110(a)(2)(D)(i)(I).

Response 9:

The DEP established sufficient support for its conclusion that WV has satisfactorily complied with the requirements of CAA §110(a)(2)(d)(i)(I) and therefore, will not be adding the additional evaluation flexibilities requested in this comment.

Comment 10:

An important flexibility that should be considered is an alternative method for determining which monitors should be considered "maintenance" monitors.

Historically, the CSAPR Update methodology has been to address "interference with maintenance." This approach is, however, not only inconsistent with the CAA, but also inconsistent with both the U.S. Supreme Court and D.C. Circuit decisions on CSAPR. Upon consideration of the reasonableness test, EPA's emphasis upon the single maximum design value to determine a maintenance problem for which sources (or states) must be accountable creates a default assumption of contribution. A determination that the single highest modeled maximum design value is appropriate for the purpose to determining contribution to interference with maintenance is not reasonable either mathematically, in fact, or as prescribed by the Clean Air Act or the U.S. Supreme Court. The method chosen by EPA must be a "permissible construction of the Statute."

The U.S. Supreme Court in *EPA v. EME Homer City* explains the maintenance concept set forth in the Good Neighbor Provision as follows:

> Just as EPA is constrained, under the first part of the Good Neighbor Provision, to eliminate only those amounts that "contribute...to *nonattainment*," EPA is limited, by the second part of the provision, to reduce only by "amounts" that "interfere with *maintenance*," *i.e*. by just enough to permit an already-attaining State to maintain satisfactory air quality."[29]

Relative to the reasonableness of EPA's assessment of contribution, the U.S. Supreme Court also provides,

> The Good Neighbor Provision . . . prohibits only upwind emissions that contribute significantly to downwind nonattainment. <u>EPA's authority is therefore limited to eliminating . . . the overage caused by the collective contribution</u> . . ."[30] (Emphasis added.)

EPA's use of a modeled maximum design value, when the average design value is below the NAAQS, to define contribution, results in a conclusion that any modeled contribution

[29] 134 S. Ct. at 1064, Ftn. 18.
[30] *Id.* at 1604.

is deemed to be a significant interference with maintenance. This concept is inconsistent with the Clean Air Act and the U.S. Supreme Court's assessment of its meaning.

As noted by the D.C. Circuit in the 2012 lower case of *EME Homer City v. EPA*, "The good neighbor provision is not a free-standing tool for EPA to seek to achieve air quality levels in downwind States that are *well below* the NAAQS."[31] "EPA must avoid using the good neighbor provision in a manner that would result in unnecessary over-control in the downwind States. Otherwise, EPA would be exceeding its statutory authority, which is expressly tied to achieving attainment in the downwind States."[32]

The Texas Commission on Environmental Quality (TCEQ) introduced in its 2015 Ozone NAAQS Transport SIP Revision 35 an approach for identifying maintenance monitors that differs from the approach used by the EPA in CSAPR and the 2015 Transport NODA. The EPA used the maximum of the three consecutive regulatory design values containing the base year as the base year design value (DV_b) to identify maintenance monitors. Both the EPA's approach and the TCEQ's approach account for three years of meteorological variability in their choice of DV_b to identify maintenance monitors since a single design value is a three-year average of the annual fourth-highest MDA8 ozone concentration. The EPA's approach is to choose the maximum of the three consecutive regulatory design values containing the base year as the DV_b while the TCEQ's approach is to choose the latest of the three consecutive regulatory design values containing the base year as the DV_b. For the reasons described in TCEQ's SIP revision, the TCEQ determined that the selection of the most recent DV_b addresses all issues relevant for an independent assessment of maintenance; and therefore, provides a comprehensive assessment of the potential impacts of Texas emissions on potential maintenance monitors.[33]

We urge that DEP offer this alternative calculation of maintenance monitors as an additional statement of the conservative nature of its conclusions that no further action on the part of West Virginia is needed to address the requirements of CAA section 110(a)(2)(D)(i)(I).

Response 10:

The DEP presented sufficient basis for the conservative nature of its conclusion such that no further controls are needed beyond those already taken, planned, and presented in the proposed Good Neighbor SIP to demonstrate compliance with CAA §110(a)(2)(d)(i)(I); therefore, the additional alternative calculation of maintenance monitors as an additional statement of the conservative nature of its conclusion is not needed.

[31] *EME Homer City v. EPA*, 696 F. 3d 7, 22 (D.C. Cir 2012).
[32] *Id.*
[33] https://www.tceq.texas.gov/airquality/airmod/data/gn.

Comment 11:

In the development of its Good Neighbor SIP, maintenance areas should not be given the same weight and status as nonattainment areas.

Maintenance areas should not be subject to the same "significance" test as is applied to nonattainment areas. Maintenance areas do not require the same emission reduction requirements as nonattainment areas, and therefore, require different management. The DEP's proposal at page 55 correctly summarizes as follows the manner in which its proposal must address interfere with maintenance:

> *The "interfere with maintenance" prong of the statute is not an open-ended invitation for EPA to impose reductions on upwind states. Rather, it is a "carefully calibrated and commonsense supplement to the "contribute significantly" requirement.*

The U.S. Supreme Court opinion in *EPA v. EME Homer City* offered the following on "interference with maintenance,"

> The statutory gap identified also exists in the Good Neighbor Provision's second instruction. That instruction requires EPA to eliminate amounts of upwind pollution that "interfere with maintenance" of a NAAQS by a downwind State. §7410(a)(2)(D)(i). This mandate contains no qualifier analogous to "significantly," and yet it entails a delegation of administrative authority of the same character as the one discussed above. Just as EPA is constrained, under the first part of the Good Neighbor Provision, to eliminate only those amounts that "contribute . . . to *nonattainment*," EPA is limited, by the second part of the provision, to reduce only by "amounts" that "interfere with *maintenance,"* i.e., by just enough to permit an already-attaining State to maintain satisfactory air quality. (Emphasis added). With multiple upwind States contributing to the maintenance problem, however, EPA confronts the same challenge that the "contribute significantly" mandate creates: How should EPA allocate reductions among multiple upwind States, many of which contribute in amounts sufficient to impede downwind maintenance" Nothing in *either* clause of the Good Neighbor Provision provides the criteria by which EPA is meant to apportion responsibility.[34]

The D.C. Circuit opinion in *EME Homer City v. EPA*, also informs the maintenance area issue:

> The statute also requires upwind States to prohibit emissions that will "interfere with maintenance" of the NAAQS in a downwind State. "Amounts" of air pollution cannot be said to "interfere with maintenance" unless they leave the upwind State and reach a downwind State's maintenance area. To require a

[34] 134 S. Ct. at 1064, Ftn 18.

> State to reduce "amounts" of emission pursuant to the "interfere with maintenance" prong, EPA must show some basis in evidence for believing that those "amounts" from an upwind State, together with amounts from other upwind contributors, will reach a specific maintenance area in a downwind State and push that maintenance area back over the NAAQS in the near future. Put simply, the "interfere with maintenance" prong of the statute is not an open-ended invitation for EPA to impose reductions on upwind States. Rather, it is a carefully calibrated and commonsense supplement to the "contribute significantly" requirement.[35]

EPA's January 17, 2018 brief in the CSAPR Update litigation (*Wisconsin et al. v EPA*, Case No. 16-1406) documents with the following statement on pages 77 and 78 that EPA is ready to concede that a lesser level of control is appropriate in situations not constrained by the time limits of the CSAPR Update:

> Ultimately, Petitioners' complaint that maintenance-linked states are unreasonably subject to the "same degree of emission reductions" as nonattainment linked states must fail. Indus. Br. 25. There is no legal or practical prohibition on the Rule's use of a single level of control stringency for both kinds of receptors, provided that the level of control is demonstrated to result in meaningful air quality improvements without triggering either facet of the Supreme Court's test for over-control. So <u>while concerns at maintenance receptors can potentially be eliminated at a lesser level of control in some cases given the smaller problem being addressed, this is a practical possibility, not a legal requirement.</u> See 81 Fed. Reg. at 74,520. Here, <u>EPA's use of the same level of control for both maintenance-linked states and nonattainment-linked states is attributable to the fact that the Rule considered only emission reduction measures available in time for the 2017 ozone season.</u> Id. at 74,520. Under this constraint, both sets of states reduced significant emissions, without over-control, at the same level of control. Id. at 74,551-52. Accordingly, EPA's selection of a uniform level of control for both types of receptors was reasonable. Emphasis added.

As an alternative to maintenance monitors being accorded the same weight as nonattainment monitors, we urge that the DEP take the position that no additional control would be needed to address a maintenance monitor if it is apparent that emissions and air quality trends make it likely that the maintenance monitor will remain in attainment. Such an approach is consistent with Section 175A(a) of the Clean Air Act which provides:

Each State which submits a request under section 7407 (d) of this title for redesignation of a nonattainment area for any air pollutant as an area which has attained the national primary ambient air quality standard for that air pollutant shall also submit a revision of the applicable State implementation plan to provide for the maintenance of the national primary ambient air quality standard for such air pollutant in the area concerned for at least 10 years after the

[35] EME Homer City v. EPA, 96 F. 3d 7, 27 Ftn. 25 (D.C. Cir 2012).

redesignation. The plan shall contain such additional measures, if any, as may be necessary to ensure such maintenance.

It is also consistent with the John Calcagni memorandum of September 4, 1992, entitled "Procedures for Processing Requests to Redesignate Areas to Attainment", which contains the following statement on page 9:

> A State may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of source and emission rates will not cause a violation of the NAAQS. Under the Clean Air Act, many areas are required to submit modeled attainment demonstrations to show that proposed reductions in emissions will be sufficient to attain the applicable NAAQS. For these areas, the maintenance demonstration should be based upon the same level of modeling. In areas where no such modeling was required, the State should be able to rely on the attainment inventory approach. In both instances, the demonstration should be for a period of 10 years following the redesignation.

As stated above, while West Virginia would not be linked to any maintenance monitor at a significance threshold of 2 ppb, it would be linked by EPA's 12km modeling data to a maintenance monitor (Harford Maryland) at a significance threshold of 1 ppb. Accordingly, MOG urges that the DEP apply an alternate methodology to assess maintenance monitors that is different than any method it would apply to assess nonattainment monitors. Any impacts which West Virginia has on maintenance areas will certainly be addressed by consideration of controls that are already on-the-books and by emissions reductions that have been and will continue to apply to West Virginia sources as is well-demonstrated by these comments and the DEP's proposed GNS.

Response 11:

DEP agrees with MOGs comment that maintenance areas should not be given the same weight and status as nonattainment areas. However, DEP presented sufficient support for the conservative nature of its conclusion that no further controls are needed beyond those already taken, planned, and presented in the proposed Good Neighbor SIP to demonstrate compliance with CAA §110(a)(2)(d)(i)(I), and the treatment of maintenance areas would not change the conclusion.

Comment 12:

> **An additional element of conservatism in the DEP's proposal is recognition of West Virginia's very limited proportional contribution to the Harford Maryland monitor.**
>
> MOG was very pleased that EPA's March 27, 2018 memorandum recognized two methods for apportioning responsibility among upwind states to downwind problem monitors. In its memorandum, EPA offers the following statement:
>
> > For states that are found to significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind, apportioning responsibility among states.
> >
> > - Consider control stringency levels derived through "uniform-cost" analysis of NOx reductions.
> > - Consider whether the relative impact (*e.g.*, parts per billion/ton) between states is sufficiently different such that this factor warrants consideration in apportioning responsibility.
>
> Addressing these issues is particularly important in the situation in which a state's contribution to a downwind problem monitor is greater than the level at which a monitor exceeds the NAAQS. To avoid unlawful over-control, a state must be allowed the option of prorating the reduction needed to achieve attainment over all states that contribute to that monitor. This process allows a state the option of addressing only their prorate portion of responsibility for the portion of the problem monitors ozone concentration that exceeds the NAAQS.
>
> In EPA's March 2018 memorandum, the agency also recognizes that consideration can be given to states based on their relative significant impact to downwind air quality monitors compared to other significant contributing states and whether the contribution values are sufficiently different enough that each state should be given a proportional responsibility for assisting in downwind attainment. Under an analysis like this, reductions should be allocated in proportion to the size of their contribution to downwind nonattainment.
>
> As Alpine Geophysics points out in the Technical Support Document (TSD) relied upon by the DEP, the Harford, MD (240251001) monitor and the OSAT-derived significant contribution results from the 4km modeling, the Harford Maryland monitor is required to have a 0.2 ppb reduction to demonstrate attainment with the 2015 ozone NAAQS. In the following calculation taken from that TSD, each significantly contributing (based on 1% NAAQS) upwind State must (1) achieve less than 0.70 ppb significant contribution or (2) the monitor must achieve attainment (70.9 ppb). From these assumptions, the reduction necessary from each upwind state has been calculated.

Proportional contribution and reductions associated with significantly contributing upwind states to Harford, MD (240251001) monitor in 4km modeling domain.

	Relative Contribution			Required Reduction
Region	**ppb**	**%**		**ppb**
VA/DC	3.92	22%		0.04
OH	3.02	17%		0.03
PA	2.70	15%		0.03
WV	2.52	14%		0.03
KY	2.07	12%		0.02
IN	1.81	10%		0.02
IL	1.05	6%		0.01
TX	0.90	5%		0.01
Total	**17.99**	**100%**		**0.20**

Even though this modeling predicts West Virginia's contribution to the Harford Maryland monitor to be 2.52 ppb, the result of the proportional reduction requirement associated with the relative significant contribution from each upwind state, West Virginia's required reduction would be lowered to only 0.03 ppb – a level that is conservatively addressed by the various factors cited by DEP and reinforced by these comments.

For reasons stated elsewhere in these comments MOG does not favor applying the same weight to maintenance monitors as would be applied to nonattainment monitors. We therefore urge that this same approach <u>not</u> be applied to maintenance monitors. Any impacts which West Virginia has on maintenance areas will certainly be addressed by consideration of controls that are already on the books and by emissions reductions that have been and will continue to apply to West Virginia sources as is well-demonstrated by these comments and the proposed GNS.

Response 12:

DEP agrees with MOGs comment that maintenance areas should not be given the same weight and status as nonattainment areas and further agrees with the recognition of WV's very limited proportional contribution to the Hartford, Maryland monitor. As noted by MOG in their comment, any impacts West Virginia has on maintenance areas will be addressed by controls that are already installed and by emissions reduction requirements that apply and will continue to apply to West Virginia sources that are well-demonstrated in the proposed GNS.

II. New York State Department of Environmental Conservation (DEC)

Comment 1:

WVDEP's transport demonstration relies on CAMx modeling conducted by Alpine Geophysics, based on the 2023 projection inventory developed by the U.S. Environmental Protection Agency (EPA). EPA's 2023 projection inventory is riddled with unenforceable assumptions, and the CAMx modeling platform produces results that differ considerably from another approved air-quality model, i.e. CMAQ. Enclosed are comments submitted by DEC to EPA on the many flaws in its CAMx projection modeling associated with its "Cross-State Air Pollution Rule (CSAPR) Close-Out" proposal. The modeling results serve to underrepresent the extent of downwind nonattainment and maintenance issues, and minimize the extent of ozone transport from upwind states such as West Virginia.

Response 1:

DEP does not agree with New York's (NY) assessment of EPA's 2023 projection inventory. As noted on EPA's Air Emissions Modeling website: "The 2011v6.3 modeling platform is based on the 2011NEI version 2 and includes projected future years of 2017, 2023, and 2028. The modeling cases 2011ek and 2017ek supported the Final Cross-State Air Pollution Rule (CSAPR) Update, a rule related to interstate transport for the 2008 Ozone National Ambient Air Quality Standards (NAAQS). Updates to the platform were made to support preliminary modeling of interstate transport for the 2015 Ozone NAAQS with cases 2011el and 2023el, and preliminary modeling for the assessment of reasonable progress for regional haze with cases 2011el and 2028el. The inventories were further updated based on public comments for an updated analysis of interstate transport for the 2008 Ozone NAAQS with cases 2011en and 2023en."[36]

DEP appreciates that NY DEC shared their comments on EPA's proposed "CSAPR Close-Out." On December 21, 2018, EPA published the final "CSAPR Close-Out,"[37] which includes EPA's response to comments. Therefore, DEP does not address the comments made by NY DEC to EPA. The final "CSAPR Close-Out" is included in Appendix RTC-1 to this Response to Comments document.

Computer models are used to simulate the meteorological conditions and chemical reactions that contribute to the formation of air pollutants and to predict how air quality in a region will be affected by economic and population growth, and by reducing pollution emissions. New York identified two photochemical models: Community Multi-scale Air Quality (CMAQ) and Comprehensive Air quality Model with extensions (CAMx) and indicate that the models produce differing results. The CMAQ model includes state-of-the-science capabilities for conducting urban to regional scale simulations of multiple air quality issues, including tropospheric ozone, fine particles, toxics, acid deposition, and

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[36] https://www.epa.gov/air-emissions-modeling/2011-version-63-platform

[37] 83 FR 65878, 21 Dec 2018

visibility degradation. The CAMx model simulates air quality over many geographic scales. The CAMx model treats a wide variety of inert and chemically active pollutants, including ozone, particulate matter, inorganic and organic PM2.5/PM10, and mercury and other toxics. CAMx also has plume-in-grid and source apportionment capabilities.

As the statistician George Box said, "All models are wrong, some are useful." Air quality models are extremely complex and depend on various inputs and model assumptions. A comparative evaluation of the two models would provide tremendous insight into the validity of model inputs, model configuration and model results. However, New York did not provide all the inputs, assumptions and outputs required to allow a comparative evaluation. Nevertheless, CAMx provides specific advantages with respect to source apportionment, which EPA and many others use to determine culpability.

DEP stands by its decision to rely upon the "Good Neighbor" Modeling by Alpine (June 2018), using the nested 4 km grid for reasons explained in Section 3.5 of the SIP narrative.

Alpine recently (December 2018) completed updated 4 km modeling[38], which while not relied upon in this Good Neighbor SIP is included in Appendix RTC-2 to this Response to Comments document.

Comment 2:

Irrespective of projected future design values and emissions contributions, West Virginia is obligated to resolve its current significant contributions to the NYMA, which continues to record exceedances of the 2008 and 2015 ozone National Ambient Air Quality Standards (NAAQS).

Response 2:

The purpose of this Good Neighbor SIP is to address contributions to nonattainment and maintenance receptors for the 2015 Ozone NAAQS. West Virginia submitted their 2008 Ozone Good Neighbor SIP to EPA on March 26, 2018.

Although no response is required regarding the 2008 ozone NAAQS, the DEP notes that on December 6, 2018, the EPA signed and submitted for publication in the Federal Register *Determination Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard* as a final rule. Pertinent parts taken from the summary of this action are provided below:

> This action finalizes the EPA's determination that the existing Cross-State Air Pollution Rule Update for the 2008 Ozone National Ambient Air Quality Standards (NAAQS) (CSAPR Update) fully addresses certain states' obligations under Clean Air Act (CAA) section 110(a)(2)(D)(i)(I) regarding interstate pollution transport for the 2008 ozone NAAQS. . . .

[38] http://www.midwestozonegroup.com/files/Final_TSD_-_Updated_4km_Ozone_Modeling_Dec_2018_.pdf

> Based on information and analysis that became available after the CSAPR Update was finalized, this action finalizes a determination that the existing CSAPR Update fully addresses CAA section 110(a)(2)(D)(i)(I) for the 2008 ozone NAAQS for all remaining CSAPR Update states. Specifically, EPA is finalizing a determination that 2023 is an appropriate future analytic year to evaluate remaining good neighbor obligations and that, for the purposes of addressing good neighbor obligations, there will be no remaining nonattainment or maintenance receptors with respect to the 2008 ozone NAAQS in the eastern U.S. in that year. Therefore, with the CSAPR Update fully implemented, these remaining CSAPR Update states are not expected to contribute significantly to nonattainment in, or interfere with maintenance of, any other state with regard to the 2008 ozone NAAQS. . .

Comment 3:

DEC commends West Virginia on the reductions in ozone precursor emissions to date, but requests that WVDEP take additional measures to resolve its current significant contributions to the NYMA for the 2015 ozone NAAQS. WVDEP should not rely solely on EPA's CSAPR Update to fulfill its Good Neighbor obligations, since it is a regional trading program based on seasonal averaging periods.

Response 3:

West Virginia has not relied solely on EPA's CSAPR Update to fulfill its Good Neighbor obligations, Section 5.3.c. of the SIP narrative details the non-EGU controls and shutdowns that have also contributed to reduced NOx emissions. As noted in Section 7 of the SIP narrative "West Virginia identified permanent non-EGU NOx emissions reductions from 2011 emissions of 1,842 tons resulting from 10 source shutdowns and expected reductions of 1,012 tons due to the required shutdown of five sources by December 31, 2021."

Comment 4:

Moreover, nitrogen oxide (NOx) allowance prices stayed within a range of $150 to $300 for much of the 2018 ozone season, which is much lower than the cost to operate controls.[39] WVDEP should therefore make enforceable commitments for all control measures and operational changes (e.g., unit shutdowns) discussed in this transport analysis; specifically, units equipped with SCR and SNCR controls[40] should be subject to permanent and enforceable short-term emission limits that ensure their continuous operation during the

[39] "Cross State Air Pollution Rule Update for the 2008 Ozone NAAQS," Final Rule. Published October 26, 2016. 81 FR 74541: "The EPA identifies $800 per ton as a level of uniform control stringency that represents optimizing existing SCR controls that are already operating to some extent… The EPA identifies $1,400 per ton as a level of uniform control stringency that represents turning on idled SCR controls."
[40] WV DEP proposed Good Neighbor Demonstration, Table 7 – "West Virginia EGUs, Controls and 2017 NOx Emission Rates"

ozone season. These emission limits for SCR units should be consistent with the 0.1 lb/mmBtu emission rate assumed by EPA in 2023[41] — or lower, if feasible.

Response 4:

Compliance with the CSAPR Update will ensure that controls in WV are operated, as evidenced by the fact that in 2017, the first year that CSAPR Update Rule was in effect, the emission rates for 12 of the 15 units in WV equipped with SCR, operated at levels below 0.1 lb/mmBtu, with the remaining three operating at rates of 0.1062, 0.1135, and 0.1328 lb/MMBtu. The 2018 ozone season data continue to show controls in WV are operated, with emission rates for 12 of the 15 units equipped with SCR operating below 0.1 lb/MMBtu and the remaining three units operating at 0.1087, 0.1161 and 0.1555 lb/MMBtu. The 2017 ozone season data for all EGUs in West Virginia was provided in Table 7 of the SIP narrative, and is reproduced below, with the addition of the 2018 ozone season data.

West Virginia EGUs, Controls and 2017 and 2018 Ozone Season NO_x Emission Rates

Plant	Unit	MW	Fuel	NO_x Control	2017 Ozone Season NO_x Emission Rate (lb/MMBtu)	2018 Ozone Season NO_x Emission Rate[42] (lb/MMBtu)
Ft. Martin	1	550	Pulverized Coal	SNCR Trim	0.3016	0.2627
	2	550	Pulverized Coal	SNCR Trim	0.3118	0.2728
Grant Town	1A	84	Coal Refuse	SNCR	0.3141	0.2927
	1B		Coal Refuse	SNCR	0.3141	0.2906
MEA	CFB1	60	Coal Refuse	SNCR	0.3334	0.3384
	CFB2		Coal Refuse	SNCR	0.3332	0.3376
Harrison	1	640	Pulverized Coal	SCR	0.1062	0.0843
	2	640	Pulverized Coal	SCR	0.0885	0.0864
	3	640	Pulverized Coal	SCR	0.0761	0.1161
John Amos	1	800	Pulverized Coal	SCR	0.0838	0.0771
	2	800	Pulverized Coal	SCR	0.0760	0.0761
	3	1,300	Pulverized Coal	SCR	0.1135	0.1087
Mitchell	1	80	Pulverized Coal	SCR	0.0834	0.0795
	2	800	Pulverized Coal	SCR	0.0909	0.0823
Mountaineer		1,300	Pulverized Coal	SCR	0.0991	0.0880
Mt. Storm	1	530	Pulverized Coal	SCR	0.0684	0.0899
	2	530	Pulverized Coal	SCR	0.0913	0.0887
	3	520	Pulverized Coal	SCR	0.0810	0.0831
Pleasants	1	650	Pulverized Coal	SCR	0.0887	0.0778
	2	650	Pulverized Coal	SCR	0.1328	0.1555
Longview		700	Pulverized Coal	SCR	0.0581	0.0599
Big Sandy Peaker Plant	GS01		Natural Gas	Water Injection	0.1241	0.2981
	GS02		Natural Gas	Water Injection	0.1111	0.3644

[41] "2023en_Engineering_Analysis_Unit_File.xls" workbook released with October 27, 2017 Page Memorandum
[42] U.S. EPA Air Markets Program Data. https://ampd.epa.gov/ampd/

Plant	Unit	MW	Fuel	NO_x Control	2017 Ozone Season NO_x Emission Rate (lb/MMBtu)	2018 Ozone Season NO_x Emission Rate[42] (lb/MMBtu)
	GS03		Natural Gas	Water Injection	0.1280	0.2732
	GS04		Natural Gas	Water Injection	0.1027	0.3444
	GS05		Natural Gas	Water Injection	0.1278	0.2792
	GS06		Natural Gas	Water Injection	0.0911	0.3426
	GS07		Natural Gas	Water Injection	0.1287	0.2766
	GS08		Natural Gas	Water Injection	0.1069	0.3523
	GS09		Natural Gas	Water Injection	0.1098	0.3066
	GS10		Natural Gas	Water Injection	0.0931	0.3246
	GS11		Natural Gas	Water Injection	0.1131	0.2883
	GS12		Natural Gas	Water Injection	0.1138	0.3437
Ceredo Generating Station	1		Natural Gas	Fuel Reburning	0.1200	0.1332
	2		Natural Gas	Fuel Reburning	0.1147	0.1286
	3		Natural Gas	Fuel Reburning	0.1141	0.1407
	4		Natural Gas	Fuel Reburning	0.1202	0.1476
	5		Natural Gas	Fuel Reburning	0.1223	0.1507
	6		Natural Gas	Fuel Reburning	0.1096	0.1534
Pleasants Energy	1		Natural Gas	Water Injection	0.0374	0.0378
	2		Natural Gas	Water Injection	0.0463	0.0424

DEP's conclusion that no additional controls beyond what is already planned is based on a very conservative analysis.

Comment 5:

> The CAA specifically requires SIPs to "include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements."[43] Indeed, a SIP cannot be considered administratively complete unless it includes "[e]vidence that the plan contains emission limitations, work practice standards and recordkeeping/reporting requirements, where necessary, to ensure emission levels."[44] Without specific enforceable emissions limits and control measures, the SIP is incomplete and does not meet the requirements of the CAA and implementing regulations.[45]

Response 5:

> West Virginia has included records of permanent shutdowns, consent orders, and permits with enforceable limits for EGUs in Appendix M and for non-EGUs in Appendix N.

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[43] 40 U.S.C. §7410(a)(2)(A)
[44] 40 CFR Part 51, App. V, §2.2(g)
[45] 40 U.S.C. §7410(a)(2) and 40 CFR 60.24

Comment 6:

New York and other states that are downwind of West Virginia have already adopted control measures that are considerably more stringent than most upwind states. For example, DEC applies Reasonably Available Control Technology (RACT) requirements statewide on both electric generating units (EGUs) and non-EGUs, at a current cost threshold of $5,500 per ton of NOx reduced; meanwhile, many upwind states —including West Virginia — unreasonably rely on EPA's flawed claim that EGU NOx reductions that cost more than $1,400 per ton would not be cost-effective. For the 2017 ozone season, NOx emissions from West Virginia's electric generating sector were over 350% (more than 14,000 tons) greater than electric generating sector emissions in New York, despite the population disparity highlighted by WVDEP.[46],[47] Additionally, West Virginia's NOx emission rate was 180% higher. WVDEP should implement NOx emission controls on its major stationary sources based on a more stringent control threshold.

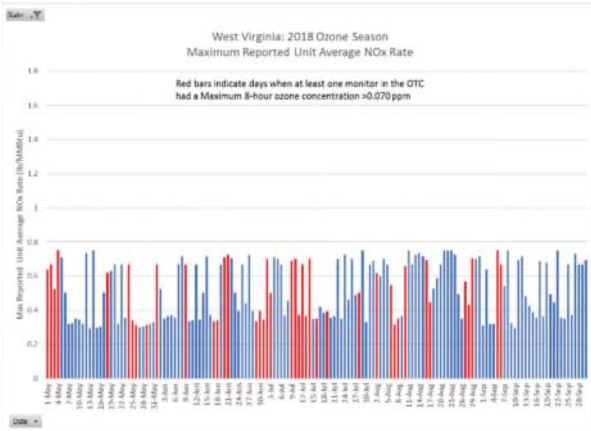
Response 6:

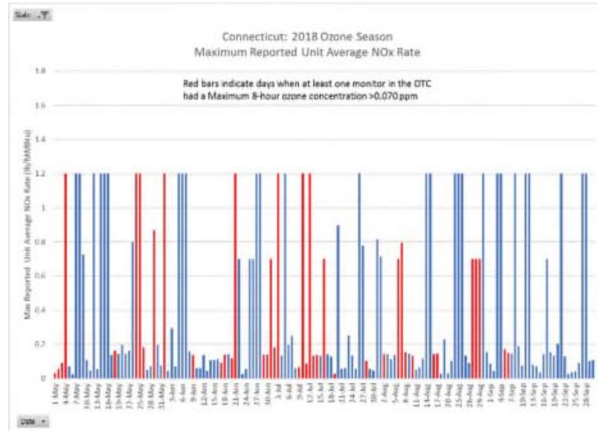
New York touts the RACT requirements for both EGUs and non-EGUs in New York and other downwind states, and finds West Virginia lacking, yet analysis of EPA's Air Markets Program Data paints a totally different picture. The table and charts below show the 2018 ozone season daily maximum reported unit average NO_x emission rates for West Virginia, Connecticut, Maryland, New Jersey, New York, and Pennsylvania. The charts below also identify the days with at least one monitor in the OTC with a maximum 8-hour ozone concentration above 0.070 ppm. During the 2018 ozone season the daily maximum reported average emission rate for any unit in West Virginia reporting to CAMD was 0.75 lb/MMBtu, which occurred on 12 days. In contrast the maximum reported unit average emission rate for New York was 1.561 lb/MMBtu, and the reported maximum average unit rate exceeded 0.75 lb/MMBtu for 81 days.

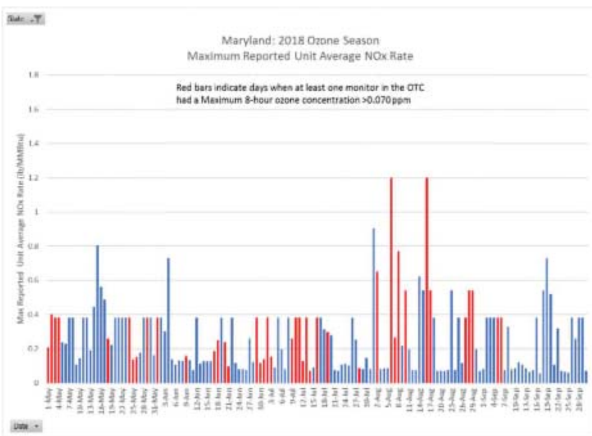
State	Reported Max Daily Unit Avg NO_x Rate (lb/MMBtu)	Number of Days with reported Max Daily Unit Avg NO_x rate ≥1.5 lb/MMBtu	Number of Days with reported Max Daily Unit Avg NO_x rate ≥1.2 lb/MMBtu	Number of Days with reported Max Daily Unit Avg NO_x rate >0.75 lb/MMBtu
West Virginia	0.75	0	0	0
Connecticut	1.201	0	34	41
Maryland	1.2	0	2	5
New Jersey	1.2	0	4	18
New York	1.561	13	53	81
Pennsylvania	2.26	34	30	36

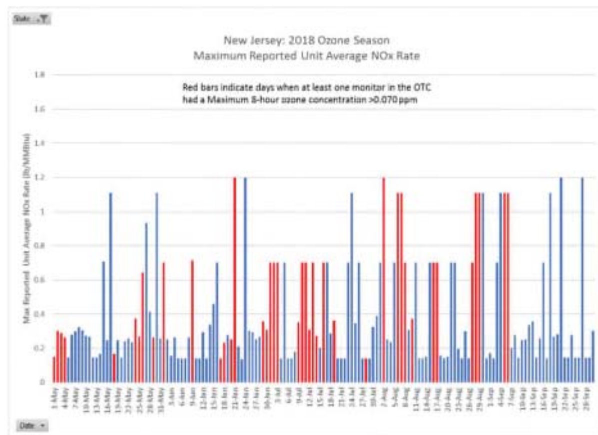
[46] U.S. EPA Air Markets Program Data
[47] WV DEP proposed Good Neighbor Demonstration, page 18.

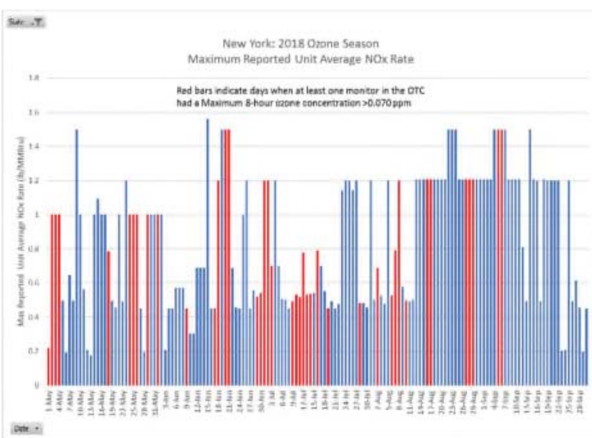
Daily Maximum Reported Unit Average NOx Rate
for West Virginia, Connecticut, Maryland, New Jersey, New York and Pennsylvania[48]

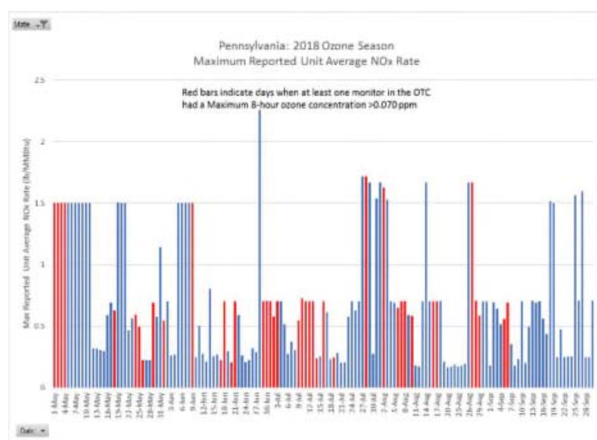






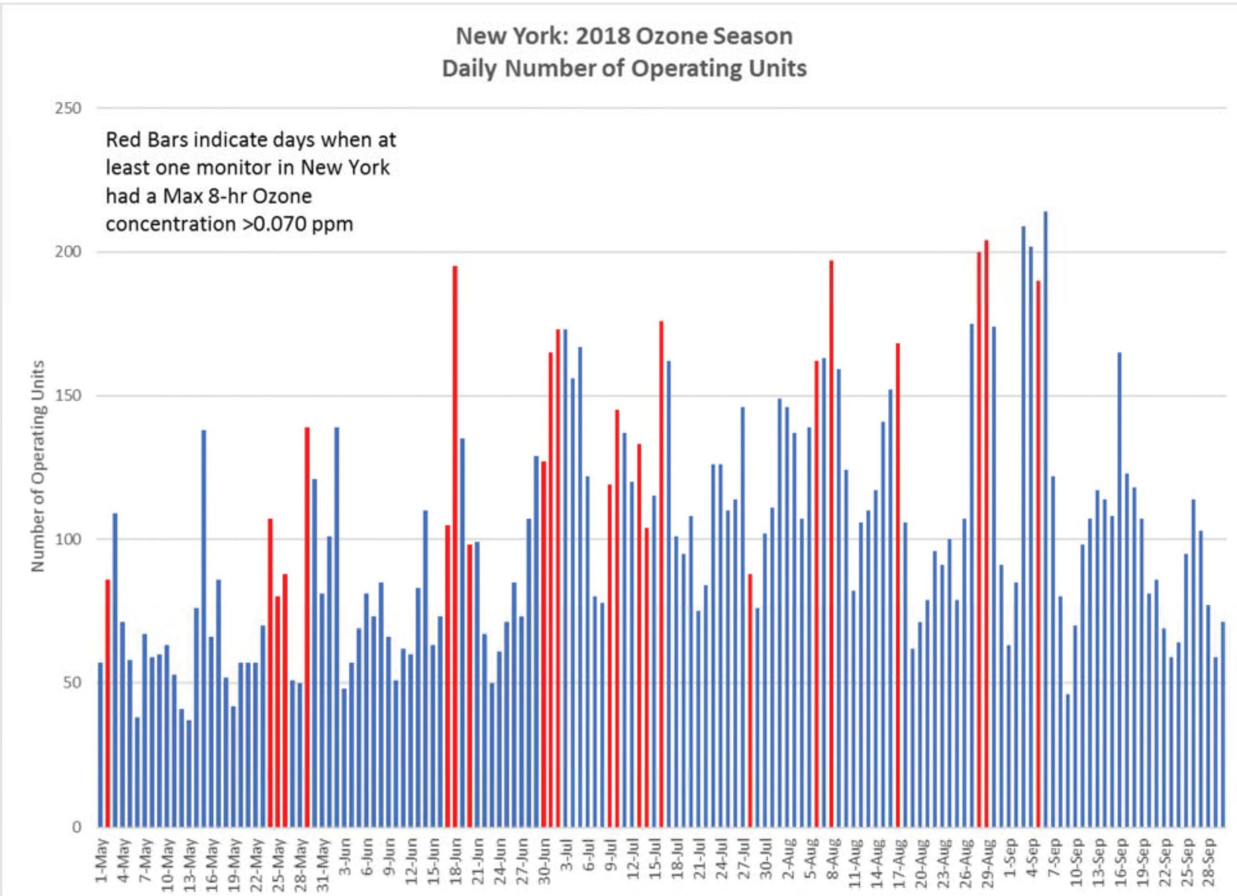






[48] Full size charts are contained in Appendix RTC-3 to this document.

Furthermore, as shown in the chart below, there are numerous units that do not normally operate in New York, that come online during hot summer days to meet peak demand. On some days in New York an additional 100 - 150 units come online and operate, some for very short periods of time.



The OTC has recognized the contribution of peaking units to the ozone attainment problems in the northeast as well. Frank Steitz, Chair of the OTC Stationary and Area Sources Committee, reported at the September 21, 2018 OTC/MANE-VU Joint Committees' Meeting[49], that Delaware analyzed emissions on high electric demand days during an ozone episode July 19-22, 2017 and found that 888 simple cycle combustion units in the OTR "cycled" at least once during the four-day episode studied, while only two operated throughout the episode. A copy of the presentation by Frank Steitz is included in Appendix RTC-4 to this Response to Comments document.

[49] https://otcair.org/upload/Documents/Meeting%20Materials/OTC_SAS_Public_09212018.pdf

DE Analysis: CSAPR-U/OTR EGU NOx Evaluation

DE's analysis of July 19 – 22, 2017 episode involving:

1. Coal EGUs with SCR or SNCR
2. Non-coal EGUs with SCR or SNCR
3. Steam EGUs without SCR or SNCR
4. Combined cycle turbines
5. Simple cycle turbines

Summary of operating status of EGUs, by configuration, in CSAPR-U/OTR during the July 19 – 22, 2017 episode

	Coal Fired EGUs Equipped with SCR or SNCR	Non-Coal Fired Steam EGUs Equipped with SCR or SNCR	Steam EGUs Not Equipped with SCR or SNCR	Combined Cycle Combution Turbine EGUs	Simple Cycle Combustion Turbine EGUs
Number Operating Throughout Episode	182	29	182	285	2
Number Cycled at Least Once During Episode	53	18	170	204	888*
Number Not Operated During Episode	13	6	114	23	337

*substantial number of the "cycled" combustion turbines operated for very short periods of time, possibly due to the units failing to come on line or the combustion turbine operated only to bring the generator to speed for VAR control.

8

The OTC Stationary and Area Source Committee, HEDD Workgroup in their *White Paper: Examining the Air Quality Effects of Small EGUs, Behind the Meter Generators, and Peaking Units during High Electric Demand Days,* concluded:

> The Workgroup's analysis revealed that peaking units can contribute over 30% of total OTR EGU NOx mass on the episode days that were analyzed, and that a NOx emissions reduction potential of over 20 tons per day could be realized if gas and oil-fired combustion turbines without installed controls were to meet "moderate RACT" emissions levels.[50]

A copy of the White Paper is included as Appendix RTC-5 to this Response to Comments document.

With respect to RACT requirements, West Virginia notes that all areas of West Virginia are in attainment with the 2015 Ozone NAAQS, therefore RACT is not required. Section 172(c)(1) of the CAA requires SIPs for nonattainment areas to include "reasonably available control measures" (RACM), including RACT, for existing sources. Section 182(a)(2)(A) requires SIPs to include RACT for Marginal Ozone nonattainment areas. Section 182(b)(2)(A) of the CAA requires SIPs to include RACT for each category of VOC sources covered by a CTG document issued between November 15, 1990, and the date of attainment for the Moderate Ozone nonattainment area.

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[50] OTC Stationary and Area Source Committee, HEDD Workgroup, *White Paper: Examining the Air Quality Effects of Small EGUs, Behind the Meter Generators, and Peaking Units during High Electric Demand Days*, Final Draft 11/10/16, p. 42.

CAA Section 184(a) establishes the OTR, which consists of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and the District of Columbia. CAA Section 184(b) requires states in the OTR to revise their SIPs to implement RACT with respect to all sources of VOCs in the state covered by a CTG issues before or after November 15, 1990.

As DAQ noted in the May 15, 2017 comments on EPA's *Response to December 9, 2013, Clean Air Act Section 176A Petition from Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island and Vermont*, OTR states are not fully implementing required OTR and other ozone controls, in a timely manner.

The Ozone Transport Commission website (www.otcair.org) identifies multiple states in the OTR that have not yet acted on promulgating regulations based on OTC mobile source model rules and OTC 2009-2014 model rules. No action had been taken (as of 10/02/16, the most recent data reported) by DE, DC, MA, NH, NJ, PA or VA on the catalytic converter mobile source model rule, or by DE, NY, PA, VA or VT on the nonroad anti-idling model rule. And no action had been taken (as of 4/25/17, the most recent data available) by ME, MA, RI, VT or VA on any of the seven the OTC 2009-2014 model rules.

EPA found that 15 states and the District of Columbia have failed to submit SIP revisions to satisfy certain requirements for the 2008 ozone NAAQS that apply to nonattainment areas and/or states in the OTR on February 3, 2017 [82 FR 9158]. Upon promulgation of the 2008 ozone NAAQS, states in the OTR were required to submit a SIP revision for RACT. West Virginia acknowledges that the only state in the OTR not included in the list was New York.

New York also noted that West Virginia's EGU emissions were greater than New York's, despite the population density disparity that West Virginia identified in the proposed SIP. New York failed to take into consideration that West Virginia exports electricity while New York imports electricity. EPA's Air Markets Program Data[51] shows that during the 2017 ozone season NY generated 22,614,647 MW-h of electricity, while WV generated 33,766,342 MW-h, 150% of the electricity generated by NY. EPA's Air Markets Program Data for the 2018 ozone season shows NY generated 25,748,383.76 MW-h, while West Virginia generated 31,767,481.2 MW-h of electricity, 124% of the electricity generated by New York.

As the U.S. Energy Information Administration (EIA) notes in *State Profile and Energy Estimates* for New York[52],

> New York's statewide grid is managed by a single independent system operator called the NYISO. The NYISO manages state wholesale electricity markets and transmission. Electricity usually flows east and south because

[51] https://ampd.epa.gov/ampd/
[52] https://www.eia.gov/state/analysis.php?sid=NY#23

> two-thirds of the state's power demand is in the New York City and Long Island region, but only about half of net electricity generation originates there.[53, 54]

EIA notes in *State Profile and Energy Estimates for West Virginia*[55],

> West Virginia generates much more electricity than it consumes. Although more than two-fifths of West Virginia households use electricity as their primary source for home heating, retail electricity sales to all customers account for less than half of the net electricity generated in the state.[56, 57] As a result, West Virginia is a net supplier of electricity to the regional grid, and is among the top 10 states in the nation in net interstate sales of electricity.[58]

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[53] U.S. Federal Energy Regulatory Commission, Electric Power Markets: New York (NYISO), accessed July 31, 2018.
[54] New York Independent System Operator, Power Trends 2017, p. 11.
[55] https://www.eia.gov/state/analysis.php?sid=WV
[56] U.S. Census Bureau, American Fact Finder, West Virginia, Table B25040, House Heating Fuel, 2012-2016 American Community Survey 5-Year Estimate.
[57] U.S. EIA, Electric Power Monthly (February 2018), Tables 1.3.B, 5.4.B.
[58] U.S. EIA, State Electricity Profiles, accessed July 24, 2018.

III. Maryland Department of the Environment

Comment 1:

The Department appreciates the opportunity to consider the West Virginia State Implementation Plan (SIP) revision supplement. We acknowledge the October 9, 2018 public hearing in Charleston and the deadline for public comments.

Response 1:

No response required.