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January 11, 2019

Ms. Mary Walker
Acting Regional Administrator
US EPA Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

RE: Request for approval of the final submission to revise the Kentucky State Implementation Plan relating to Clean Air Act Section 110(a), Infrastructure requirements for the 2015 Ozone National Ambient Air Quality Standard

Dear Ms. Walker,

The Kentucky Energy and Environment Cabinet (Cabinet) hereby submits to the U.S. Environmental Protection Agency (EPA) a letter certifying that Kentucky's existing State Implementation Plan (SIP) contains Clean Air Act (CAA) Section 110 provisions that address the requirements necessary to implement the 2015 Ozone (O_3) National Ambient Air Quality Standards (NAAQS). The Cabinet is requesting EPA's approval that the following submission satisfies all of the requirements of Section 110(a)(2) of the CAA, for purposes of implementing the 2015 O_3 NAAQS.

This certification submission is consistent with EPA's September 2013 published memorandum titled, "Guidance on Infrastructure State Implementation Plan (SIP) Elements under Clean Air Act Sections 110(a)(1) and 110(a)(2)." The certification submission provides citations to the regulations or non-regulatory measures, as appropriate, in the EPA-approved SIP for that particular infrastructure SIP element requirement and an explanation as to how those existing provisions meet the relevant requirements.

In accordance with 40 CFR 51.102, the Cabinet made the proposed SIP revision available for public review and comment from August 23, 2018 until September 21, 2018. All comments received during the comment period are included in Appendix D, along with the statement of consideration. If you have any questions or comments concerning this matter, please contact Ms. Kelly Lewis, Program Planning and Administrative Branch Manager, Division for Air Quality at (502) 782-6687 or kelly.lewis@ky.gov.

Sincerely,

Charles G. Snavely
Secretary

Cc: Beverly Banister, Region 4 US EPA
Scott Davis, Region 4 US EPA
Lynorae Benjamin, Region 4 US EPA

Final
Kentucky Infrastructure State Implementation Plan

2015 Ozone National Ambient Air Quality Standards

Prepared by the
Kentucky Division for Air Quality
Submitted by the
Kentucky Energy and Environment Cabinet

January 2019

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I. Introduction

On October 26, 2015, the U.S. Environmental Protection Agency (EPA) revised the National Ambient Air Quality Standards (NAAQS) for ozone.[1] The EPA lowered the existing primary and secondary standards from 75 parts per billion (ppb) to 70 ppb[2]. When the EPA revises an existing standard, states are required by Section 110(a)(1) and (2) of the Clean Air Act (CAA) to submit and adopt an "infrastructure" State Implementation Plan (SIP) to the EPA. Infrastructure SIPs (I-SIPs) demonstrate that a state has the basic program elements to implement, maintain, and enforce new or revised standards, including requirements for emissions inventories, monitoring, and modeling among other elements. States are required to submit SIPs to EPA demonstrating that these basic program elements have been addressed within 3 years of the promulgation of any new or revised NAAQS.

On March 7, 2013, EPA partially approved Kentucky's Section 110(a)(1) and (2) infrastructure requirements for the 2008 ozone NAAQS.[3] On July 17, 2018, EPA approved the interstate transport portion of the 2008 ozone I-SIP, which fully approved all infrastructure requirements for the 2008 ozone NAAQS.[4] In reference to EPA's memo, "Guidance on Infrastructure State Implementation Plan (SIP) Elements under Clean Air Act Sections 110(a)(1) and 110(a)(2),"[5] Kentucky is submitting this I-SIP confirming that Kentucky's existing SIP for the 2008 ozone NAAQS contains CAA Section 110 provisions that address the requirements for purposes of implementing the 2015 ozone NAAQS. Subsections (A) through (M) of CAA Section 110(a)(2) set forth the elements that a state's program must contain in the SIP. The list of CAA section 110(a)(2) requirements for NAAQS implementation and Kentucky's provisions are detailed below.

The state rules can be found on the Kentucky Legislative Research Commission (LRC) website along with the Kentucky Revised Statutes (KRS) referenced in this document.[6] The KRS are included as reference material and should not be adopted as part of Kentucky's SIP. This request is based upon the May 19, 2010 Federal Register published by EPA regarding California's legal authority.[7] The final rule states, "We also noted that the actual statutory provisions and other legal documents relied upon to support a State's assurance of adequate legal authority need not be approved into the SIP under CAA section 110 or EPA's SIP regulations in 40 CFR part 51 (although such provisions are required to be submitted with the plan). Thus, EPA could approve, consistent with CAA and EPA requirements, and did so in this instance, a wholesale revision to the original legal authority chapter without also approving the actual statutory provisions and other legal documents cited therein."

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[1] 80 FR 65292
[2] 40 CFR 50.10
[3] 78 FR 14681
[4] 83 FR 33730
[5] Stephen D. Page memorandum, September 13, 2013
[6] http://www.lrc.ky.gov
[7] 75 FR 27938

In accordance with 40 CFR 51.102, a public hearing was held at a Kentucky Division for Air Quality (Division) conference room located at 300 Sower Boulevard, Frankfort, Kentucky, on September 21, 2018. The public hearing notice and the I-SIP were made available for the public for review on the Division's website.[8] The public hearing notice was sent to members of the community, who have provided contact information for the Division's notification distribution list. A copy of the public hearing notice is included in Appendix D.

II. 2015 Ozone Infrastructure SIP Requirements

According to the EPA, I-SIP submittals must meet the requirements found in sections 110(a)(1) and (2) of the CAA. These requirements must be addressed in the submittal within three years of the promulgation of a new or revised NAAQS. Presented below are the applicable requirements found in section 110(a)(1) and (2) relating to the 2015 ozone NAAQS.

Element A – Section 110(a)(2)(A): Emission Limits and Other Control Measures

Each such plan shall --

(A) 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 of this chapter.

Emission limits and other control measures: Section 110(a)(2)(A) of the CAA requires SIPs to include enforceable emission limits and other control measures, means or techniques, schedules or compliance and other related matters. KRS Chapter 224.10-100(5) provides the Energy and Environment Cabinet (Cabinet) with the authority to provide for the prevention, abatement, and control of all water, land, and air pollution.

The following rules address additional control measures, means, and techniques:

- 401 KAR 50:010. *Definitions for 401 KAR Chapter 50.* This administrative regulation defines the terms used in 401 KAR Chapter 50. The definitions contained in this administrative regulation are neither more stringent nor otherwise different than the corresponding federal definitions.
- 401 KAR 50:012. *General application.* This administrative regulation provides guidelines by which all administrative regulations of 401 KAR Chapters 50 to 65, are to be understood.
- 401 KAR 50:015. *Documents incorporated by reference.* This administrative regulation provides for the incorporation by reference of documents referred to within these administrative regulations.
- 401 KAR 50:020. *Air quality control regions.* This administrative regulation provides for the designation and classification of air quality control regions.

[8] www.air.ky.gov

- 401 KAR 50:025. *Classification of counties.* This administrative regulation provides for the classification of counties with respect to various pollutants.
- 401 KAR 50:040. *Air quality models.* This administrative regulation specifies general provisions for the use of air quality models.
- 401 KAR 50:042. *Good engineering practice stack height.* This administrative regulation defines good engineering practice stack height which shall be used in establishing emissions limitations.
- 401 KAR 50:045. *Performance tests.* This administrative regulation establishes requirements for performance tests.
- 401 KAR 50:047. *Test procedures for capture efficiency.* This administrative regulation provides capture efficiency test procedures for volatile organic compounds.
- 401 KAR 50:050. *Monitoring.* This administrative regulation establishes requirements for stack gas monitoring, ambient air monitoring, and recording and reporting requirements as related to monitoring data.
- 401 KAR 50:055. *General compliance requirements.* This administrative regulation establishes requirements for compliance during shutdown and malfunctions; establishes requirements for demonstrating compliance with standards; establishes requirements for compliance when a source is relocated within the Commonwealth of Kentucky; and other general compliance requirements. The Cabinet has submitted a SIP revision to remove Section 1(1) and (4) from 401 KAR 50:055 in response to a SIP call in which EPA found these provisions of the regulation inadequate; however, the SIP revision will not affect Kentucky regulations. The Cabinet is waiting for final approval from EPA for this SIP revision.
- 401 KAR 50:060. *Enforcement.* This administrative regulation provides for enforcement of the terms and conditions of permits and compliance schedules.
- 401 KAR 50:065. *Conformity of general federal actions.* The federal regulation incorporated by reference in this administrative regulation provides for determining the conformity of general federal actions to the State Implementation Plan (SIP). 40 CFR 51.850 to 51.860 require that the applicable federal agencies implement the conformity determination in consultation with agencies of the Commonwealth of Kentucky.
- 401 KAR 50:066. *Conformity of transportation plans, programs, and projects.* This administrative regulation adopts the Federal Transportation Conformity Rules as codified in 40 CFR Part 93 Subpart A and incorporates a guidance document that establishes criteria and procedures for the interagency consultation process used in demonstrating conformity of federal transportation plans to the Kentucky State Implementation Plan.
- 401 KAR 51:001. *Definitions for 401 KAR Chapter 51.* This administrative regulation defines the terms used in 401 KAR Chapter 51.
- 401 KAR 51:005. *Purpose and general provisions.* This administrative regulation establishes the general provisions as related to new sources with respect to the prevention of significant deterioration of air quality and construction of stationary sources impacting on nonattainment areas.
- 401 KAR 51:010. *Attainment status designations.* This administrative regulation designates the status of all areas of the Commonwealth of Kentucky with regard to attainment of the ambient air quality standards.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation applies to the construction of new major stationary sources and

projects at existing major stationary sources that locate in areas designated attainment or unclassifiable.

- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained. Additionally, Section 5 of 401 KAR 51:052 has been amended to include language related to credits for emissions offsets, which was approved to Kentucky's SIP on December 2014.
- 401 KAR 51:150. *NO_x requirements for stationary internal combustion engines.* Pursuant to the federal NO_x SIP Call, this administrative regulation provides for the regional control of NO_x emissions by establishing requirements for large stationary internal combustion engines.
- 401 KAR 51:160. *NO_x requirements for large utility and industrial boilers.* This administrative regulation establishes requirements for the control of NO_x emissions from large boilers and turbines used in power plants and other industrial applications, pursuant to the federal mandate published under the NO_x SIP Call.
- 401 KAR 51:170. *NO_x requirements for cement kilns.* This administrative regulation provides for the regional control of NO_x emissions from Portland Cement manufacturing plants pursuant to the federal mandate published under the NO_x SIP Call.
- 401 KAR 51:180. *NO_x credits for early reduction and emergency.* This administrative regulation provides for the distribution of NO_x allowances from a compliance supplement pool allocated to Kentucky by the EPA for sources that reduce NO_x emissions before the compliance deadline of the federal mandate published under the NO_x SIP Call. It also provides for setting aside unused credits to assist sources that are unable to meet the compliance deadline.
- 401 KAR 51:190. *Banking and trading NO_x allowances.* This administrative regulation incorporates by reference the federal regulation that establishes a program for banking and trading of emission allowances to reduce NO_x emissions under the federal NO_x SIP Call.
- 401 KAR 51:195. *NO_x opt-in provisions.* The federal regulation incorporated by reference in this administrative regulation establishes provisions for individual sources to opt into the NO_x Budget Trading Program.
- 401 KAR 51:210. *CAIR NO_x annual trading program.* This administrative regulation establishes requirements for the control of NO_x emissions from large boilers and turbines used in power plants, pursuant to the federal mandate published under the Clean Air Interstate Rule (CAIR), 40 CFR 96.101 to 96.188.
- 401 KAR 51:220. *CAIR NO_x ozone season trading program.* This administrative regulation establishes requirements for the control of NO_x emissions from large boilers and turbines used in power plants and other industrial applications, pursuant to the federal mandate published under CAIR, 40 CFR 96.301 to 96.388.
- 401 KAR 51:240. *Cross-State Air Pollution Rule (CSAPR) NO_x annual trading program.* This administrative regulation establishes the requirements for the control of annual NO_x emissions from large boilers and turbines used in power plants, pursuant to the Cross-State Air Pollution Rule (CSAPR) NO_x annual trading program, 40 CFR 97.401 through 97.435, Subpart AAAAA for sources located in the Commonwealth of Kentucky. This regulation was adopted into Kentucky Administrative Regulations on July 5, 2018. The

Cabinet submitted the regulation to EPA on September 13, 2018 for approval into the Kentucky SIP.

- 401 KAR 51:250. *Cross-State Air Pollution Rule (CSAPR) NO_x ozone season group 2 trading program.* This administrative regulation establishes the requirements for the control of ozone season NO_x emissions from large boilers and turbines used in power plants, pursuant to the CSAPR NO_x ozone season group 2 trading program, 40 CFR 97.801 through 97.835, Subpart EEEEE for sources located in the Commonwealth of Kentucky. This regulation was adopted into Kentucky Administrative Regulations on July 5, 2018. The Cabinet submitted the regulation to EPA on September 13, 2018 for approval into the Kentucky SIP.
- 401 KAR 52:001. *Definitions for 401 KAR Chapter 52.* This administrative regulation defines the terms used in 401 KAR Chapter 52.
- 401 KAR 52:030. *Federally-enforceable permits for non-major sources.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that accept emission limitations to avoid the New Source Review requirements under Title I of the Clean Air Act or the Operating Permit Program requirements under Title V of the Clean Air Act.
- 401 KAR 52:090. *Prohibitory rule for hot mix asphalt plants.* This administrative regulation sets production limits for hot mix asphalt plants, which keeps their emissions below the major source threshold and avoids the necessity of having to obtain a Title V or conditional major permit.
- 401 KAR 52.100. *Public, affected state, and US EPA review.* This administrative regulation establishes the procedures used by the Cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA.
- 401 KAR 53:005. *General provisions.* This administrative regulation is to provide for the establishment of general provisions, definitions and time schedules as they pertain to this chapter.
- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.
- 401 KAR 59:001. *Definitions for 401 KAR Chapter 59.* This administrative regulation defines the terms used in 401 KAR Chapter 59.
- 401 KAR 59:005. *General provisions.* This administrative regulation is to provide for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to new sources.
- 401 KAR 59:010. *New process operations.* This administrative regulation provides for the control of emissions from new process operations which are not subject to another particulate standard within this chapter.
- 401 KAR 59:015. *New indirect heat exchangers.* This administrative regulation establishes requirements for the control of emissions from new indirect heat exchangers.
- 401 KAR 59:020. *New incinerators.* This administrative regulation is to provide standards of performance for new incinerators.
- 401 KAR 59:046. *Selected new petroleum refining processes and equipment.* This administrative regulation provides for the control of hydrocarbon emissions from selected new petroleum refining processes and equipment.

- 401 KAR 59:050. *New storage vessels for petroleum liquids.* This administrative regulation provides for the control of emissions from new storage vessels for petroleum liquids.
- 401 KAR 59:095. *New oil-effluent water separators.* This administrative regulation provides for the control of emissions from new oil-effluent water separators.
- 401 KAR 59:101. *New bulk gasoline plants.* This administrative regulation provides for the control of volatile organic compound emissions from new bulk gasoline plants.
- 401 KAR 59:174. *Stage II controls at gasoline dispensing facilities.* This administrative regulation establishes requirements for the control of emissions from gasoline dispensing facilities. On May 3, 2016, the Cabinet submitted a SIP revision amending 401 KAR 59:174, *Stage II controls at gasoline dispensing facilities*, to remove Stage II controls from gasoline dispensing facilities in Northern Kentucky. EPA approved the revision on October 14, 2016.[9]
- 401 KAR 59:175. *New service stations.* This administrative regulation provides for the control of volatile organic compound emissions from new service stations.
- 401 KAR 59:185. *New solvent metal cleaning equipment.* This administrative regulation provides for the control of volatile organic compound emissions from new solvent metal cleaning equipment.
- 401 KAR 59:190. *New insulation of magnet wire operations.* This administrative regulation provides for the control of volatile organic compound emissions from new insulation of magnet wire operations.
- 401 KAR 59:210. *New fabric, vinyl and paper surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from new fabric, vinyl or paper surface coating operations.
- 401 KAR 59:212. *New graphic arts facilities using rotogravure and flexography.* This administrative regulation provides for the control of volatile organic compound emissions from new graphic arts facilities which use rotogravure and flexography.
- 401 KAR 59:214. *New factory surface coating operations of flat wood paneling.* This administrative regulation provides for the control of volatile organic compound emissions from new factory surface coating operations of flat wood paneling.
- 401 KAR 59:225. *New miscellaneous metal parts and products surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from new miscellaneous metal parts and products surface coating operations.
- 401 KAR 59:230. *New synthesized pharmaceutical product manufacturing operations.* This administrative regulation provides for the control of volatile organic compound emissions from new synthesized pharmaceutical product manufacturing operations.
- 401 KAR 59:240. *New perchloroethylene dry cleaning systems.* This administrative regulation provides for the control of volatile organic compound emissions from new perchloroethylene dry cleaning systems.
- 401 KAR 59:315. *Specific new sources.* This administrative regulation provides for the control of volatile organic compound emissions for specific new sources.
- 401 KAR 59:760. *Commercial motor vehicle and mobile equipment refinishing operations.* This administrative regulation provides for the control of volatile organic compound

[9] 81 FR 70966

emissions from new and existing commercial motor vehicle and mobile equipment refinishing operations in Boone, Campbell, and Kenton Counties.

- 401 KAR 61:001. *Definitions for 401 KAR Chapter 61*. This administrative regulation defines the terms used in 401 KAR Chapter 61.
- 401 KAR 61:005. *General provisions*. This administrative regulation provides for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to existing sources.
- 401 KAR 61:010. *Existing incinerators*. This administrative regulation provides standards of performance for existing incinerators.
- 401 KAR 61:045. *Existing oil-effluent water separators*. This administrative regulation provides for the control of emissions from existing oil-effluent water separators.
- 401 KAR 61:050. *Existing storage vessels for petroleum liquids*. This administrative regulation provides for the control of emissions from existing storage vessels for petroleum liquids.
- 401 KAR 61:055. *Existing loading facilities at bulk gasoline terminals*. This administrative regulation provides for the control of emissions from existing loading facilities at bulk gasoline terminals.
- 401 KAR 61:056. *Existing bulk gasoline plants*. This administrative regulation provides for the control of volatile organic compound emissions from existing bulk gasoline plants.
- 401 KAR 61:060. *Existing sources using organic solvents*. This administrative regulation provides for the control of emissions from existing sources using any organic solvents.
- 401 KAR 61:065. *Existing nitric acid plants*. This administrative regulation provides for the control of emissions from existing nitric acid plants.
- 401 KAR 61:085. *Existing service stations*. This administrative regulation provides for the control of volatile organic compound emissions from existing service stations.
- 401 KAR 61:090. *Existing automobile and light-duty truck surface coating operations*. This administrative regulation provides for the control of volatile organic compound emissions from existing automobile and light-duty truck surface coating operations.
- 401 KAR 61:095. *Existing solvent metal cleaning equipment*. This administrative regulation provides for the control of volatile organic compound emissions from existing solvent metal cleaning equipment.
- 401 KAR 61:100. *Existing insulation of magnet wire operations*. This administrative regulation provides for the control of volatile organic compound emissions from existing insulation of magnet wire operations.
- 401 KAR 61:105. *Existing metal furniture surface coating operations*. This administrative regulation provides for the control of volatile organic compound emissions from existing metal furniture surface coating operations.
- 401 KAR 61:110. *Existing large appliance surface coating operations*. This administrative regulation provides for the control of volatile organic compound emissions from existing large appliance surface coating operations.
- 401 KAR 61:120. *Existing fabric, vinyl and paper surface coating operations*. This administrative regulation provides for the control of volatile organic compound emissions from existing fabric, vinyl or paper surface coating operations.

- 401 KAR 61:122. *Existing graphic arts facilities using rotogravure and flexography.* This administrative regulation provides for the control of volatile organic compound emissions from existing graphic arts facilities which use rotogravure and flexography.
- 401 KAR 61:124. *Existing factory surface coating operations of flat wood paneling.* This administrative regulation provides for the control of volatile organic compound emissions from existing factory surface coating operations of flat wood paneling.
- 401 KAR 61:125. *Existing can surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing can surface coating operations.
- 401 KAR 61:130. *Existing coil surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing coil surface coating operations.
- 401 KAR 61:132. *Existing miscellaneous metal parts and products surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing miscellaneous metal parts and products surface coating operations.
- 401 KAR 61:135. *Selected existing petroleum refining processes and equipment.* This administrative regulation provides for the control of hydrocarbon emissions from selected existing petroleum refining processes and equipment.
- 401 KAR 61:137. *Leaks from existing petroleum refinery equipment.* This administrative regulation provides for the control of volatile organic compound emissions from leaks from existing petroleum refinery equipment.
- 401 KAR 61:150. *Existing synthesized pharmaceutical product manufacturing operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing synthesized pharmaceutical product manufacturing operations.
- 401 KAR 61:155. *Existing pneumatic rubber tire manufacturing plants.* This administrative regulation provides for the control of volatile organic compound emissions from existing pneumatic rubber tire manufacturing plants.
- 401 KAR 61:160. *Existing perchloroethylene dry cleaning systems.* This administrative regulation provides for the control of volatile organic compound emissions from existing perchloroethylene dry cleaning systems.
- 401 KAR 61:175. *Leaks from existing synthetic organic chemical and polymer manufacturing equipment.* This administrative regulation provides for the control of volatile organic compound emissions from leaks from existing synthetic organic chemical and polymer manufacturing equipment.
- 401 KAR 63:001. *Definitions for 401 KAR Chapter 63.* This administrative regulation defines the terms used in 401 KAR Chapter 63.
- 401 KAR 63:005. *Open burning.* This administrative regulation establishes requirements for the control of open burning.
- 401 KAR 63:010. *Fugitive emissions.* This administrative regulation provides for the control of fugitive emissions.
- 401 KAR 63:025. *Asphalt paving operations.* This administrative regulation provides for the control of volatile organic compound emissions due to asphalt paving operations.

- 401 KAR 63:031. *Leaks from gasoline tank trucks.* This administrative regulation provides for the control of volatile organic compound emissions from leaks from gasoline tank trucks.
- 401 KAR 65:001. *Definitions for 401 KAR Chapter 65.* This administrative regulation defines the terms used in 401 KAR Chapter 65.
- 401 KAR 65:005. *Liquefied petroleum gas carburetion systems.* This administrative regulation complies with the requirement to establish emission standards for liquefied petroleum gas carburetion systems.

The following regulations are not approved into the Kentucky SIP; however, they are relevant to this element and are therefore included for reference:

- 401 KAR 50:038. *Air emissions fee.* This administrative regulation provides for the assessment of fees necessary to fund the state permit program as defined in Section 1(8) of this administrative regulation.
- 401 KAR 52:020. *Title V permits.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that are required to obtain a Title V permit.
- 401 KAR 52:040. *State-origin permits.* This administrative regulation establishes requirements for minor sources whose permits are not required to be federally enforceable.
- 401 KAR 52:050. *Permit application forms.* This administrative regulation incorporates by reference the application forms used to permit air contaminant sources in Kentucky.
- 401 KAR 52:060. *Acid rain permits.* This administrative regulation incorporates by reference the federal acid rain provisions as codified at 40 CFR Parts 72 to 78.
- 401 KAR 52:070. *Registration of designated sources.* This administrative regulation establishes the procedure for the registration of designated air contaminant sources in Kentucky.
- 401 KAR 59:021. *New municipal solid waste incinerators.* This administrative regulation provides standards of performance for new municipal solid waste incinerators.
- 401 KAR 59:023. *New medical waste incinerators.* This administrative regulation provides for standards of performance for new medical waste incinerators.
- 401 KAR 60:005. *40 CFR Part 60 standards of performance for new stationary sources.* This administrative regulation establishes the standards of performance for new stationary sources by referencing the Standards of Performance for New Stationary Sources (NSPS) codified in 40 C.F.R. Part 60. Delegation of implementation and enforcement authority for the federal NSPS program from the U.S. Environmental Protection Agency to the Commonwealth of Kentucky is provided by 42 U.S.C. 7411(c)(1).
- 401 KAR 61:011. *Existing municipal solid waste incinerators.* This administrative regulation provides standards of performance for existing municipal solid waste incinerators.
- 401 KAR 61:013. *Existing medical waste incinerators.* This administrative regulation provides for standards of performance for existing medical waste incinerators.

- 401 KAR 61:036. *Emission guidelines and compliance times for municipal solid waste landfills.* The federal regulation incorporated by reference in this administrative regulation provides for the control of emissions from existing municipal solid waste landfills.

The following administrative regulations demonstrate the Louisville Metro Air Pollution Control District's (LMAPCD) commitment to apply permanent and enforceable measures to address the requirements of CAA section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.

- Regulation 1.01. *General Application of Regulations and Standards.* This regulation describes the general application of District regulations and emission standards.
- Regulation 1.02. *Definitions.* This regulation contains definitions used throughout District regulations.
- Regulation 1.03. *Abbreviations and Acronyms.* This regulation contains certain abbreviations and acronyms used in District regulations.
- Regulation 1.05. *Compliance with Emission Standards and Maintenance Requirements.* This regulation establishes the conditions for compliance with emissions standards.
- Regulation 1.06. *Stationary Source Self-Monitoring, Emissions Inventory Development, and Reporting.* This regulation establishes requirements for stationary source monitoring, recordkeeping, and reporting.
- Regulation 1.07. *Excess Emissions During Startups, Shutdowns, and Upset Conditions.* This regulation establishes the notification, reporting, and operational requirements for the owner or operator of a stationary source when excess emissions occur as a result of a startup, shutdown, preventable upset condition, or malfunction.
- Regulation 2.02. *Air Pollution Regulation Requirements and Exemptions.* This regulation establishes requirements for exempt stationary sources, temporary exemptions, and registered stationary sources.
- Regulation 2.04. *Construction or Modification of Major Sources in or Impacting upon Non-Attainment Areas (Emission Offset Requirements).* This regulation establishes requirements for the construction, modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- Regulation 2.05. *Prevention of Significant Deterioration of Air Quality.* This regulation, which adopts the Federal Prevention of Significant Deterioration of Air Quality program, provides for the prevention of significant deterioration of air quality where the national ambient air quality standards have been achieved.
- Regulation 3.01. *Ambient Air Quality Standards.* This regulation establishes ambient air quality standards to protect public health and welfare.
- Regulation 4.05. *Hydrocarbon and Nitrogen Oxides Reduction Requirements.* This regulation establishes the requirements for reduction of hydrocarbon and nitrogen oxides emissions under certain conditions.
- Regulation 6.01. *General Provisions.* This regulation establishes the general provisions for the application of standards of performance for existing affected facilities.

- Regulation 6.09. *Standards of Performance for Existing Process Operations.* This regulation provides for the control of emissions from existing process operations.
- Regulation 6.12. *Standard of Performance for Existing Asphalt Paving Operations.* This regulation provides for the control of emissions from existing asphalt paving operations.
- Regulation 6.13. *Standard of Performance for Existing Storage Vessels for Volatile Organic Compounds.* This regulation provides for the control of emissions of volatile organic compounds from existing storage vessels.
- Regulation 6.16. *Standard of Performance for Existing Large Appliance Surface Coating Operations.* This regulation provides for the control of emissions from surface coating operations at large appliance manufacturing facilities.
- Regulation 6.17. *Standard of Performance for Existing Automobile and Truck Surface Coating Operations.* This regulation provides for the control of emissions from surface coating operations at automobile and truck manufacturing facilities.
- Regulation 6.29. *Standard of Performance for Graphic Arts Facilities Using Rotogravure or Flexographic Printing.* This regulation provides for the control of volatile organic compound emissions from graphic arts facilities that use rotogravure or flexographic printing.
- Regulation 6.30. *Standard of Performance for Existing Factory Surface Coating Operations of Flat Wood Paneling.* This regulation provides for the control of surface coating emissions from existing wood panel facilities.
- Regulation 6.31. *Standard of Performance for Existing Miscellaneous Metal Parts and Products Surface Coating Operations.* This regulation provides for the control of volatile organic compound emissions from existing miscellaneous metal parts and products surface coating operations.
- Regulation 6.32. *Standard of Performance for Leaks from Existing Petroleum Refinery Equipment.* This regulation provides for the control of leakage from equipment at existing petroleum refineries.
- Regulation 6.33. *Standard of Performance for Existing Synthesized Pharmaceutical Product Manufacturing Operations.* This regulation provides for the control of emissions from existing pharmaceutical manufacturing operations.
- Regulation 6.34. *Standard of Performance for Existing Pneumatic Rubber Tire Manufacturing Plants.* This regulation provides for the control of emissions from existing rubber tire manufacturing facilities.
- Regulation 6.35. *Standard of Performance for Existing Fabric, Vinyl, and Paper Surface Coating Operations.* This regulation provides for the control of emissions from existing fabric, vinyl, and paper surface coating operations.
- Regulation 6.38. *Standard of Performance for Existing Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industries.* This regulation provides for the control of volatile organic compound emissions from air oxidation processes in the synthetic organic chemical manufacturing industry.
- Regulation 6.39. *Standard of Performance for Equipment Leaks of Volatile Organic Compounds in Existing Synthetic Organic Chemical and Polymer Manufacturing Plants.*

This regulation provides for the control of volatile organic compound leaks from synthetic organic chemical and polymer manufacturing equipment.

- Regulation 6.42. *Reasonably Available Control Technology Requirements for Major Volatile Organic Compound- and Nitrogen Oxides-Emitting Facilities.* This regulation establishes the requirements for Reasonably Available Control Technology (RACT) determination, demonstration, and compliance for VOC and NO_x emitting facilities for new or renewed operating permit applications.
- Regulation 6.43. *Volatile Organic Compound Emission Reduction Requirements.* This regulation establishes emissions, equipment, and operational requirements for the listed stationary sources, each of which voluntarily agreed to these requirements.
- Regulation 6.44. *Standards of Performance for Existing Commercial Motor Vehicle and Mobile Equipment Refinishing Operations.* This regulation provides for the control of VOC emissions from existing commercial motor vehicle and mobile equipment refinishing operations.
- Regulation 6.48. *Standard of Performance for Existing Bakery Oven Operations.* This regulation provides for the quantification of VOC emissions from existing bakery oven operations.
- Regulation 6.49. *Standards of Performance for Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry.* This regulation provides for the control of emissions from reactor processes and distillation operations processes in the synthetic organic chemical manufacturing industry (SOCMI).
- Regulation 6.50. *NO_x Requirements for Portland Cement Kilns.* This regulation, which provides for regional control of oxides of nitrogen (NO_x) emissions from Portland Cement kilns pursuant to the federal mandate published under the EPA's NO_x SIP Call, would allow the District to enforce 401 KAR 51:170 NO_x requirements for cement kilns.
- Regulation 7.01. *General Provisions. This regulation establishes general requirements for new affected facilities.* (specifically, Standard of Performance for New Storage Vessels for Volatile Organic Compounds)
- Regulation 7.08. *Standards of Performance for New Process Operations.* This regulation provides for the control of particulates and nitrous oxide emissions from new sources.
- Regulation 7.11. *Standard of Performance for New Asphalt Paving Operations.* This regulation provides for the control of emissions from new asphalt paving operations.
- Regulation 7.12. *Standard of Performance for New Storage Vessels for Volatile Organic Compounds.* This regulation provides for the control of emissions of volatile organic compounds from new storage vessels.
- Regulation 7.15. *Standards of Performance for Gasoline Transfer to New Service Station Storage Tanks (Stage I Vapor Recovery).* This regulation provides for the control of emissions from gasoline delivery and storage tanks at existing service stations.
- Regulation 7.20. *Standard of Performance for New Gasoline Loading Facilities at Bulk Plants.* This regulation provides for the control of volatile organic compound emissions from new gasoline loading facilities at bulk plants.

- Regulation 7.22. *Standard of Performance for New Volatile Organic Materials Loading Facilities.* This regulation provides for the control of emissions from new volatile organic materials loading facilities.
- Regulation 7.25. *Standard of Performance for New Sources Using Volatile Organic Compounds.* This regulation provides for the control of emissions of volatile organic compounds from new sources.
- Regulation 7.36. *Standard of Performance for New Volatile Organic Compound Water Separators.* This regulation provides for the control of emissions from new water separators.
- Regulation 7.51. *Standard of Performance for New Liquid Waste Incinerators.* This regulation provides for the control of emissions from new liquid waste incinerators.
- Regulation 7.52. *Standard of Performance for New Fabric, Vinyl and Paper Surface Coating Operations.* This regulation provides for the control of emissions from new fabric, vinyl and paper surface coating operations.
- Regulation 7.55. *Standard of Performance for New Insulation of Magnet Wire.* This regulation provides for the control of emissions of volatile organic compounds from magnetic wire coatings.
- Regulation 7.56. *Standard of Performance for Leaks from New Petroleum Refinery Equipment.* This regulation provides for the control of leakage from equipment at new petroleum refineries.
- Regulation 7.58. *Standard of Performance for New Factory Surface Coating Operations of Flat Wood Paneling.* This regulation provides for the control of surface coating emissions from new wood panel facilities.
- Regulation 7.59. *Standard of Performance for New Miscellaneous Metal Parts and Products Surface Coating Operations.* This regulation provides for the control of volatile organic compound emissions from new miscellaneous metal parts and products surface coating operations.
- Regulation 7.60. *Standard of Performance for New Synthesized Pharmaceutical Product Manufacturing Operations.* This regulation provides for the control of emissions from new pharmaceutical manufacturing operations.
- Regulation 7.79. *Standards of Performance for New Commercial Motor Vehicle and Mobile Equipment Refinishing Operations.* This regulation provides for the control of VOC emissions from new commercial motor vehicle and mobile equipment refinishing operations.
- Regulation 7.81. *Standard of Performance for New or Modified Bakery Oven Operations.* This regulation provides for the quantification and control of VOC emissions from new or modified bakery ovens.

Element B – Section 110(a)(2)(B): Ambient Air Quality Monitoring/Data System

Each such plan shall --

(B) provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to --

(i) monitor, compile, and analyze data on ambient air quality, and

(ii) upon request, make such data available to the Administrator.

Ambient air quality monitoring/data system: Section 110(a)(2)(B) of the CAA requires SIPs to include provisions for establishment and operation of ambient air quality monitors, collection and analysis of ambient air quality data, and presentation of these data to EPA upon request. KRS 224.10-100(22) requires the installation, maintenance, and use of equipment, devices, or tests and methodologies to monitor the nature and amount of any substance emitted into the ambient air and to provide the information to the Cabinet.

In accordance with 40 CFR 58.10, Kentucky submitted its annual monitoring network plan to the EPA on June 23, 2018. The Cabinet is awaiting EPA's approval of the submittal. Kentucky currently has 34 air monitoring stations operated by the Division, LMAPCD, and the National Park Service (NPS). As of 2016, there are 26 ozone monitors within the state. Kentucky monitors criteria air pollutants for the NAAQS through the State or Local Air Monitoring Stations (SLAMS) Network. In addition to the SLAMS network, the Division collects air toxics and meteorological data using special purpose monitors (SPM).

- 401 KAR 50:050. *Monitoring*. This administrative regulation establishes requirements for stack gas monitoring, ambient air monitoring, and recording and reporting requirements as related to monitoring data.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality*. This administrative regulation applies to the construction of any new major stationary source or any project at an existing major stationary source in an area designated as attainment or unclassifiable.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained. It should be noted that Section 5 of 401 KAR 51:052 has been amended to include language related to credits for emissions offsets, which was approved to Kentucky's SIP in December 2014.
- 401 KAR 53:005. *General provisions.* This administrative regulation is to provide for the establishment of general provisions, definitions and time schedules as they pertain to this chapter.
- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.

Element C - Section 110(a)(2)(C): Programs for Enforcement of Control Measures and for Construction or Modification of Stationary Sources
Each such plan shall --

(C) include a program to provide for the enforcement of the measures described in subparagraph (A), and regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved, including a permit program as required in parts C and D of this subchapter.

Program for enforcement of control measures and construction: Section 110(a)(2)(C) of the CAA requires States to include a program that provides for enforcement of all SIP control measures and the regulation of construction of new or modified stationary sources to meet prevention of significant deterioration (PSD) and nonattainment new source review (NSR) requirements.

- 401 KAR 50:040. *Air quality models.* This administrative regulation specifies general provisions for the use of air quality models.
- 401 KAR 50:042. *Good engineering practice stack height.* This administrative regulation defines good engineering practice stack height which shall be used in establishing emissions limitations.
- 401 KAR 50:060. *Enforcement.* This administrative regulation provides for enforcement of the terms and conditions of permits and compliance schedules.
- 401 KAR 50:065. *Conformity of general federal actions.* The federal regulation incorporated by reference in this administrative regulation provides for determining the conformity of general federal actions to the State Implementation Plan (SIP). 40 CFR 51.850 to 51.860 require that the applicable federal agencies implement the conformity determination in consultation with agencies of the Commonwealth of Kentucky.
- 401 KAR 51:001. *Definitions for 401 KAR Chapter 51.* This administrative regulation defines the terms used in 401 KAR Chapter 51.
- 401 KAR 51:005. *Purpose and general provisions.* This administrative regulation establishes the general provisions as related to new sources with respect to the prevention of significant deterioration of air quality and construction of stationary sources impacting on nonattainment areas.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation provides for the prevention of significant deterioration of ambient air quality.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 52:001. *Definitions for 401 KAR Chapter 52.* This administrative regulation defines the terms used in 401 KAR Chapter 52.
- 401 KAR 52:030. *Federally-enforceable permits for non-major sources.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that accept emission limitations to avoid the New Source Review requirements

under Title I of the Clean Air Act or the Operating Permit Program requirements under Title V of the Clean Air Act.

- 401 KAR 52:040. *State-origin permits.* This administrative regulation establishes requirements for minor sources whose permits are not required to be federally enforceable.
- 401 KAR 52:090. *Prohibitory rule for hot mix asphalt plants.* This administrative regulation sets production limits for hot mix asphalt plants, which keeps their emissions below the major source threshold and avoids the necessity of having to obtain a Title V or conditional major permit.
- 401 KAR 52:100. *Public, affected state, and U.S. EPA review.* This administrative regulation establishes the procedures used by the Cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA.
- 401 KAR 53:005. *General provisions.* This administrative regulation is to provide for the establishment of general provisions, definitions and time schedules as they pertain to this chapter.
- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.

Element C requires the regulation of new and modified minor sources and minor modification of major sources. The Cabinet, through the Division, administers an NSR air quality permit program that EPA fully approved into the Kentucky SIP in 1989.[10] Since 1989, EPA has fully approved at least seven revisions of the NSR permit program into the Kentucky SIP at 40 CFR 52, Subpart S.[11] As required in the PSD permitting process, air dispersion modeling must be performed to assess increment consumption in the area of the new or modifying source.

Minor source impacts are also assessed through the PSD/NSR permitting process. Any source that consumes PSD increment and is within a new or modifying source's significant impact area (SIA) is considered for a screening analysis. Minor sources that were constructed on or after the minor source baseline date for the area within the SIA are included in the increment modeling analysis. Increment modeling includes actual emissions from minor sources that consume increment within the SIA and impacts are compared to the Class I and Class II increments to each applicable pollutant.

Minor sources are also considered when performing refined cumulative modeling impact analyses for the PSD/NSR permitting process. Minor sources within 50 km of a proposed source's emissions are first considered in a screening process before proceeding with refined cumulative modeling. Additionally, actual emissions of minor sources that are determined to cause a significant impact on the SIA are included in refined cumulative modeling.

[10] 54 FR 36307

[11] 54 FR 46612; 54 FR 48887; 55 FR 4169; 59 FR 32343; 63 FR 39741; 71 FR 38990; 75 FR 55988

Another way minor source impacts are incorporated into the cumulative modeling demonstration is through background air quality monitoring values. Cumulative modeling with the inclusion of background monitored concentrations and actual emissions of nearby sources (minor and major) allows the reviewing authority to understand the current ambient conditions and predict the impact the proposed source will have on the surrounding airshed.

EPA's Guideline on Air Quality Models (40 CFR Part 51 Appendix W) states, "…the identification of nearby sources to be explicitly modeled is regarded as an exercise of professional judgment to be accomplished jointly by the applicant and the appropriate reviewing authority" (82 FR 5198). The Cabinet determines that PSD increment and cumulative modeling provides a thoroughly conservative approach as to how emissions from nearby sources, including minor sources, are evaluated during the PSD/NSR permitting process. Kentucky finds that the SIP-approved NSR air quality permitting program provides the regulatory authority necessary to evaluate the construction of minor sources and minor modifications at major sources and appropriately ensure that the NAAQS are achieved and maintained.

The following regulations are not approved into the Kentucky SIP; however, they are relevant to this element and are therefore included for reference:

- 401 KAR 52:020. *Title V permits.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that are required to obtain a Title V permit.
- 401 KAR 52:040. *State-origin permits.* This administrative regulation establishes requirements for minor sources whose permits are not required to be federally enforceable.
- 401 KAR 52:050. *Permit application forms.* This administrative regulation incorporates by reference the application forms used to permit air contaminant sources in Kentucky.
- 401 KAR 52:070. *Registration of designated sources.* This administrative regulation establishes the procedure for the registration of designated air contaminant sources in Kentucky.

Element D(i) - Section 110(a)(2)(D)(i)(I) and (II): Interstate Pollution Transport

Each such plan shall --

(D) contain adequate provisions --

(i) prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will --

> *(I) contribute significantly to nonattainment in, or interference with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard, or*

(II) interfere with measures required to be included in the applicable implementation plan for any other State under part C of this subchapter to prevent significant deterioration of air quality or to protect visibility.

(ii) insuring compliance with the applicable requirements of sections 7426 and 7415 of this title (relating to interstate and international pollution abatement).

110(a)(2)(D)(i)(I) "Prongs 1 & 2" – Significant contribution to nonattainment or interference with maintenance:

i. EPA Interstate Transport Memorandum

On March 27, 2018, EPA Air Quality Planning and Standards Director, Peter Tsirigotis, signed a memorandum that was issued to air agency directors within all EPA regions.[12] The memorandum provided information for the 2015 ozone NAAQS under CAA Section 110(a)(2)(D)(i)(I). In the memo, which can be found in Appendix A of this submittal, EPA stated that the objective was "to assist states efforts to develop 'good neighbor' SIPs for the 2015 ozone NAAQS to address their interstate transport obligations."

EPA's March 2018 memorandum provided an update to the contribution modeling analysis in EPA's January 2017 Notice of Data Availability (NODA) for ozone transport modeling data of the 2015 ozone NAAQS. It built upon information provided in the October 2017 interstate transport memorandum, which was used to assist states in completing "good neighbor" transport actions for the 2008 ozone NAAQS.[13] EPA retained 2023 as the future analytical year due to its alignment with the anticipated attainment year for moderate ozone nonattainment areas. EPA also utilized the Comprehensive Air Quality Model with Extensions (CAMx v6.40) to model emissions in 2011 and 2023, based on updates provided to EPA from states and other stakeholders. The results from EPA's latest analysis indicate that there are 11 monitoring sites outside of California that are potential nonattainment receptors and 14 monitoring sites outside of California that are potential maintenance receptors. Once the nonattainment and maintenance receptors were identified, EPA performed nationwide, state-level ozone source apportionment modeling using the CAMx Anthropogenic Precursor Culpability Analysis (APCA) technique to identify sources which could be contributing to the downwind receptors. As seen in Table 1 below, Kentucky was linked to four (4) downwind nonattainment receptors and one (1) maintenance receptor.

[12] EPA Memorandum, "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.
[13] EPA Memorandum, "Supplemental Information on the Interstate Transport State Implementation Plan Submissions for the 2008 Ozone National Ambient Air Quality Standards under Clean Air Action Section 110(a)(2)(D)(i)(I)" October 27, 2017.

Table 1: Kentucky Links to Downwind Receptors 2015 Ozone NAAQS

Site ID	County, State	2023en Average	2023en Maximum	Receptor Type	Kentucky Contribution
90013007	Fairfield, CT	71.0	75.0	Nonattainment	0.89
90019003	Fairfield, CT	73.0	75.9	Nonattainment	0.79
550790085	Milwaukee, WI	71.2	73	Nonattainment	0.77
551170006	Sheboygan, WI	72.8	75.1	Nonattainment	0.81
240251001	Harford, MD	70.9	73.3	Maintenance	1.52

ii. EPA Alternative Contribution Threshold Analysis

On August 31, 2018, EPA Director, Peter Tsirigotis, signed a memorandum that was issued to air agency directors within all EPA regions.[14] In this memorandum, located in Appendix B, EPA analyzed three alternative contribution thresholds including the screening threshold equivalent to 1 percent of the NAAQS that has been used in past federal actions related to ozone standards. The other two alternatives include contribution thresholds of 1 ppb and 2 ppb. The EPA analysis examined to what extent the air quality threshold amounts capture the collective amount of upwind contribution from upwind states to downwind receptors for the 2015 ozone NAAQS. EPA's analysis determined that the amount of upwind collective contribution captured using a 1 ppb threshold is generally comparable to the amount captured using a threshold equivalent to 1 percent of the NAAQS.

The Cabinet agrees with the rationale of the EPA analysis confirming the use of a 1 ppb contribution threshold is comparable to the amount captured using a threshold equivalent to 1 percent of the NAAQS. As seen in Table 1 above, the use of the 1 ppb threshold would no longer link Kentucky as a significant contributor to the Connecticut or Wisconsin nonattainment monitors. Kentucky would still be linked to the Harford, Maryland maintenance monitor; however, as discussed below, the amount of controls required for an upwind state should not be the same for a nonattainment monitor as they are for a monitor that is already attaining the NAAQS. Consequently, no further reductions other than controls that are on-the-books are required from Kentucky. The factors discussed below demonstrate that the Kentucky SIP contains adequate provisions to prevent sources and other types of emissions activities within the state from significantly contributing to nonattainment, or interfering with the maintenance, of downwind states with respect to the 2015 ozone NAAQS; therefore, meeting the requirements of CAA section 110(a)(2)(D)(i)(I) "prongs 1 and 2."

[14] EPA Memorandum, "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" August 31, 2018.

iii. Permanent and Enforceable Measures

The following regulations and programs address the requirements of CAA section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.

Kentucky Administrative Regulations addressing 110(a)(2)(D)(i)(I)

The following administrative regulations demonstrate the Cabinet's commitment to apply permanent and enforceable measures to prevent interference with attainment and maintenance of the 2015 ozone NAAQS in downwind areas.

- 401 KAR 50:012. *General application.* This administrative regulation provides the general guidelines by which all administrative regulations of 401 KAR 50 through 65 are to be understood. Specifically, this regulation mandates the use of reasonable controls on sources of VOC emissions and defines a major source of VOC, among other applicable items.
- 401 KAR 50:055. *General compliance requirements.* This administrative regulation establishes requirements for demonstrating compliance with standards; establishes requirements for compliance when a source is relocated within the Commonwealth of Kentucky; and other general compliance requirements.
- 401 KAR 50:060. *Enforcement.* This administrative regulation provides for enforcement of the terms and conditions of permits and compliance schedules.
- 401 KAR 51:001. *Definitions for 401 KAR Chapter 51.* This administrative regulation defines the terms used in 401 KAR Chapter 51. The definitions contained in this administrative regulation are neither more stringent nor otherwise different than the corresponding federal definitions.
- 401 KAR 51:010. *Attainment status designations.* This administrative regulation designates the status of all areas of the Commonwealth of Kentucky with regard to attainment of the ambient air quality standards.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation applies to the construction of any new major stationary source or any project at an existing major stationary source in an area designated as attainment or unclassifiable. It ensures the prevention of significant deterioration (PSD) of air quality in areas of Kentucky where the air quality is better than the ambient air quality standards (i.e. attainment areas).
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 51:150. *NO_x Requirements for stationary internal combustion engines.* Pursuant to the federal NO_x SIP Call, this administrative regulation provides for the regional control of NO_x emissions by establishing requirements for large stationary internal combustion engines.
- 401 KAR 51:240. *Cross-State Air Pollution Rule (CSAPR) NO_x annual trading program.* This administrative regulation establishes the requirements for the control of annual NO_x

emissions from large boilers and turbines used in power plants, pursuant to the Cross-State Air Pollution Rule (CSAPR) NO_x annual trading program, 40 CFR 97.401 through 97.435, Subpart AAAAA for sources located in the Commonwealth of Kentucky. This regulation was adopted into Kentucky Administrative Regulations on July 5, 2018. The Cabinet submitted the regulation to EPA on September 13, 2018 for approval into the Kentucky SIP.

- 401 KAR 51:250. *Cross-State Air Pollution Rule (CSAPR) NO_x ozone season group 2 trading program.* This administrative regulation establishes the requirements for the control of ozone season NO_x emissions from large boilers and turbines used in power plants, pursuant to the CSAPR NO_x ozone season group 2 trading program, 40 CFR 97.801 through 97.835, Subpart EEEEE for sources located in the Commonwealth of Kentucky. This regulation was adopted into Kentucky Administrative Regulations on July 5, 2018. The Cabinet submitted the regulation to EPA on September 13, 2018 for approval into the Kentucky SIP.
- 401 KAR 52:030. *Federally-enforceable permits for non-major sources.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that accept federally-enforceable emission limitations. It specifically deals with sources that are located in ozone nonattainment areas and emit, or have the potential to emit 25 tpy or more of VOCs or NO_x, stating that they shall submit an annual emission certification pursuant to Section 25(2) of this administrative regulation.
- 401 KAR 53:005. *General provisions.* This administrative regulation is to provide for the establishment of general provisions, definitions and time schedules as they pertain to this chapter. Except as provided in 401 KAR 51:010, no person shall violate, or interfere with the attainment or maintenance of, ambient air quality standards as specified in 401 KAR 53:010.
- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.
- 401 KAR 59:001. *Definitions for 401 KAR Chapter 59.* This administrative regulation provides all the definitions used in 401 KAR Chapter 59 regulations.
- 401 KAR 59:005. *General provisions.* This administrative regulation includes the monitoring requirements for new sources with the potential to emit NO_x and other criteria pollutants, which applies to the controlling of emissions.
- 401 KAR 59:046. *Selected new petroleum refining processes and equipment.* This administrative regulation provides for the control of hydrocarbon emissions from selected new petroleum refining processes and equipment.
- 401 KAR 59:050. *New storage vessels for petroleum liquids.* This administrative regulation controls emissions from new petroleum liquid storage vessels. This regulation includes standards for VOC monitoring, testing, and operating requirements.
- 401 KAR 59:101. *New bulk gasoline plants.* This administrative regulation controls VOC emissions from new bulk gasoline plants.
- 401 KAR 59:174. *Stage II controls at gasoline dispensing facilities.* This administrative regulation establishes requirements for the control of emissions from gasoline dispensing

facilities. On May 3, 2016, the Cabinet submitted a SIP revision amending 401 KAR 59:174, *Stage II Controls at gasoline dispensing facilities*, to remove Stage II controls from gasoline dispensing facilities in Northern Kentucky. EPA approved the revision on October 14, 2016.[15]

- 401 KAR 59:175. *New service stations*. This administrative regulation controls VOC emissions from new service stations in Kentucky.
- 401 KAR 59:185. *New solvent metal cleaning equipment*. This administrative regulation describes the controls for VOC emissions from new solvent metal cleaning equipment.
- 401 KAR 59:190. *New insulation of magnet wire operations*. This administrative regulation controls VOC emissions from new insulation of magnet wire operations.
- 401 KAR 59:210. *New fabric, vinyl and paper surface coating operations*. This administrative regulation addresses VOC emissions from new fabric, vinyl, or paper surface coating operations.
- 401 KAR 59:212. *New graphic arts facilities using rotogravure and flexography*. This administrative regulation applies to new graphic arts facilities that use rotogravure and flexography and controls any potential VOC emissions they create.
- 401 KAR 59:214. *New factory surface coating operations of flat wood paneling*. This administrative regulation deals with VOC emissions from new factory surface coating operations of flat wood paneling.
- 401 KAR 59:225. *New miscellaneous metal parts and products surface coating operations*. This administrative regulation controls VOC emissions from new miscellaneous metal parts and products surface coating operations.
- 401 KAR 59:230. *New synthesized pharmaceutical product manufacturing operations*. This administrative regulation controls VOC emissions from new synthesized pharmaceutical product manufacturing operations.
- 401 KAR 59:240. *New perchloroethylene dry cleaning systems*. This administrative regulation deals with VOC emissions from new perchloroethylene dry cleaning systems.
- 401 KAR 59:315. *Specific new sources*. This administrative regulation controls VOC emissions from specific new sources in Kentucky.
- 401 KAR 59:760. *Commercial motor vehicle and mobile equipment refinishing operations*. This administrative regulation controls VOC emissions from commercial motor vehicle and mobile equipment refinishing operations.
- 401 KAR 61:001. *Definitions for 401 KAR Chapter 61*. This administrative regulation defines the terms used in 401 KAR Chapter 61.
- 401 KAR 61:005. *General provisions*. This administrative regulation provides for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to existing sources.
- 401 KAR 61:010. *Existing incinerators*. This administrative regulation provides standards of performance for existing incinerators.
- 401 KAR 61:045. *Existing oil-effluent water separators*. This administrative regulation provides for the control of emissions from existing oil-effluent water separators.

[15] 81 FR 70966

- 401 KAR 61:050. *Existing storage vessels for petroleum liquids.* This administrative regulation provides for the control of emissions from existing storage vessels for petroleum liquids.
- 401 KAR 61:055. *Existing loading facilities at bulk gasoline terminals.* This administrative regulation provides for the control of emissions from existing loading facilities at bulk gasoline terminals.
- 401 KAR 61:056. *Existing bulk gasoline plants.* This administrative regulation provides for the control of volatile organic compound emissions from existing bulk gasoline plants.
- 401 KAR 61:060. *Existing sources using organic solvents.* This administrative regulation provides for the control of emissions from existing sources using any organic solvents.
- 401 KAR 61:065. *Existing nitric acid plants.* This administrative regulation provides for the control of emissions from existing nitric acid plants.
- 401 KAR 61:085. *Existing service stations.* This administrative regulation provides for the control of volatile organic compound emissions from existing service stations.
- 401 KAR 61:090. *Existing automobile and light-duty truck surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing automobile and light-duty truck surface coating operations.
- 401 KAR 61:095. *Existing solvent metal cleaning equipment.* This administrative regulation provides for the control of volatile organic compound emissions from existing solvent metal cleaning equipment.
- 401 KAR 61:100. *Existing insulation of magnet wire operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing insulation of magnet wire operations.
- 401 KAR 61:105. *Existing metal furniture surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing metal furniture surface coating operations.
- 401 KAR 61:110. *Existing large appliance surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing large appliance surface coating operations.
- 401 KAR 61:120. *Existing fabric, vinyl and paper surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing fabric, vinyl or paper surface coating operations.
- 401 KAR 61:122. *Existing graphic arts facilities using rotogravure and flexography.* This administrative regulation provides for the control of volatile organic compound emissions from existing graphic arts facilities which use rotogravure and flexography.
- 401 KAR 61:124. *Existing factory surface coating operations of flat wood paneling.* This administrative regulation provides for the control of volatile organic compound emissions from existing factory surface coating operations of flat wood paneling.
- 401 KAR 61:125. *Existing can surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing can surface coating operations.
- 401 KAR 61:130. *Existing coil surface coating operations.* This administrative regulation provides for the control of volatile organic compound emissions from existing coil surface coating operations.

- 401 KAR 61:132. *Existing miscellaneous metal parts and products surface coating operations*. This administrative regulation provides for the control of volatile organic compound emissions from existing miscellaneous metal parts and products surface coating operations.
- 401 KAR 61:135. *Selected existing petroleum refining processes and equipment*. This administrative regulation provides for the control of hydrocarbon emissions from selected existing petroleum refining processes and equipment.
- 401 KAR 61:137. *Leaks from existing petroleum refinery equipment*. This administrative regulation provides for the control of volatile organic compound emissions from leaks from existing petroleum refinery equipment.
- 401 KAR 61:150. *Existing synthesized pharmaceutical product manufacturing operations*. This administrative regulation provides for the control of volatile organic compound emissions from existing synthesized pharmaceutical product manufacturing operations.
- 401 KAR 61:155. *Existing pneumatic rubber tire manufacturing plants*. This administrative regulation provides for the control of volatile organic compound emissions from existing pneumatic rubber tire manufacturing plants.
- 401 KAR 61:160. *Existing perchloroethylene dry cleaning systems*. This administrative regulation provides for the control of volatile organic compound emissions from existing perchloroethylene dry cleaning systems.
- 401 KAR 61:175. *Leaks from existing synthetic organic chemical and polymer manufacturing equipment*. This administrative regulation provides for the control of volatile organic compound emissions from leaks from existing synthetic organic chemical and polymer manufacturing equipment.

The following regulation is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- 401 KAR 52:020. *Title V permits*. This administrative regulation establishes the requirements for air contaminant sources located in Kentucky to obtain a Title V operating permit.

Regulations Administered by the Louisville Metro Air Pollution Control District Addressing 110(a)(2)(D)(i)(I)

The following administrative regulations demonstrate the LMAPCD's commitment to apply permanent and enforceable measures to address the requirements of CAA section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.

- Regulation 1.01. *General Application of Regulations and Standards*. This regulation describes the general application of District regulations and emission standards.
- Regulation 1.02. *Definitions*. This regulation contains definitions used throughout District regulations.
- Regulation 1.03. *Abbreviations and Acronyms*. This regulation contains certain abbreviations and acronyms used in District regulations.

- Regulation 1.05. *Compliance with Emission Standards and Maintenance Requirements.* This regulation establishes the conditions for compliance with emissions standards.
- Regulation 1.06. *Stationary Source Self-Monitoring, Emissions Inventory Development, and Reporting.* This regulation establishes requirements for stationary source monitoring, recordkeeping, and reporting.
- Regulation 1.07. *Excess Emissions During Startups, Shutdowns, and Upset Conditions.* This regulation establishes the notification, reporting, and operational requirements for the owner or operator of a stationary source when excess emissions occur as a result of a startup, shutdown, preventable upset condition, or malfunction.
- Regulation 2.02. *Air Pollution Regulation Requirements and Exemptions.* This regulation establishes requirements for exempt stationary sources, temporary exemptions, and registered stationary sources.
- Regulation 2.04. *Construction or Modification of Major Sources in or Impacting upon Non-Attainment Areas (Emission Offset Requirements).* This regulation establishes requirements for the construction, modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- Regulation 2.05. *Prevention of Significant Deterioration of Air Quality.* This regulation, which adopts the Federal Prevention of Significant Deterioration of Air Quality program, provides for the prevention of significant deterioration of air quality where the national ambient air quality standards have been achieved.
- Regulation 3.01. *Ambient Air Quality Standards.* This regulation establishes ambient air quality standards to protect public health and welfare.
- Regulation 4.05. *Hydrocarbon and Nitrogen Oxides Reduction Requirements.* This regulation establishes the requirements for reduction of hydrocarbon and nitrogen oxides emissions under certain conditions.
- Regulation 6.01. *General Provisions.* This regulation establishes the general provisions for the application of standards of performance for existing affected facilities.
- Regulation 6.09. *Standards of Performance for Existing Process Operations.* This regulation provides for the control of emissions from existing process operations.
- Regulation 6.12. *Standard of Performance for Existing Asphalt Paving Operations.* This regulation provides for the control of emissions from existing asphalt paving operations.
- Regulation 6.13. *Standard of Performance for Existing Storage Vessels for Volatile Organic Compounds.* This regulation provides for the control of emissions of volatile organic compounds from existing storage vessels.
- Regulation 6.16. *Standard of Performance for Existing Large Appliance Surface Coating Operations.* This regulation provides for the control of emissions from surface coating operations at large appliance manufacturing facilities.
- Regulation 6.17. *Standard of Performance for Existing Automobile and Truck Surface Coating Operations.* This regulation provides for the control of emissions from surface coating operations at automobile and truck manufacturing facilities.
- Regulation 6.29. *Standard of Performance for Graphic Arts Facilities Using Rotogravure or Flexographic Printing.* This regulation provides for the control of volatile

organic compound emissions from graphic arts facilities that use rotogravure or flexographic printing.

- Regulation 6.30. *Standard of Performance for Existing Factory Surface Coating Operations of Flat Wood Paneling.* This regulation provides for the control of surface coating emissions from existing wood panel facilities.
- Regulation 6.31. *Standard of Performance for Existing Miscellaneous Metal Parts and Products Surface Coating Operations.* This regulation provides for the control of volatile organic compound emissions from existing miscellaneous metal parts and products surface coating operations.
- Regulation 6.32. *Standard of Performance for Leaks from Existing Petroleum Refinery Equipment.* This regulation provides for the control of leakage from equipment at existing petroleum refineries.
- Regulation 6.33. *Standard of Performance for Existing Synthesized Pharmaceutical Product Manufacturing Operations.* This regulation provides for the control of emissions from existing pharmaceutical manufacturing operations.
- Regulation 6.34. *Standard of Performance for Existing Pneumatic Rubber Tire Manufacturing Plants.* This regulation provides for the control of emissions from existing rubber tire manufacturing facilities.
- Regulation 6.35. *Standard of Performance for Existing Fabric, Vinyl, and Paper Surface Coating Operations.* This regulation provides for the control of emissions from existing fabric, vinyl, and paper surface coating operations.
- Regulation 6.38. *Standard of Performance for Existing Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industries.* This regulation provides for the control of volatile organic compound emissions from air oxidation processes in the synthetic organic chemical manufacturing industry.
- Regulation 6.39. *Standard of Performance for Equipment Leaks of Volatile Organic Compounds in Existing Synthetic Organic Chemical and Polymer Manufacturing Plants.* This regulation provides for the control of volatile organic compound leaks from synthetic organic chemical and polymer manufacturing equipment.
- Regulation 6.42. *Reasonably Available Control Technology Requirements for Major Volatile Organic Compound- and Nitrogen Oxides-Emitting Facilities.* This regulation establishes the requirements for Reasonably Available Control Technology (RACT) determination, demonstration, and compliance for VOC and NO_x emitting facilities for new or renewed operating permit applications.
- Regulation 6.43. *Volatile Organic Compound Emission Reduction Requirements.* This regulation establishes emissions, equipment, and operational requirements for the listed stationary sources, each of which voluntarily agreed to these requirements.
- Regulation 6.44. *Standards of Performance for Existing Commercial Motor Vehicle and Mobile Equipment Refinishing Operations.* This regulation provides for the control of VOC emissions from existing commercial motor vehicle and mobile equipment refinishing operations.

- Regulation 6.48. *Standard of Performance for Existing Bakery Oven Operations.* This regulation provides for the quantification of VOC emissions from existing bakery oven operations.
- Regulation 6.49. *Standards of Performance for Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry.* This regulation provides for the control of emissions from reactor processes and distillation operations processes in the synthetic organic chemical manufacturing industry (SOCMI).
- Regulation 6.50. *NO_x Requirements for Portland Cement Kilns.* This regulation, which provides for regional control of oxides of nitrogen (NO_x) emissions from Portland Cement kilns pursuant to the federal mandate published under the EPA's NO_x SIP Call, would allow the District to enforce 401 KAR 51:170 NO_x requirements for cement kilns.
- Regulation 7.01. *General Provisions. This regulation establishes general requirements for new affected facilities.* (specifically, Standard of Performance for New Storage Vessels for Volatile Organic Compounds)
- Regulation 7.08. *Standards of Performance for New Process Operations.* This regulation provides for the control of particulates and nitrous oxide emissions from new sources.
- Regulation 7.11. *Standard of Performance for New Asphalt Paving Operations.* This regulation provides for the control of emissions from new asphalt paving operations.
- Regulation 7.12. *Standard of Performance for New Storage Vessels for Volatile Organic Compounds.* This regulation provides for the control of emissions of volatile organic compounds from new storage vessels.
- Regulation 7.15. *Standards of Performance for Gasoline Transfer to New Service Station Storage Tanks (Stage I Vapor Recovery).* This regulation provides for the control of emissions from gasoline delivery and storage tanks at existing service stations.
- Regulation 7.20. *Standard of Performance for New Gasoline Loading Facilities at Bulk Plants.* This regulation provides for the control of volatile organic compound emissions from new gasoline loading facilities at bulk plants.
- Regulation 7.22. *Standard of Performance for New Volatile Organic Materials Loading Facilities.* This regulation provides for the control of emissions from new volatile organic materials loading facilities.
- Regulation 7.25. *Standard of Performance for New Sources Using Volatile Organic Compounds.* This regulation provides for the control of emissions of volatile organic compounds from new sources.
- Regulation 7.36. *Standard of Performance for New Volatile Organic Compound Water Separators.* This regulation provides for the control of emissions from new water separators.
- Regulation 7.51. *Standard of Performance for New Liquid Waste Incinerators.* This regulation provides for the control of emissions from new liquid waste incinerators.
- Regulation 7.52. *Standard of Performance for New Fabric, Vinyl and Paper Surface Coating Operations.* This regulation provides for the control of emissions from new fabric, vinyl and paper surface coating operations.

- Regulation 7.55. *Standard of Performance for New Insulation of Magnet Wire.* This regulation provides for the control of emissions of volatile organic compounds from magnetic wire coatings.
- Regulation 7.56. *Standard of Performance for Leaks from New Petroleum Refinery Equipment.* This regulation provides for the control of leakage from equipment at new petroleum refineries.
- Regulation 7.58. *Standard of Performance for New Factory Surface Coating Operations of Flat Wood Paneling.* This regulation provides for the control of surface coating emissions from new wood panel facilities.
- Regulation 7.59. *Standard of Performance for New Miscellaneous Metal Parts and Products Surface Coating Operations.* This regulation provides for the control of volatile organic compound emissions from new miscellaneous metal parts and products surface coating operations.
- Regulation 7.60. *Standard of Performance for New Synthesized Pharmaceutical Product Manufacturing Operations.* This regulation provides for the control of emissions from new pharmaceutical manufacturing operations.
- Regulation 7.79. *Standards of Performance for New Commercial Motor Vehicle and Mobile Equipment Refinishing Operations.* This regulation provides for the control of VOC emissions from new commercial motor vehicle and mobile equipment refinishing operations.
- Regulation 7.81. *Standard of Performance for New or Modified Bakery Oven Operations.* This regulation provides for the quantification and control of VOC emissions from new or modified bakery ovens.

Federal Programs

The following programs address additional control measures, means and techniques to address the requirements of CAA section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.

- 40 CFR 52.940(b)(2). *Interstate pollutant transport provisions; What are the FIP requirements for decreases in emissions of nitrogen oxides?* (2) The owner and operator of each source and each unit located in the State of Kentucky and for which requirements are set forth under the CSAPR NO_x Ozone Season Group 2 Trading Program in subpart EEEEE of part 97 of this chapter must comply with such requirements with regard to emissions occurring in 2017 and each subsequent year.

- *National Program for Greenhouse Gas (GHG) Emissions and Fuel Economy Standards*: The federal GHG and fuel economy standards apply to light-duty cars and trucks in model years 2012 - 2016 (phase 1) and 2017 - 2025 (phase 2). The final standards are projected to result in an average industry fleet-wide level of 163 grams/mile of carbon dioxide (CO_2) which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements. These emission reductions will be federally enforceable.

- *Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards*: EPA finalized a federal rule in 2000 to reduce emissions from passenger vehicles in each manufacturer's fleet to meet an average standard of 0.07 grams of NO_x per mile. Additionally, in January 2006, the sulfur content of gasoline was required to be on average 30 parts per million (ppm), which assists in lowering NO_x emissions. EPA estimated that the reduction of NO_x emissions ranged from 77% for cars to 86% for minivans, light trucks and small sport-utility vehicles (SUVs). Volatile Organic Compound (VOC) emissions were also reduced, ranging from 12% for cars up to 18% for minivans, light trucks and small SUVs. These emission reductions are federally enforceable.

- *Tier III Emission Standards for Vehicles and Gasoline Sulfur Standards*: On March 3, 2014, the EPA finalized new Tier III emission standards for light duty (and some larger) motor vehicles. Light duty vehicles include cars, SUVs, vans, and most pickup trucks. Phase-in of the standards began with Model Year 2017. According to EPA, by the time Tier III is fully implemented in Model Year 2025, the standards for light duty vehicles will require a national reduction of about 80% in tailpipe emissions of VOC and NO_x (both of which contribute to the formation of ground-level ozone) and of about 70% in tailpipe emissions of particulates.

  Like the current Tier II standards, which were promulgated in 2000 and phased in between Model Years 2004 and 2009, the Tier III standards treat vehicles and fuels as a system: reductions in vehicle emissions are easier to achieve if the fuel used contains less sulfur. The Tier III standards required that gasoline contain no more than 10 ppm sulfur on an annual average basis beginning January 1, 2017, down from 30 ppm under the Tier II program. Further, the rule extended the required useful life of emission control equipment from 120,000 miles to 150,000 miles, and set standards for heavier duty gasoline-powered vehicles. The standards also required about a 50% reduction in evaporative emissions.

  EPA anticipates that the implementation of the Tier III vehicle and fuel standards will reduce emissions of NO_x, VOC, fine particulate matter ($PM_{2.5}$), and air toxics. The fuel standards alone, which became effective in 2017, were projected to provide an immediate 56% reduction in sulfur dioxide (SO_2) emissions as the ultra-low sulfur gasoline is deployed in existing vehicles and engines. Further, EPA projects that NO_x emissions will be reduced by about 260,000 tons by 2018 (about 10% of the current emissions from on-highway vehicles), and by about 330,000 tons by 2030 (about 25% of the current emissions from on-highway vehicles) as covered vehicles become a larger percentage of the fleet. VOC and CO emissions are projected to be reduced by about 170,000 tons and 3.5 million tons respectively by 2030 (16% and 24% of the current emissions from on-highway vehicles). These projected national reductions would lead to significant decreases in ambient concentrations of ozone, $PM_{2.5}$ and air toxics by 2030 as the vehicle fleets become updated.

- *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.

iv. Emission Trends

Comparison of annual NO_x emissions from historic year to current emission totals

As demonstrated in Table 2, NO_x emissions in Kentucky have significantly decreased since 2008, and are expected to continue to decline. Although VOC and NO_x emissions both contribute to the formation of ground-level ozone, ozone is far more sensitive to NO_x emissions than VOC emissions in the Southeastern United States.[16] In the 2011 Federal Implementation Plan (FIP) ruling for Interstate Transport of Fine Particulate Matter and Ozone, the EPA stated that "Authoritative assessments of ozone control approaches have concluded that, for reducing regional scale ozone transport, a NO_x control strategy is most effective, whereas VOC reductions are generally most effective locally, in more dense urbanized areas…EPA continues to believe that the most effective regional pollution control strategy for mitigation of interstate transport of ozone remains NO_x emission reductions."[17] Therefore, controlling NO_x emissions is a more effective strategy in reducing ozone levels than controlling VOC emissions.

Table 2: Kentucky Point Source Annual NO_x Emissions under CSAPR (tpy)

	2008	2009	2010	2011	2012	2013	2014	2015	2016
NO_x	167,427	91,203	105,081	102,680	90,952	91,527	92,323	75,798	71,442

Based on EPA's 2014 National Emissions Inventory (NEI) emissions data, the major contributor of NO_x emissions in Kentucky are from the point, mobile and nonpoint sectors, with point sources being the largest contributor. As listed above in section ii, *Permanent and Enforceable Measures*, several federal programs will continue to decrease mobile VOC and NO_x emissions significantly once fully implemented. The majority of point source NO_x emissions in Kentucky are from electric generating units (EGUs), which have already decreased significantly since the implementation of CAIR and CSAPR. (See Charts 1 and 2) NO_x emissions from EGUs will continue to decrease with the implementation of the CSAPR Update, and the retirement of several EGUs located in Kentucky.

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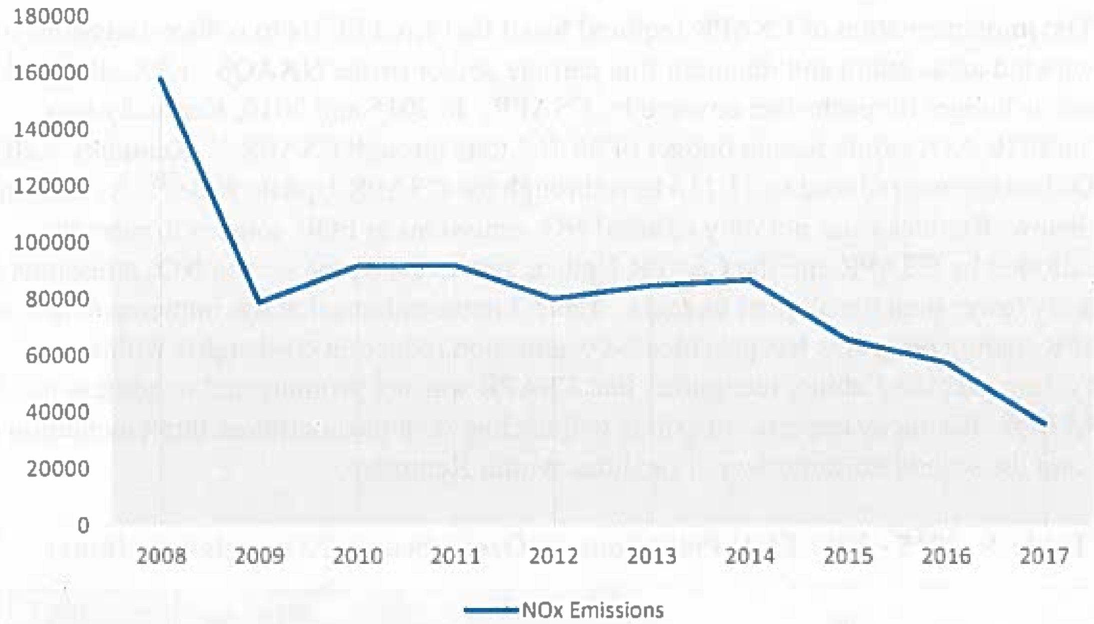
[16] Odman, M Talat et al., *Quantifying the sources of ozone, fine particulate matter, and regional haze in the Southeastern United States*, 90 Journal of Environmental Management 3155-3168 (2009).

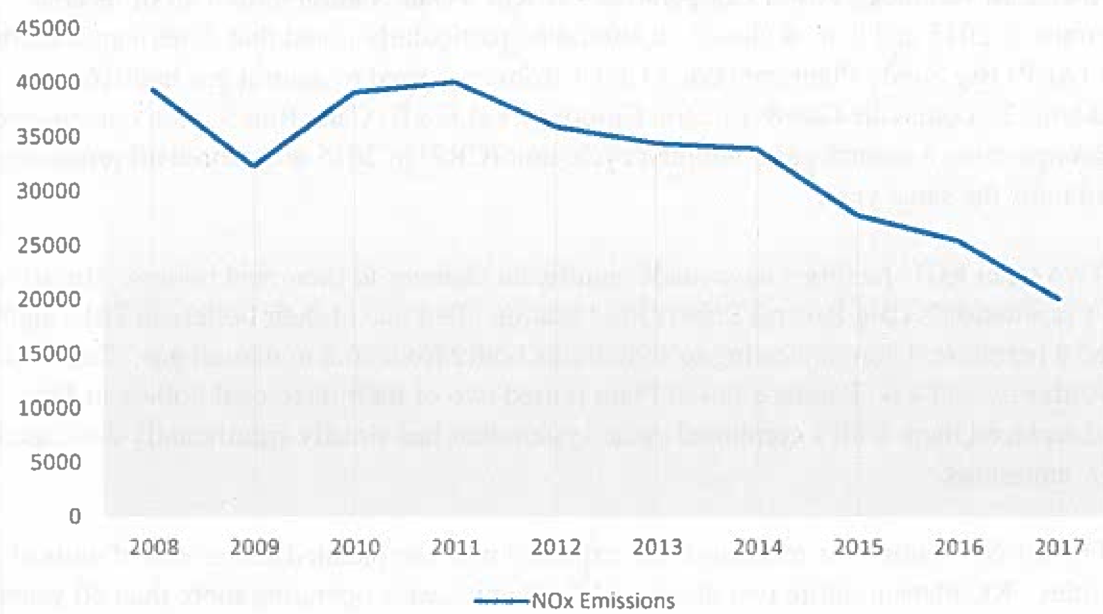
[17] 76 FR 48222

Chart 1: 2008 – 2017 Annual NO_x Emissions for Kentucky EGUs (tpy)



Note: Chart 1 data obtained from EPA's Air Markets Program Data: https://ampd.epa.gov/ampd/

Chart 2: 2008 – 2017 Ozone Season NO_x Emissions for Kentucky EGUs (tpy)



Note: Chart 2 data obtained from EPA's Air Markets Program Data: https://ampd.epa.gov/ampd/

Emission Totals after CSAPR Implementation

The implementation of CSAPR required fossil fuel-fired EGUs to reduce emissions to help downwind areas attain and maintain fine particle and/or ozone NAAQS. EPA allocated a set emissions budget for each state covered by CSAPR. In 2015 and 2016, Kentucky was allotted an EGU NO_x ozone season budget of 36,167 tons through CSAPR.[18] Kentucky's 2017 EGU NO_x budget was reduced to 21,115 tons through the CSAPR Update Rule.[19] As seen in Table 3 below, Kentucky has not only reduced NO_x emissions at EGU sources to meet the budgets allotted by CSAPR and the CSAPR Update, but actual ozone season NO_x emissions are significantly lower than the allotted budgets. Table 3 demonstrates that the implementation of the CSAPR trading programs has provided NOx emission reduction co-benefits within Kentucky, however the Cabinet recognizes that CSAPR was not promulgated to address the 2015 ozone NAAQS. Kentucky expects emissions will decline with the continued implementation of CSAPR and the scheduled shutdown of facilities within Kentucky.

Table 3: 2015 - 2017 EGU Point Sources Ozone Season NO_x emissions (tons)

	2015	2016	2017
Allocations	**36,167**	**36,167**	**21,115**
NO_x Actual Emission Totals (tons)[20]	**27,790.75**	**25,473.99**	**20,053.01**

Kentucky Utilities Company's (KU) Green River Station retired its last two coal units in 2015. Also, East Kentucky Power Cooperative's (EKPC) Dale Station retired all of its coal burning units in 2015 and is now closed. It should be particularly noted that American Electric Power's (AEP) Big Sandy Plant converted Unit 1 from coal-fired to natural gas in 2016, and removed Unit 2. Louisville Gas & Electric Company's (LG&E) Cane Run Station constructed and began operating a natural gas combined cycle unit (CR7) in 2015 and retired all remaining coal-fired units the same year.

Two other EGU facilities have made significant changes to their coal boilers. Big Rivers Electric Corporation's (Big Rivers) Robert Reid Station idled one of their boilers in 2016 and has submitted a permit revision requesting to switch this boiler from coal to natural gas. Tennessee Valley Authority's (TVA) Paradise Fossil Plant retired two of their three coal boilers in June 2017 and replaced them with a combined cycle system that has already significantly decreased their NO_x emissions.

Further NO_x emissions reductions are expected with the planned retirement of units at two facilities. KU plans to retire two older coal-fired units, each operating more than 50 years, at

[18] 40 CFR 97.510(a)(8)(i)
[19] 40 CFR 97.810(a)(8)(i)
[20] Ozone Season NO_x emissions data obtained from EPA's Air Markets Program Data https://ampd.epa.gov/ampd/

the E.W. Brown Generating Station in February 2019.[21] Owensboro Municipal Utilities (OMU) announced in 2015 their plans to retire Unit 1 at the Elmer Smith Plant by 2019.[22] In March 2017, OMU announced that they will also retire Unit 2 which will effectively close the Elmer Smith Plant in its entirety before 2023.

v. **Downwind Monitors**

Connecticut

In accordance with CAA section 107(d), the EPA designated the entire state of Connecticut as nonattainment for the 2015 ozone NAAQS. The EPA divided the state into two areas, Greater Connecticut, CT, with a marginal classification, and New York-Northern New Jersey-Long Island, NY-NJ-CT (New York Metro), with a moderate classification. The EPA made its determination based upon the most recent 3 years of certified monitoring data, and the five-factor analysis from the EPA ozone guidance.[23]

Fairfield County, Connecticut is within the New York Metro area and contains two nonattainment ambient air monitors. EPA's March 27, 2018 updated modeling identified Kentucky as significantly contributing to these two monitors using a threshold contribution of 1 percent of the 2015 ozone standard (0.70 ppb). EPA's most recent analysis allows for the use of an alternative contribution threshold, 1 ppb, which was shown to be comparable to the amount captured using a threshold equivalent to 1 percent of the NAAQS. With the applicability of the 1 ppb threshold, Kentucky is no longer shown to significantly contribute to the two monitors in Fairfield County. This section demonstrates that emissions from local sources in the area surrounding the monitors contribute significantly to the continued nonattainment issues, and local controls should be implemented to resolve this issue before requesting upwind states to over-control their facilities.

The Westport Sherwood monitor[24] is located in Sherwood Island State Park in Westport, Connecticut, which is a coastal site located 0.31 miles south of Interstate 95 (I-95) on the Long Island Sound. Its design value for 2014 – 2016 was 0.083 ppm. This is the highest design value in the area.[25] The distance between the Westport monitor and the Stratford Point Lighthouse monitor[26] is 19.3 miles. The Stratford Point Lighthouse monitor is located at 1275 Prospect Drive, Stratford, Connecticut, which is a coastal site located 2.8 miles southeast of I-95 and approximately 27.96 miles northeast of the New York border. Its design value for 2014 – 2016 was 0.081 ppm. Both monitors exceeded the 2015 ozone NAAQS for design value years 2014 –

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[21] https://lge-ku.com/newsroom/press-releases/2017/11/14/kentucky-utilities-announces-upcoming-retirement-two-coal-fired

[22] https://omu.org/_uploads/20171019_CCR-Ash-Pond-Initial-and-Post-Closure-Plan.pdf

[23] 83 FR 25794

[24] AQS Site ID Monitor 90019003

[25] EPA, *New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area, Final Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)*

[26] AQS Site ID Monitor 90013007

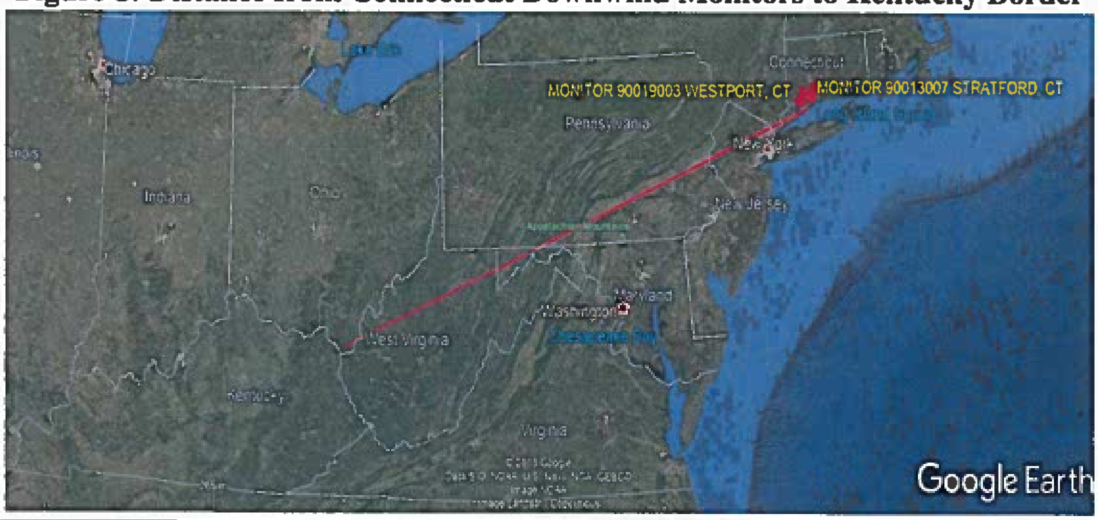
2016.[28] Table 4 indicates that both monitors have consistently violated the ozone standard for the past 10 years.

Table 4: Design Values for Kentucky-linked Downwind Connecticut Monitors (ppm)[29]

Monitor - AQS	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016
Westport - 090019003	0.087	0.087	0.082	0.080	0.079	0.085	0.087	0.085	0.084	0.083
Stratford - 090013007	0.092	0.088	0.081	0.076	0.079	0.085	0.089	0.084	0.083	0.081

Kentucky emissions were previously linked to the monitors listed in Table 4; however, Kentucky emissions were not linked to the following nonattainment ambient air monitors which are in close proximity to both the Westport and Stratford monitors. The Greenwich Point Park monitor[30] in Fairfield County is southwest of both monitors with a distance of 15.2 miles from the Westport monitor and 27.3 miles from the Stratford monitor. The Criscuolo Park – New Haven monitor[31] in New Haven County is northeast of both monitors with a distance of 14.7 miles from the Stratford monitor and 26 miles from the Westport monitor. Figure 1 shows the distance between the Kentucky border and both the Westport and Stratford monitors.

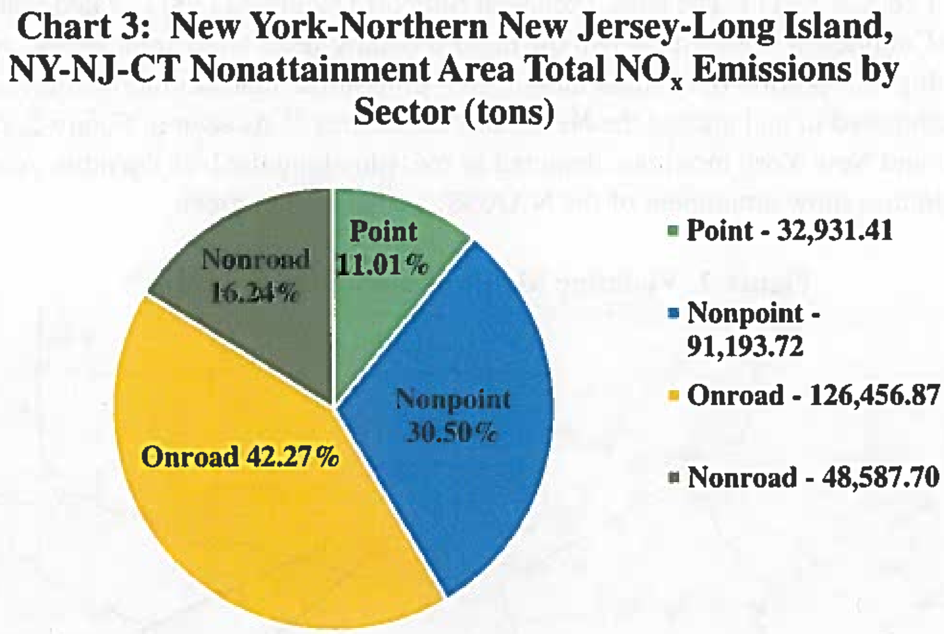
Figure 1: Distance from Connecticut Downwind Monitors to Kentucky Border

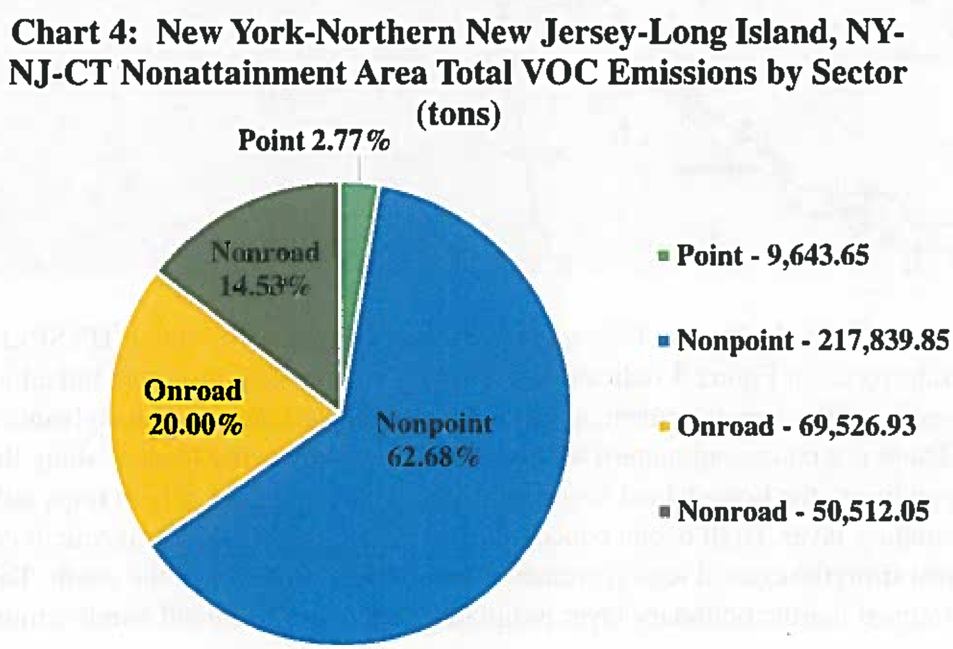


Distance from Connecticut Downwind Monitors to Kentucky Border	
Monitor ID	**Distance from Kentucky Border**
Westport Sherwood - 90019003	526.10 miles
Stratford - 90013007	538.43 miles

[28] *New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area Final Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)*
[29] https://www.epa.gov/air-trends/air-quality-design-values
[30] AQS Site ID Monitor 90010017
[31] AQS Site ID Monitor 90090027

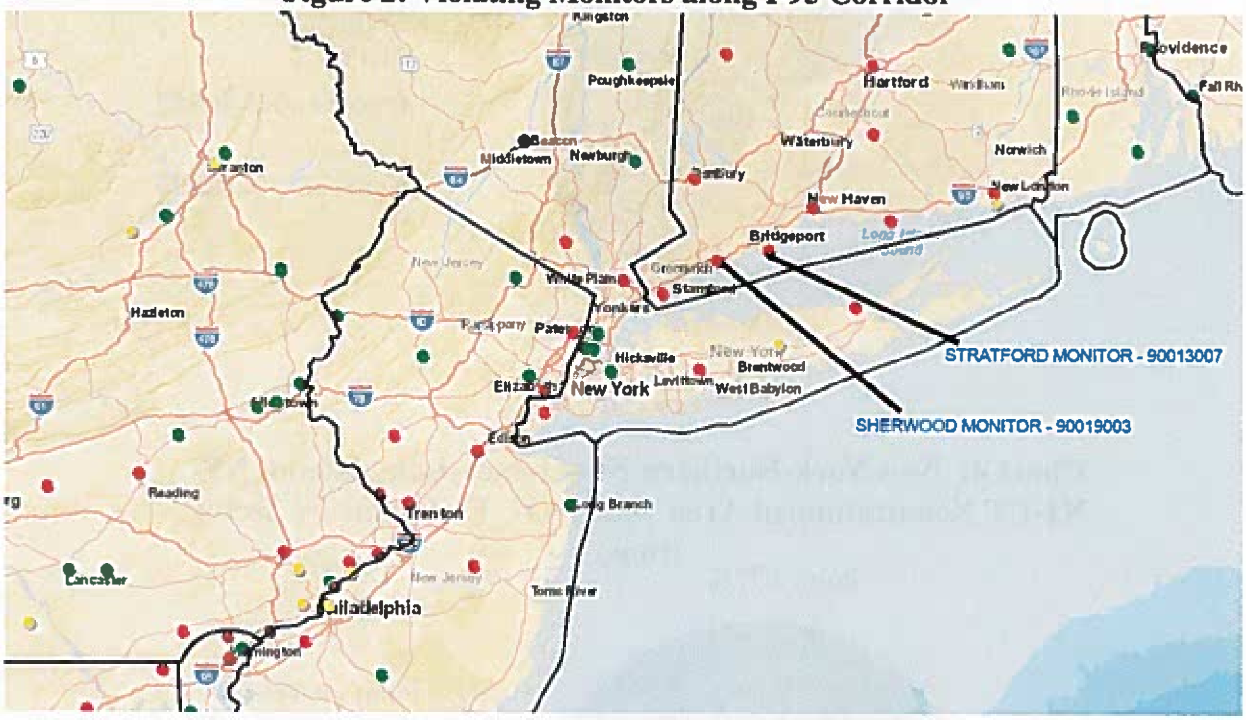
2014 NEI emissions data show that the on-road source sector contributed the highest amount of NO_x emissions in the New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area. The nonpoint source sector contributed the highest amount of VOC emissions within the Core-Based Statistical Area (CBSA). (See Charts 3 and 4)





The New York Metro area is a heavily populated urban area. In 2014, total Vehicle Miles Traveled (VMT) in the area was over 120 billion miles; 9 million county residents work within the area and, of those, 3 million commute to the area which the violating monitor is located. The counties with the highest VMT are Suffolk, NY (14,438 VMT), West Chester, NY (8,736 VMT), Middlesex, NJ (8,036 VMT), Bergen, NJ (7,302 VMT), New Haven, CT (6,976 VMT) and Fairfield, CT (6,876 VMT). The EPA Technical Support Document (TSD) stated that Suffolk and Nassau Counties in Long Island had the highest county-level VMT total for the area, reflecting a high proportion of on-road mobile NO_x emissions. Transportation arteries, such as I-95, are concentrated in and around the New York Metro area.[32] As seen in Figure 2, the Southern Connecticut and New York monitors, depicted in red, run along the I-95 corridor. A majority of outlying monitors show attainment of the NAAQS, as depicted in green.

Figure 2: Violating Monitors along I-95 Corridor[33]



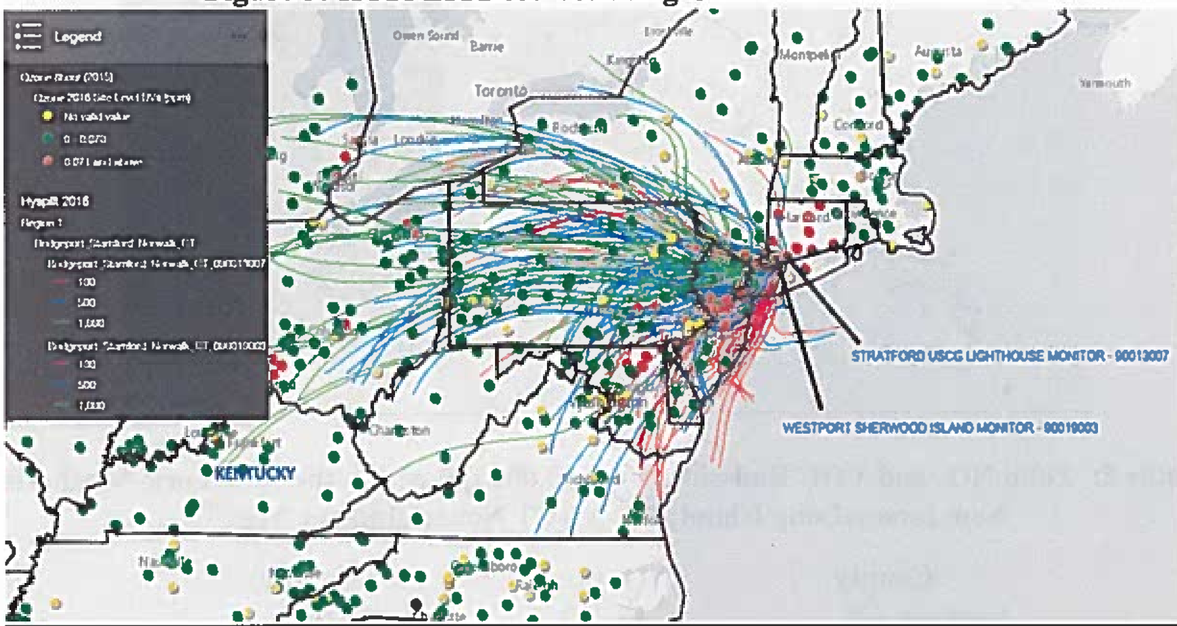
The Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) backward trajectories in Figure 3 indicate the violating Connecticut monitors linked to Kentucky are downwind from the nonattainment areas in New York, New Jersey, Pennsylvania and Maryland. There is a consistent pattern with violating monitors being located along the I-95 corridor. In addition, the Long Island Sound has relatively cool water, which traps pollutants into a marine boundary layer. High ozone concentrations develop along the Connecticut coast as the afternoon heat from the coastal region creates a sea breeze coming from the south. This breeze carries the trapped marine boundary layer pollutants along with it. Inland winds coming from the

[32] EPA, *New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area, Final Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)*

[33] EPA Ozone Mapping Tool – Official Design Values

west can deter sea breeze penetration and sometimes contributes to further ozone concentration along the coast.[34] The I-95 corridor is west and southwest of this high ozone concentration region.

Figure 3: HYSPLITS for Violating Connecticut Monitors



Another contributing factor surrounding the nonattainment monitors are point sources. Figure 4 shows a multitude of large point sources, as depicted in black, that are located in the New York Metro area and upwind of both Connecticut monitors. Other violating monitors around these large point sources are unaffiliated with Kentucky emissions. As shown in Table 5, Suffolk, Queens, and Nassau Counties had the highest NO_x emissions of the counties and they surround Fairfield County. Table 5 accounts for counties within New York Metro with emissions totals of NO_x and VOCs above 10,000 tpy.

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[34] *Retrospective and Future Analysis of Air Quality In and Downwind of New York City DRAFT White Paper (Dec. 15, 2017)*

Figure 4: New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area (New York Metro) Large Point Sources[35]

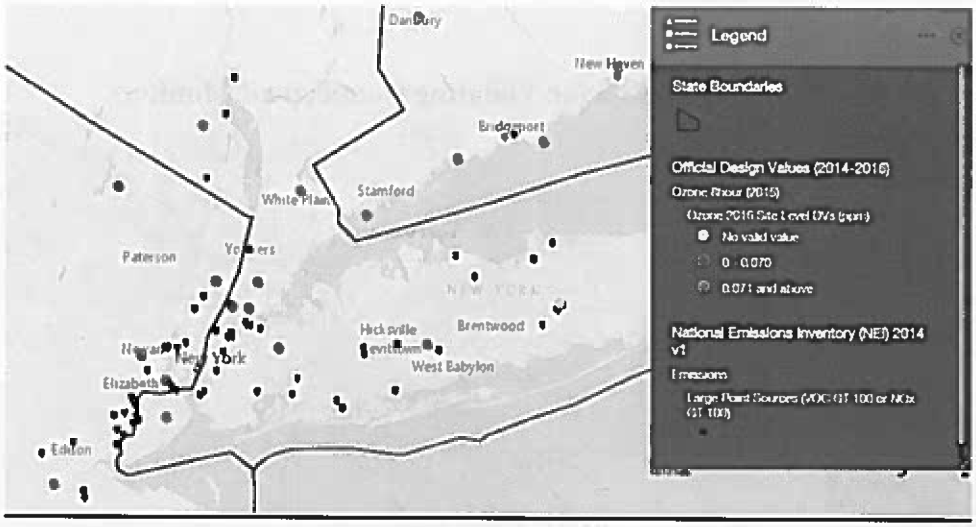


Table 5: Total NO_x and VOC Emissions over 10,000 tpy within the New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area[36]

County	NO_x (tpy)	VOCs (tpy)
Fairfield, CT	15,222	19,987
New Haven, CT	12,439	16,924
Bergen, NJ	13,418	15,228
Essex, NJ	12,527	10,844
Middlesex, NJ	16,126	15,081
Monmouth, NJ	12,288	11,488
Union, NJ	12,128	9,523
Kings, NY	17,260	15,521
Nassau, NY	21,698	17,625
New York, NY	24,514	16,447
Queens, NY	27,848	17,252
Suffolk, NY	31,161	26,287
Westchester, NY	15,195	14,479

High electric demand days (HEDD) occur on the hottest days in summer due to the increased demand of electricity, primarily from air conditioning. Additional EGUs operate in order to meet the peak demand, which results in the increase in NO_x emissions. The HEDD coincide with days that have the highest monitored ozone levels. The New York Department of Environmental Conservation (NYDEC) found that peaking units used on HEDD have been

[35] EPA Ozone Mapping Tool – Large Point Source Emissions

[36] EPA, *New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area, Final Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)*

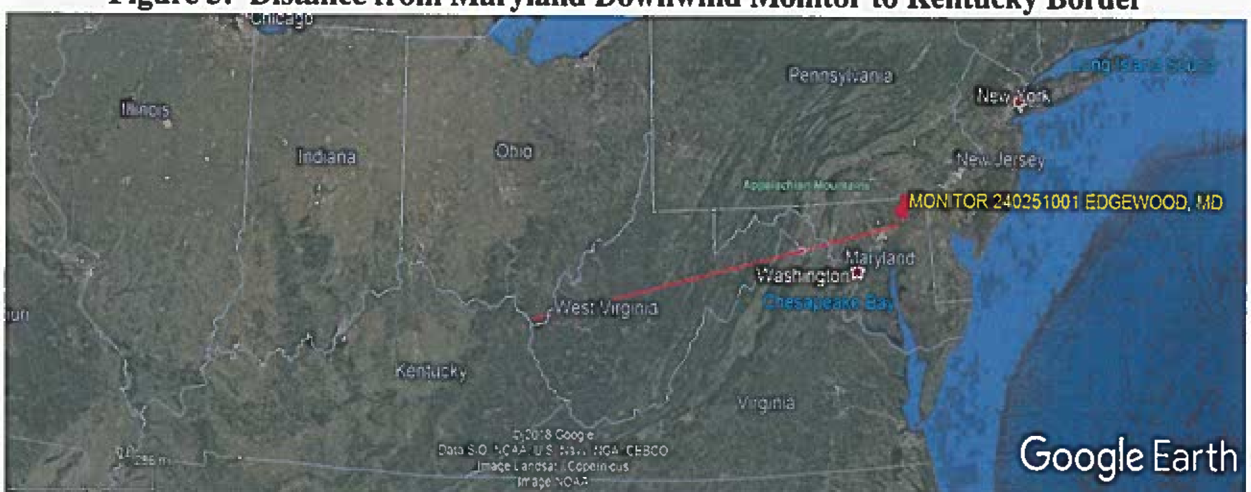
identified as a significant contributor of NO_x emissions, especially those units which were installed prior to 1987. NYDEC performed an emissions analysis on peaking units and found that they can contribute 4.8 ppb of ozone on high ozone days.[38] The reduction of NO_x emissions from these units would have a significant impact on ozone levels in this region.

[38] "Background, High Electric Demand Day (HEDD) Initiative", New York Department of Environmental Conservation. http://midwestozonegroup.com/files/New_York_Peakers.pptx

Maryland

In accordance with CAA section 107(d), the EPA designated counties in Baltimore, Maryland (MD) and the Washington, DC-MD-VA areas as nonattainment for the 2015 ozone NAAQS.[40] The EPA made its determination based upon the most recent 3 years of certified monitoring data, and the five-factor analysis from the EPA ozone guidance. Maryland's Edgewood monitor[41] in Harford County, which is one of the nonattainment areas of Baltimore, exceeded the 2015 ozone NAAQS with a design value of 0.073 ppm for the years 2014 – 2016.[42] The monitor is located at the U.S. Army Edgewood Chemical Biological Center (APG), Waehli Road, Edgewood, Maryland and is part of the Baltimore-Columbia-Towson, MD CBSA. This location is considered to capture the highest concentration of ozone at the urban measurement scale.[43] Based on EPA's March 27, 2018 updated modeling, it shows the potential for Kentucky to significantly contribute to this maintenance monitor in 2023; however, this section demonstrates that emissions from local sources in the area surrounding the monitor contribute significantly to the continued nonattainment issues. Further, there are local controls that should be implemented to resolve this issue before requesting upwind states to over-control their facilities. Figure 5 shows the distance between the Kentucky border and the Edgewood monitor.

Figure 5: Distance from Maryland Downwind Monitor to Kentucky Border



Distance from Maryland Downwind Monitors to Kentucky	
Monitor and AQS ID	**Distance from Kentucky Border**
Edgewood - 240251001	346.28 miles

40 83 FR 25812

41 AQS Site ID Monitor 240251001

42 *Maryland: Baltimore, MD; Washington, DC-MD-VA; and Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD Nonattainment Areas Final Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)*

43 *Maryland Department of the Environment: Ambient Air Monitoring Network Plan for Calendar Year 2018*

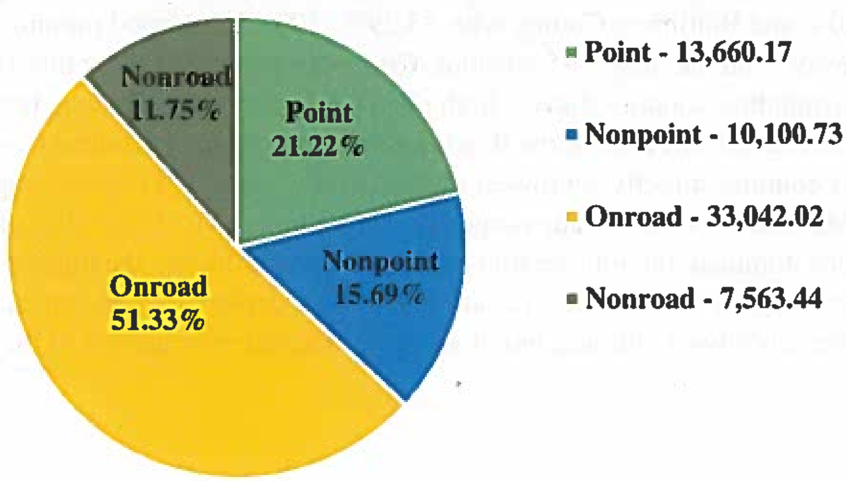
The surrounding nonattainment monitors are the Padonia monitor[44] in Baltimore County, which is 18 miles to the northwest; the Essex monitor[45] in Baltimore County, which is 11.8 miles to the southwest; and the Aldino monitor in Harford County, which is 11.8 miles to the northeast. As seen in Table 6, the Edgewood monitor has consistently violated the ozone standard for the past 10 years.[46]

Table 6: Design Values for Kentucky-linked Downwind Maryland Monitors (ppm)

Monitor - AQS	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016
Edgewood - 240251001	0.094	0.091	0.087	0.089	0.092	0.093	0.085	0.075	0.071	0.073

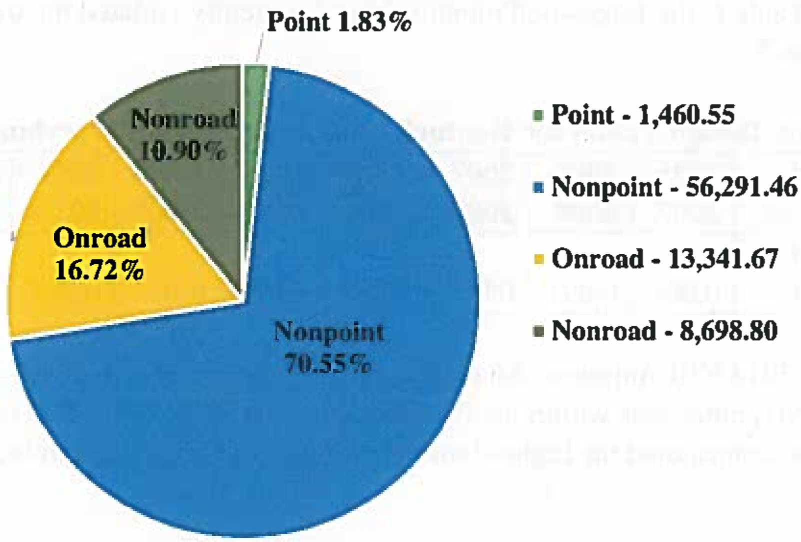
The 2014 NEI emissions data show that the on-road source sector contributed the highest amount of NO_x emissions within the Baltimore-Columbia-Towson, MD CBSA. The nonpoint source sector contributed the highest amount of VOC emissions within the CBSA.[47] (See Charts 5 and 6)

Chart 5: Baltimore-Columbia-Towson, MD CBSA Total NO_x Emissions by Sector (tons)



[44] AQS Site ID Monitor 240051007
[45] AQS Site ID Monitor 240259001
[46] https://www.epa.gov/air-trends/air-quality-design-values
[47] Ozone Mapping Tool – Total NO_x and Total VOC Emissions

Chart 6: Baltimore-Columbia-Towson, MD CBSA Total VOC Emissions by Sector (tons)



The counties with the highest VMT within the Baltimore-Columbia-Towson, MD CBSA were Harford County, with a commuting percentage of the population traveling to or within each area of 62.20% and Baltimore County with 43.29%.[48] The Edgewood monitor in Harford County is 3 miles away from the busy I-95 corridor. Commuting patterns show that Harford County, along with surrounding counties, have a high percentage of commuters who travel in the I-95 corridor area. VMT data from 2014 show that the southern portion of Harford County, along with multiple counties directly southwest of this county, are in the highest range of 204,018,496.01 to 5,247,588,352.00 VMT.[49] The range also runs along the I-95 corridor, of which on-road emissions dominate the four sectors in respect to contributing the highest portion of NO_x emissions. Figure 6 shows that violating monitors, depicted in red, run along the I-95 corridor, while the majority of outlying monitors show attainment of the NAAQS.

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[48] *Maryland: Baltimore, MD; Washington, DC-MD-VA; and Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD Nonattainment Areas Final Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)*

[49] EPA Ozone Mapping Tool – Vehicle Miles Traveled (VMT)

Figure 6: Violating Monitors along I-95 Corridor[50]

It is notable to mention research on bay breeze and its associated complexity of air pollution formation and accumulation. The Edgewood monitor is located between Gunpowder River (less than 2 miles away at closest point) and Bush River (less than 1 mile away at closest point), which are both tidal estuaries of Chesapeake Bay. The monitor is on the northern coastline of the bay – roughly 5.6 miles at closest point of contact where the Bush River meets. A 2010 study during the month of July indicated that surface ozone concentrations tend to be higher over Chesapeake Bay than over other upwind areas. This is due to lower deposition rates, higher photolysis rates, trapped ship emissions, and fewer clouds decreasing boundary layer venting. The case study revealed that pollutants are transported from urban areas by westerly winds to Chesapeake Bay. Pollutants stagnate in the bay and accumulate, thus creating a bay breeze. Southerly winds then push this bay breeze northward, where the Edgewood monitor is located.[51] The I-95 corridor runs northeast and south/southwest of these river and bay regions.

The HYSPLIT backward trajectories in Figure 7 indicate the violating Edgewood monitor is downwind from the following nonattainment areas: Baltimore County, Baltimore City, Arlington County (Virginia) and the District of Columbia. EPA analysis indicates that during exceedance days, higher altitude air particles, which appear to come mainly from the northwest of Baltimore, combine with lower level particles, which appear to come from mainly the south and southeast, and continue to move towards Harford County, MD. The monitors depicted in red run along the I-95 corridor. Within Baltimore, there are multiple highways in

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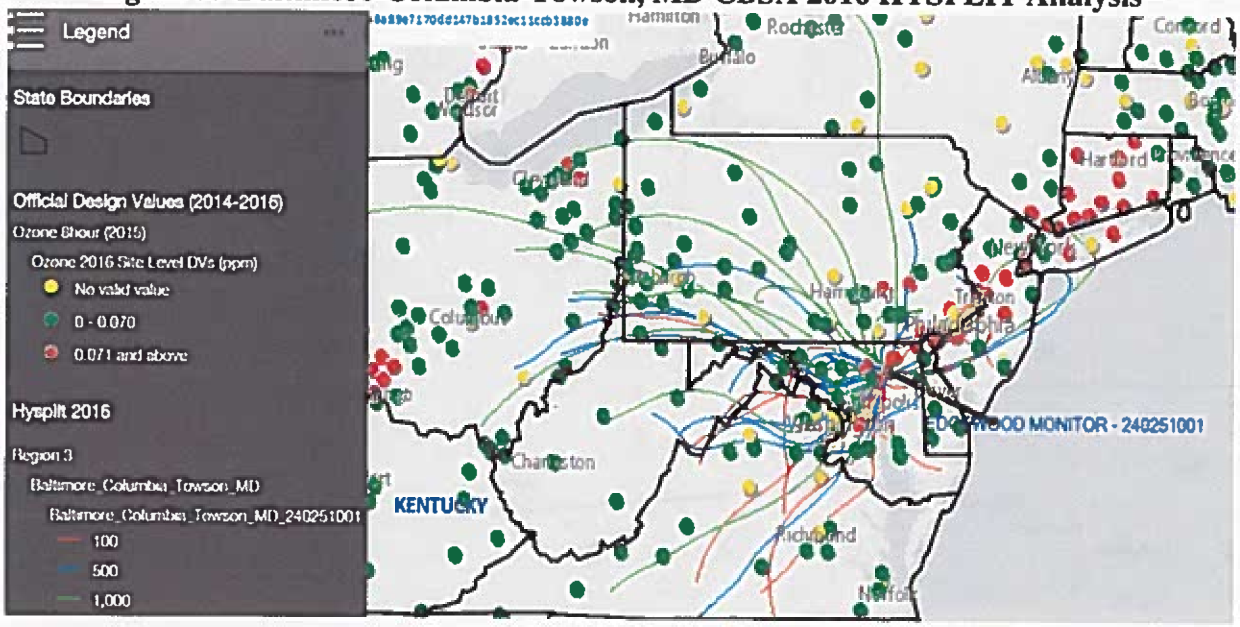
[50] EPA Ozone Mapping Tool – Official Design Values

[51] Stauffer, R. M., and Coauthors, 2014: Bay breeze influence on surface ozone at Edgewood, MD during July 2011

conjunction with and intersecting I-95. Baltimore is located southwest of the Edgewood monitor, a potential upwind to downwind direction.

Figure 7: Baltimore-Columbia-Towson, MD CBSA 2016 HYSPLIT Analysis[52]



On December 11, 2017, Tad Aburn, Director of Air for the Maryland Department of the Environment (MDE), presented "A Path Forward for Reducing Ozone in Maryland and the Mid-Atlantic States, Driving With Science." The presentation highlighted programs to reduce emissions from local sources in Maryland and the Northeast including:

- New rules by New York on small generators;
- New Ozone Transport Commission initiatives involving idle reduction;
- Aftermarket catalysts on mobile sources;
- Electric and other zero emission vehicles;
- Maryland rules on municipal waste combustors; and
- Maryland's Idle Free Initiative.

On-road mobile sources make up 51.33% of NO_x emissions in the area surrounding the Edgewood monitor. Figure 6 clearly shows the concentration of nonattainment monitors along the I-95 corridor. Tad Aburn stated in his December 2017 presentation that "Anything that we can do to reduce mobile source NO_x will be critical." The introduction of zero emission vehicles and aftermarket catalysts, along with the decrease in idling, will help with the reduction of emissions from the on-road sector.

The implementation of local programs to reduce emissions should be sufficient for monitors in the area to attain the 2015 ozone NAAQS. This is especially significant to note since

[52] EPA Ozone Mapping Tool – 2016 HYSPLIT Analysis

EPA's modeling platform does not account for newly announced unit retirements, fuel switching and modifications, or emission control programs that will be or are required to be adopted and implemented prior to 2023, as discussed in further detail below.

The Midwest Ozone Group (MOG) provided comments on EPA's March 27, 2018 memorandum. MOG noted that the current EPA modeling does not account for all current local control programs and unit shutdowns, which can cause the model to over-predict ozone concentrations. With the inclusion of the programs and shutdowns, Alpine states, "...it is highly likely that the inclusion of these emissions reductions will result in all areas demonstrating attainment of the 2015 NAAQS without the need for further additional regional or national emissions reductions programs." MOG's comments on EPA's March 27, 2018 memo can be found in Appendix C.

vi. Conclusion

The results of EPA's March 27, 2018 memorandum updated modeling shows Kentucky significantly contributing to four (4) nonattainment and one (1) maintenance monitor. The updated modeling used a screening threshold of 1 percent of the 2015 ozone NAAQS (0.70 ppb) to apply to step 2 of the four-step framework used to address upwind state obligations under the good neighbor provisions. On August 31, 2018, the EPA published a memo detailing an analysis used to assess alternative contribution thresholds (1 ppb, 2 ppb). The Cabinet agrees with the rationale of the EPA's August 31, 2018 analysis confirming that the use of a 1 ppb contribution threshold is comparable to the amount captured using a threshold equivalent to 1 percent of the NAAQS. With the application of the 1 ppb threshold, Kentucky is no longer shown to be significantly contributing to the four nonattainment monitors. Consequently, the Kentucky 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 CAA element 110(a)(2)(D)(i)(I) "prong 1" for the 2015 ozone NAAQS.

As shown in Section iv. *Emissions Trends*, Kentucky has significantly lowered emissions over the past 10 years. Planned shutdowns and conversion to natural gas, along with the implementation of federal and state programs, ensure Kentucky's emissions will continue to decrease.

Upwind states should not be required to apply the same degree of reductions that are required for nonattainment areas. MOG referenced the U.S. Supreme Court opinion in *EPA v. EME Homer City* to uphold their opinion that EPA should develop an alternative emission reduction approach that accounts for the fact that maintenance areas are already in attainment. The U.S. Supreme Court opinion states:

"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 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. 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."[59]

Additionally, MOG has made the following statement regarding controls on local sources: "When an area is measuring nonattainment of a NAAQS, as is the case with the areas linked to Kentucky, the 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."[60]

Section v. *Downwind Monitors*, focuses on the local emissions impacting nonattainment monitors located Northeast of Kentucky. Kentucky has been linked to nonattainment monitors in the area historically and is still shown to be contributing to the maintenance monitor located in Harford, Maryland. However, the Cabinet agrees with the statements above and that local controls should be implemented foremost before requiring upwind states to over-control their facilities. Further, the Cabinet agrees that maintenance areas should not be treated the same as nonattainment areas since those areas are attaining the standard.

Section v. demonstrates that on-road emissions are a major contributor to the Edgewood monitor located in Harford, Maryland. The Edgewood monitor is located along the I-95 corridor. Figure 6 shows the majority of monitors located along the I-95 corridor between Maryland and Connecticut are not attaining the 2015 ozone standard. There are several local programs that, once implemented, would reduce on-road emissions and allow for the monitors in the area to attain the 2015 ozone NAAQS. Thus, the Cabinet concludes that the emissions reductions resulting from on-the-books and on-the-way emissions reductions are adequate to prohibit emissions within Kentucky from interfering with the maintenance of downwind states with respect to the 2015 ozone NAAQS; therefore, meeting the requirements of CAA section 110(a)(2)(D)(i)(I) "prong 2."

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[59] 33 EME Homer City v. EPA, 96 F.3d 7, 27 Ftn. 25 (D.C. Cir 2012).

[60] Flannery, David M. (Midwest Ozone Group), *Proposed Infrastructure State Implementation Plan Related to the 2015 Ozone NAAQS*. 21 Sep 2018: Page 9.

110(a)(2)(D)(i)(I) "Prong 3" – Interference with Prevention of Significant Deterioration (PSD):

- 401 KAR 51:010. *Attainment status designations.* This administrative regulation designates the status of all areas of the Commonwealth of Kentucky with regard to attainment of the ambient air quality standards.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation applies to the construction of new major stationary sources and projects at existing major stationary sources that locate in areas designated attainment or unclassifiable.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 52.100. *Public, affected state, and US EPA review.* This administrative regulation establishes the procedures used by the cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA.

110(a)(2)(D)(i)(I) "Prong 4" – Visibility Transport:

- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation applies to the construction of new major stationary sources and projects at existing major stationary sources that locate in areas designated attainment or unclassifiable.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 52.100. *Public, affected state, and US EPA review.* This administrative regulation establishes the procedures used by the cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA

The Cabinet submitted its initial SIP for Regional Haze in 2008, which established 2018 reasonable progress goals for visibility in Kentucky's Class 1 Federal area, Mammoth Cave National Park. On March 30, 2012, EPA promulgated a limited approval and a limited disapproval of the Cabinet's two SIP revisions, dated June 25, 2008 and May 28, 2010, that addressed regional haze requirements for the first implementation period.[62] EPA issued the limited disapproval due to the SIP revision's reliance on the remanded CAIR. As a result, EPA implemented a FIP on June 7, 2012, to replace the Kentucky Regional Haze SIP's reliance on CAIR with reliance on CSAPR as an alternative to Best Available Retrofit Technology (BART) for SO_2 and NO_x emissions from EGUs.[63] The implementation of the limited FIP was used to satisfy the BART requirement and to achieve reasonable progress goals.

[62] 77 FR 19098
[63] 77 FR 33642

On September 29, 2017, EPA published a final rule affirming the continued validity of the June 7, 2012 ruling that participation in CSAPR meets the Regional Haze Rule's criteria for an alternative to the application of BART.[64] On September 14, 2018, the Cabinet submitted a SIP revision requesting EPA's approval to adopt 401 KAR 51:240 *Cross-State Air Pollution Rule (CSAPR) NO_x annual trading* program and 401 KAR 51:250 *Cross-State Air Pollution Rule (CSAPR) NO_x ozone season group 2 trading* program, into the Kentucky SIP. The two CSAPR related regulations were adopted into Kentucky regulations on July 5, 2018.

On September 4, 2018, the Cabinet submitted a proposed revision to the Kentucky Regional Haze SIP requesting EPA to change Kentucky's reliance from CAIR to reliance on CSAPR to satisfy BART. The letter also requests that EPA revise the limited disapproval of Kentucky's Regional Haze SIP to a full approval and grant full approval of section 110(a)(2)(D)(i)(I) "prong 4" within Kentucky's disapproved I-SIPs once the revised Regional Haze SIP has been approved. The proposed submittal was provided to Federal Land Managers (FLMs) for a 60-day review and comment period. The public comment period closed October 4, 2018. The Cabinet intends to submit a final revision in the near future.

The Regional Haze 5-Year Periodic Report SIP Revision, submitted September 17, 2014, demonstrates a steady decline in fine particle emissions, of which SO_2 and NO_x are the most important precursors. The implementation of state and federal emission reduction measures have led to this decline and have contributed to Kentucky exceeding the reasonable progress goals set in the Regional Haze SIP.

Elements D(ii) - Section 110(a)(2)(D)(ii): Interstate Pollution Abatement and International Air Pollution

Each such plan shall --

(D) contain adequate provisions --

(ii) insuring compliance with the applicable requirements of sections 126 and 115 (relating to interstate and international pollution abatement).

In accordance with 40 CFR 51.166(q)(2)(iv), Kentucky is in compliance with the requirement of notifying air agencies whose lands may be affected by emissions from any new or modified source subject to its EPA-approved PSD program. The following regulations ensure that Element D(ii) is satisfied; as outlined in the EPA I-SIP guidance.

- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation applies to the construction of new major stationary sources and projects at existing major stationary sources that locate in areas designated attainment or unclassifiable. Section 15 provides that the Cabinet shall follow the applicable procedures of 401 KAR 52:100 and 40 CFR 51.166(q) to ensure the Cabinet notifies all nearby states of potential impacts from a new or modified major source.

64 82 FR 45481

- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 52.100. *Public, affected state, and US EPA review.* This administrative regulation establishes the procedures used by the cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA.

All actions related to CAA sections 126(a), 126(b) and (c) and 115 can be found in 40 CFR 52.34.

Element E – Section 110(a)(2)(E): Adequate Resources and Authority, Conflict of Interest, and Oversight of Local Governments and Regional Agencies

Each such plan shall --

(E) provide

> *(i)necessary assurances that the State (or, except where the Administrator deems inappropriate, the general purpose local government or governments, or a regional agency designated by the State or general purpose local governments for such purpose) will have adequate personnel, funding, and authority under State (and, as appropriate, local) law to carry out such implementation plan (and is not prohibited by any provision of Federal or State law from carrying out such implementation plan or portion thereof),*
>
> *(ii) requirements that the State comply with the requirements respecting State boards under section 128, and*
>
> *(iii)necessary assurances that, where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision.*

Sub-element (i)

The following regulation is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- 401 KAR 50:038. Air emissions fee. This administrative regulation provides for the assessment of fees necessary to fund the state permit program as defined in Section 1(8) of this administrative regulation.

The following Kentucky Revised Statutes are relevant to this element, and are therefore included for reference:

- KRS 224.10-020. *Departments, offices and divisions within the cabinet – Appointments,* describes who is authorized in the Commonwealth to approve air permits, enforcement orders and appeals thereof.
- KRS 224.10-100. *Powers and duties of the cabinet,* provides for authority under State law to carry out its SIP and related issues.
- KRS 224.20-050. *Fee for administration of air quality program,* describes the adoption of fees for the cost of administering the air quality program, as mandated under Title V of the CAA Amendments of 1990.

Sub-element (ii)

Section 110(a)(2)(E)(ii) pertains to Section 128 of the CAA; applicable to certain boards, bodies, and personnel that approve permits or enforcement orders. Kentucky does not have a state board that oversees these measures, thus the first (1) requirement for Section 128 is irrelevant. This authority rests with the Cabinet.

Sec. 128(a) - Not later than the date one year after August 7, 1977, each applicable implementation plan shall contain requirements that—

(1) any board or body which approves permits or enforcement orders under this Act shall have at least a majority of members who represent the public interest and do not derive any significant portion of their income from persons subject to permits or enforcement orders under this Act, and

(2) any potential conflicts of interest by members of such board or body or the head of an executive agency with similar powers be adequately disclosed.

A state may adopt any requirements respecting conflicts of interest for such boards or bodies or heads of executive agencies, or any other entities which are more stringent than the requirements of (paragraphs (1) and (2), and the Administrator shall approve any such more stringent requirements submitted as part of an implementation plan.

The following regulation is not approved into the Kentucky SIP; however, it is relevant to this element and therefore is only included for reference:

- 401 KAR 50:038. *Air emissions fee.* This administrative regulation provides for the assessment of fees necessary to fund the state permit program as defined in Section 1(8) of this administrative regulation.

The following Kentucky Revised Statutes are relevant to this element, and are therefore included for reference:

- KRS 11A.020. *Public servant prohibited from certain conduct – Exception – Disclosure of personal or private interest*, requires adequate disclosure of any potential conflicts of interest
- KRS 11A.030. *Considerations in determination to abstain from action on official decision – Advisory opinion*, proscribes guidelines for determining whether to abstain from action on an official decision because of a possible conflict of interest
- KRS 11A.040. *Acts prohibited for public servant or officer – Exemption,*
- KRS 11A.050. *Financial disclosure by officers, candidates, and public servants, shall file a statement of financial disclosure with the commission.*

Sub-element (iii)

KRS 224 acknowledges counties' rights to develop their own air pollution control districts. In 1952, the Kentucky legislature passed KRS Chapter 77, which authorizes the formation of county air pollution districts. Within the same year, Jefferson County established its own local air pollution program, Louisville Metro Air Pollution Control District (LMAPCD), and has been maintaining it ever since. LMAPCD is governed by the Air Pollution Control Board, which is comprised of seven members appointed by the Mayor of Louisville and approved by the Louisville Metro Council. Its regulations must be at least as stringent as state and federal programs.

The following Kentucky Revised Statutes are relevant to this element, and are therefore included for reference:

- KRS Chapter 77. *Air Pollution Control*, provides for the creation of each county to development an air pollution control district.
- KRS 224.10-100. *Powers and duties of the cabinet*, provides for authority under State law to carry out its SIP and related issues
- KRS 224.10-020. *Departments, offices, and divisions within the cabinet – Appointments*, describes who is authorized in the Commonwealth to approve Air permits and enforcement orders and appeals thereof.
- KRS 224.20-050. *Fee for administration of air quality program,* describes the adoption of fees for the cost of administering the air quality program.
- KRS 224.20-130. *Concurrent jurisdiction with local district,* this statute establishes working synchronously with local districts to implement standards and procedures to implement the program in a manner consistent with the objective of KRS Chapter 224.

Element F – Section 110(a)(2)(F): Stationary Source Monitoring and Reporting

Each such plan shall --

(F) require, as may be prescribed by the Administrator --

(i) the installation, maintenance, and replacement of equipment, and the implementation of other necessary steps, by owners or operators of stationary sources to monitor emissions from such sources,

(ii) periodic reports on the nature and amounts of emissions and emissions-related data from such sources, and

(iii) correlation of such reports by the State agency with any emission limitations or standards established pursuant to this chapter, which reports shall be available at reasonable times for public inspection.

Stationary source monitoring system: Section 110(a)(2)(F) of the CAA requires states to establish a system to monitor emissions from stationary sources and to submit periodic emissions reports.

Sub-element (i)

- 401 KAR 50:020. *Air quality control regions.* This administrative regulation provides for the designation and classification of air quality control regions.
- 401 KAR 50:045. *Performance tests.* This administrative regulation establishes requirements for performance tests.
- 401 KAR 50:050. *Monitoring.* This administrative regulation establishes requirements for stack gas monitoring, ambient air monitoring, and recording and reporting requirements as related to monitoring data.
- 401 KAR 50:055. *General compliance requirements.* This administrative regulation establishes requirements for compliance during shutdown and malfunctions; establishes requirements for demonstrating compliance with standards; establishes requirements for compliance when a source is relocated within the Commonwealth of Kentucky; and other general compliance requirements. The Cabinet has submitted a SIP revision to remove Section 1(1) and (4) from 401 KAR 50:055 in response to a SIP call in which EPA found these provisions of the regulation inadequate; however, the SIP revision will not affect Kentucky regulations. The Cabinet is waiting for final approval from EPA for this SIP revision.
- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.
- 401 KAR 59:005. *General provisions.* This administrative regulation is to provide for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to new sources.
- 401 KAR 61:005. *General provisions.* This administrative regulation provides for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to existing sources.

Sub-element (ii)

To address periodic reporting requirements, the I-SIP submission includes the air agency requirements for periodic reporting of emissions and emissions-related data as required by 40

CFR 51.211, 40 CFR sections 51.321 through 51.323, and the EPA's air emissions reporting rule, 40 CFR part 51 subpart A.

- 401 KAR 50:020. *Air quality control regions*. This administrative regulation provides for the designation and classification of air quality control regions.
- 401 KAR 50:045. *Performance tests*. This administrative regulation establishes requirements for performance tests.
- 401 KAR 50:050. *Monitoring*. This administrative regulation establishes requirements for stack gas monitoring, ambient air monitoring, and recording and reporting requirements as related to monitoring data.
- 401 KAR 50:055. *General compliance requirements*. This administrative regulation establishes requirements for compliance during shutdown and malfunctions; establishes requirements for demonstrating compliance with standards; establishes requirements for compliance when a source is relocated within the Commonwealth of Kentucky; and other general compliance requirements. The Cabinet has submitted a SIP revision to remove Section 1(1) and (4) from 401 KAR 50:055 in response to a SIP call in which EPA found these provisions of the regulation inadequate; however, the SIP revision will not affect Kentucky regulations. The Cabinet is waiting for final approval from EPA for this SIP revision.
- 401 KAR 53:010. *Ambient air quality standards*. This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.
- 401 KAR 59:005. *General provisions*. This administrative regulation is to provide for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to new sources.
- 401 KAR 61:005. *General provisions*. This administrative regulation provides for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to existing sources.

The following regulation is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- 401 KAR 50:038. *Air emissions fee*. This administrative regulation provides for the assessment of fees necessary to fund the state permit program as defined in Section 1(8) of this administrative regulation.

Sub-element (iii)

The infrastructure SIP submission includes the air agency requirements regarding the correlation of emissions reports by sources with applicable emission limitations or standards and the public availability of emission reports by sources.

- 401 KAR 50:050. *Monitoring*. This administrative regulation establishes requirements for stack gas monitoring, ambient air monitoring, and recording and reporting requirements as related to monitoring data.

- 401 KAR 50:055. *General compliance requirements.* This administrative regulation establishes requirements for compliance during shutdown and malfunctions; establishes requirements for demonstrating compliance with standards; establishes requirements for compliance when a source is relocated within the Commonwealth of Kentucky; and other general compliance requirements. The Cabinet has submitted a SIP revision to remove Section 1(1) and (4) from 401 KAR 50:055 in response to a SIP call in which EPA found these provisions of the regulation inadequate; however, the SIP revision will not affect Kentucky regulations. The Cabinet is waiting for final approval from EPA for this SIP revision.
- 401 KAR 52:030. *Federally-enforceable permits for non-major sources.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that accept emission limitations to avoid the New Source Review requirements under Title I of the Clean Air Act or the Operating Permit Program requirements under Title V of the Clean Air Act.
- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.
- 401 KAR 59:005. *General provisions.* This administrative regulation is to provide for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to new sources.
- 401 KAR 61:005. *General provisions.* This administrative regulation provides for the establishment of monitoring requirements, performance testing requirements, and other general provisions as related to existing sources.

The following regulations are not approved into the Kentucky SIP; however, they are relevant to this element and are therefore included for reference:

- 401 KAR 52:020. *Title V permits.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that are required to obtain a Title V permit.
- 401 KAR 52:040. *State-origin permits.* This administrative regulation establishes requirements for minor sources whose permits are not required to be federally enforceable.

The following Kentucky Revised Statute is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- KRS 224.10-210. *Records open to public inspection – Confidential nature of certain data.* This statute provides that applicable records, furnished to or obtained by the Cabinet, shall be open to reasonable public inspection.

Element G – Section 110(a)(2)(G): Emergency Powers

Each such plan shall --

(G) provide for authority comparable to that in section 303 and adequate contingency plans to implement such authority.

Emergency power: Section 303 of the CAA allows the EPA the legal authority to halt the emission of air pollutants presenting an imminent and substantial endangerment to public health or welfare or the environment. The EPA is authorized to either bring a lawsuit in federal court or, if such civil action cannot assure prompt protection of public health or welfare or the environment, to issue such orders as may be necessary to protect public health or welfare or the environment. The requirement for states to provide adequate contingency plans (40 CFR 51.150 through 51.153) to implement such authority is intended to establish emergency episode plans for responding to elevated pollutant levels in urban areas. Emergency episode plans are required in areas that record ambient pollutant concentrations in excess of threshold levels specified in 40 CFR Part 51.150.

EPA has not promulgated regulations that provide the ambient levels to classify different priority levels. In its "Guidance on Infrastructure State Implementation Plan (SIP) Elements under Clean Air Act Sections 110(a)(1) and 110(a)(2)" from September 13, 2013, the EPA recommends that states follow previous EPA guidance regarding the 2015 ozone standard.[65] The 2015 guidance addresses both the primary and secondary standard.

On November 16, 2017[66], most of the state of Kentucky was designated as "attainment/unclassifiable" with the exception of Boone (partial), Campbell (partial) and Kenton (partial) Counties within the Cincinnati-OH-KY area and Bullitt, Jefferson and Oldham Counties within the Louisville, KY-IN area, which were designated "nonattainment" with a marginal classification for the 2015 ozone NAAQS.[67]

The following regulations provide the means to implement emergency air pollution episode measures if ever necessary.

- 401 KAR 50:060. *Enforcement*. This administrative regulation provides for enforcement of the terms and conditions of permits and compliance schedules.
- 401 KAR 55:005. *Significant harm criteria*. This administrative regulation defines those levels of pollutant concentration which must be prevented in order to avoid significant harm to the health of persons.
- 401 KAR 55:010. *Episode criteria*. This administrative regulation defines those levels of pollutant concentrations which justify the proclamation of an air pollution alert, air pollution warning, and air pollution emergency.
- 401 KAR 55:015. *Episode declaration*. This administrative regulation requires the owner or operator of an air contaminant source to take action to reduce air contaminant

[65] *Area Designations for the 2015 Ozone National Ambient Air Quality Standards).* (February 25, 2016)
[66] 82 FR 54232
[67] 83 FR 25776

emissions whenever an air pollution alert, air pollution warning, or air pollution emergency is declared.

- 401 KAR 55:020. *Abatement strategies*. This administrative regulation sets forth in detail action that must be taken by air contaminant sources when an episode is declared.

The following Kentucky Revised Statute is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- KRS 224.10-100. *Powers and duties of cabinet.* This statute provides the Energy and Environment cabinet the authority to promulgate all rules, regulations, and orders promulgated under KRS Chapter 224, and to provide for the prevention, abatement, and control of all water, land, and air pollution.

Element H – Section 110(a)(2)(H): SIP Revisions

Each such plan shall --
(H) provide for revision of such plan --
(i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of attaining such standard, and
(ii) except as provided in paragraph (3)(C), whenever the Administrator finds on the basis of information available to the Administrator that the plan is substantially inadequate to attain the national ambient air quality standard which it implements or to otherwise comply with any additional requirements established under this chapter.

Future SIP revisions: Section 110(a)(2)(H) of the CAA requires states to have the authority to revise their SIPs in response to changes in the NAAQS, availability of improved methods for attaining the NAAQS, or in response to the EPA finding that the SIP is substantially inadequate.

- 401 KAR 51:010. *Attainment status designations*. This administrative regulation designates the status of all areas of the Commonwealth of Kentucky with regard to attainment of the ambient air quality standards.
- 401 KAR 53:005. *General provisions*. This administrative regulation is to provide for the establishment of general provisions, definitions and time schedules as they pertain to this chapter.
- 401 KAR 53:010. *Ambient air quality standards*. This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.

Element I – Section 110(a)(2)(I): Plan Revisions for Nonattainment Areas

Each such plan shall --

(I) in the case of a plan or plan revision for an area designated as a nonattainment area, meet the applicable requirements of part D of this subchapter (relating to nonattainment areas).

The EPA does not require that Element I be addressed in an I-SIP submission. Element I is addressed when a nonattainment SIP or an attainment demonstration is due for an area that has been designated as not attaining the standard. Nonattainment SIPs and attainment demonstrations are subject to a different submission schedule than those for Section 110 infrastructure elements and will be reviewed and acted upon through a separate process. It is only included within this document to clarify why it is not a part of the I-SIP.

Element J – Section 110(a)(2)(J): Consultation with Government Officials, Public Notification, and PSD and Visibility Protection

Each such plan shall --

(J) meet the applicable requirements of section 121 of this title (relating to consultation), section 127 of this title (relating to public notification), and part C of this subchapter (relating to prevention of significant deterioration of air quality and visibility protection).

Consultation with identified officials on certain actions:
Sec. 121. In carrying out the requirements of this chapter requiring applicable implementation plans to contain—
(1) any transportation controls, air quality maintenance plan requirements or preconstruction review of direct sources of air pollution, or
(2) any measure referred to—
(A) in part D of this subchapter (pertaining to nonattainment requirements), or
(B) in part C of this subchapter (pertaining to prevention of significant deterioration), and in carrying out the requirements of section 113(d) of this title (relating to certain enforcement orders), the State shall provide a satisfactory process of consultation with general purpose local governments, designated organizations of elected officials of local governments and any Federal land manager having authority over Federal land to which the State plan applies, effective with respect to any such requirement which is adopted more than one year after August 7, 1977, as part of such plan. Such process shall be in accordance with regulations promulgated by the Administrator to assure adequate consultation. The Administrator shall update as necessary the original regulations required and promulgated under this section (as in effect immediately before November 15, 1990) to ensure adequate consultation. Only a general purpose unit of local government, regional agency, or council of governments adversely affected by action of the Administrator approving any portion of a plan referred to in this subsection may petition for judicial review of such action on the basis of a violation of the requirements of this section.

Consultation with government officials: Section 110(a)(2)(J) of the CAA requires states to provide a process for consultation with local governments and federal land managers carrying out NAAQS implementation requirements pursuant to CAA Section 121 relating to consultation.

- 401 KAR 50:055. *General compliance requirements*. This administrative regulation establishes requirements for compliance during shutdown and malfunctions; establishes requirements for demonstrating compliance with standards; establishes requirements for compliance when a source is relocated within the Commonwealth of Kentucky; and other general compliance requirements. The Cabinet has submitted a SIP revision to remove Section 1(1) and (4) from 401 KAR 50:055 in response to a SIP call in which EPA found these provisions of the regulation inadequate; however, the SIP revision will not affect Kentucky regulations. The Cabinet is waiting for final approval from EPA for this SIP revision.
- 401 KAR 50:060. *Enforcement*. This administrative regulation provides for enforcement of the terms and conditions of permits and compliance schedules.
- 401 KAR 50:065. *Conformity of general federal actions*. The federal regulation incorporated by reference in this administrative regulation provides for determining the conformity of general federal actions to the State Implementation Plan (SIP). 40 CFR 51.850 to 51.860 require that the applicable federal agencies implement the conformity determination in consultation with agencies of the Commonwealth of Kentucky.
- 401 KAR 50:066. *Conformity of transportation plans, programs, and projects*. This administrative regulation adopts the Federal Transportation Conformity Rules as codified in 40 CFR Part 93 Subpart A and incorporates a guidance document that establishes criteria and procedures for the interagency consultation process used in demonstrating conformity of federal transportation plans to the Kentucky State Implementation Plan.
- 401 KAR 51:001. *Definitions for 401 KAR Chapter 51*. This administrative regulation defines the terms used in 401 KAR Chapter 51.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality*. This administrative regulation applies to the construction of new major stationary sources and projects at existing major stationary sources that locate in areas designated attainment or unclassifiable. Section 14 requires the Cabinet to provide written notice to the U.S. EPA, federal land managers, and federal officials directly responsible for the management of lands within Class I areas impacted by sources.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas*. This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 52.100. *Public, affected state, and US EPA review*. This administrative regulation establishes the procedures used by the Cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA.

In accordance with 40 CFR 51.308(i)(4), the Work Plan for the Southeastern VISTAS II Regional Haze Analysis Project includes information regarding strengthening the FLM consultation requirements; in particular, states will be required to consult with FLMs and obtain public comment on their progress reports before submission to the EPA.[68] The VISTAS Contract with Eastern Research Group (ERG) in support of the Southeastern VISTAS II Regional Haze Analysis Project also includes the following language: "SESARM shall assist with scheduling and facilitating Federal Land Manager (FLM) consultations to ensure that all

[68] 82 FR 3078

obligations to the FLMs are met." On August 3, 2018, the Cabinet provided the FLMs and EPA a pre-draft copy of the SIP revision requesting that the Kentucky Regional Haze SIP be revised to rely on CSAPR instead of CAIR to satisfy the BART requirements. The letter also requested that EPA revise the limited disapproval of Kentucky's Regional Haze SIP to a full approval and grant full approval of CAA section 110(a)(2)(D)(i)(I) "prong 4" within Kentucky's disapproved I-SIPs once the revised Regional Haze SIP has been approved. On January 31, 2018 and August 1, 2018, the VISTAS Regional Haze workgroups held calls with FLMs to provide an update on the progress of the preliminary planning and modeling needed for states to submit their Regional Haze SIPs by the July 31, 2021 deadline. Additionally, Bret Anderson, with the U.S. Forest Service, provided an updated list of Forest Service contacts to John Hornback (VISTAS) on August 6, 2018.

Sect. 127. Each State plan shall contain measures which will be effective to notify the public during any calendar [year] on a regular basis of instances or areas in which any national primary ambient air quality standard is exceeded or was exceeded during any portion of the preceding calendar year to advise the public of the health hazards associated with such pollution, and to enhance public awareness of the measures which can be taken to prevent such standards from being exceeded and the ways in which the public can participate in regulatory and other efforts to improve air quality. Such measures may include the posting of warning signs on interstate highway access points to metropolitan areas or television, radio, or press notices or information.
(b) The Administrator is authorized to make grants to States to assist in carrying out the requirements of subsection (a) of this section.

Public Notification: Section 110(a)(2)(J) of the CAA further requires states to notify the public if NAAQS are exceeded in an area and to enhance public awareness of measures that can be taken to prevent exceedances.

- 401 KAR 51:001. *Definitions for 401 KAR Chapter 51.* This administrative regulation defines the terms used in 401 KAR Chapter 51.
- 401 KAR 51:010. *Attainment status designations.* This administrative regulation designates the status of all areas of the Commonwealth of Kentucky with regard to attainment of the ambient air quality standards.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation provides for the prevention of significant deterioration of ambient air quality.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 52:001. *Definitions for 401 KAR Chapter 52.* This administrative regulation defines the terms used in 401 KAR Chapter 52.
- 401 KAR 52:030. *Federally-enforceable permits for non-major sources.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that accept emission limitations to avoid the New Source Review requirements

under Title I of the Clean Air Act or the Operating Permit Program requirements under Title V of the Clean Air Act.

- 401 KAR 52.100. *Public, affected state, and US EPA review.* This administrative regulation establishes the procedures used by the Cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA.
- 401 KAR 53:005. *General provisions.* This administrative regulation is to provide for the establishment of general provisions, definitions and time schedules as they pertain to this chapter.
- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.

The following KRS is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- 401 KAR 52:020. *Title V permits.* This administrative regulation establishes requirements for air contaminant sources located in Kentucky that are required to obtain a Title V permit.

PSD and visibility protection: Section 110(a)(2)(J) of the CAA also requires states to meet applicable requirements of Part C related to PSD and visibility protection. Even though the EPA does not require the visibility protection component within Element J to be addressed in an I-SIP submission, the following regulations are in place to address the requirements of this sub-element.

- 401 KAR 51:005. *Purpose and general provisions.* This administrative regulation establishes the general provisions as related to new sources with respect to the prevention of significant deterioration of air quality and construction of stationary sources impacting on nonattainment areas.
- 401 KAR 51:010. *Attainment status designations.* This administrative regulation designates the status of all areas of the Commonwealth of Kentucky with regard to attainment of the ambient air quality standards.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality.* This administrative regulation applies to the construction of new major stationary sources and projects at existing major stationary sources that locate in areas designated attainment or unclassifiable.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas.* This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 63:005. *Open burning.* This administrative regulation establishes requirements for the control of open burning.
- 401 KAR 63:010. *Fugitive emissions.* This administrative regulation provides for the control of fugitive emissions.
- Regional Haze SIP, June 25, 2008; 5-Year Periodic Report, September 17, 2014.

The Cabinet submitted its initial SIP for Regional Haze in 2008, which established 2018 reasonable progress goals for visibility in Kentucky's Class 1 Federal area, Mammoth Cave National Park. The Regional Haze 5-Year Periodic Report SIP Revision, submitted September 17, 2014, demonstrates a steady decline in fine particle emissions, of which SO_2 and NO_x are the most important precursors. The implementation of state and federal emission reduction measures have led to this decline and have contributed to Kentucky exceeding the reasonable progress goals set in the Regional Haze SIP.

Element K – Section 110(a)(2)(K): Air Quality Modeling and Submission of Modeling Data

Each such plan shall --

(K) provide for --

(i) the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard, and

(ii) the submission, upon request, of data related to such air quality modeling to the Administrator.

Air quality modeling/data: Section 110(a)(2)(K) of the CAA requires that SIPs provide for modeling of criteria pollutants to predict air quality and that such predictions are made available to the EPA.

- 401 KAR 50:040. *Air quality models*. This administrative regulation specifies general provisions for the use of air quality models.
- 401 KAR 50:050. *Monitoring*. This administrative regulation establishes requirements for stack gas monitoring, ambient air monitoring, and recording and reporting requirements as related to monitoring data.
- 401 KAR 51:001. *Definitions for 401 KAR Chapter 51*. This administrative regulation defines the terms used in 401 KAR Chapter 51.
- 401 KAR 51:010. *Attainment status designations*. This administrative regulation designates the status of all areas of the Commonwealth of Kentucky with regard to attainment of the ambient air quality standards.
- 401 KAR 51:017. *Prevention of significant deterioration of air quality*. This administrative regulation provides for the prevention of significant deterioration of ambient air quality.
- 401 KAR 51:052. *Review of new sources in or impacting upon nonattainment areas*. This administrative regulation establishes requirements for the construction or modification of stationary sources within, or impacting upon, areas where the national ambient air quality standards have not been attained.
- 401 KAR 53:005. *General provisions*. This administrative regulation is to provide for the establishment of general provisions, definitions and time schedules as they pertain to this chapter.

- 401 KAR 53:010. *Ambient air quality standards.* This administrative regulation establishes ambient air quality standards necessary for the protection of the public health, the general welfare, and the property and people in the Commonwealth of Kentucky.

Element L – Section 110(a)(2)(L): Permitting Fees

Each such plan shall --

(L) require the owner or operator of each major stationary source to pay to the permitting authority, as a condition of any permit required under this chapter, a fee sufficient to cover --

(i) the reasonable costs of reviewing and acting upon any application for such a permit, and

(ii) if the owner or operator receives a permit for such source, the reasonable costs of implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated with any enforcement action), until such fee requirement is superseded with respect to such sources by the Administrator's approval of a fee program under subchapter V of this chapter.

Permitting fees: Section 110(a)(2)(L) of the CAA requires SIPs to require each major stationary source to pay permitting fees to cover the costs of reviewing, approving, implementing, and enforcing a permit.

The following regulation is not approved into the Kentucky SIP; however, it is relevant to this element and therefore is only included for reference:

- 401 KAR 50:038. *Air emissions fee.* This administrative regulation provides for the assessment of fees necessary to fund the state permit program as defined in Section 1(8) of this administrative regulation.

The following Kentucky Revised Statute is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- KRS 224.20 – 050. *Fee for administration of air quality program.* This statute describes the adoption of fees for the cost of administering the air quality program.

Element M – Section 110(a)(2)(M): Consultation and Participation by Affected Local Entities

Each such plan shall --

(M) provide for consultation and participation by local political subdivisions affected by the plan.

Consultation/participation by affected local entities: Section 110(a)(2)(M) of the CAA requires States' to provide for consultation and participation in SIP development by local political subdivisions affected by the SIP. KRS Chapter 77, Air Pollution Control, provides for the ability of each county to develop an air pollution control district.

- 401 KAR 50:066. *Conformity of transportation plans, programs, and projects*. This administrative regulation adopts the Federal Transportation Conformity Rules as codified in 40 C.F.R. Part 93 Subpart A and incorporates a guidance document that establishes criteria and procedures for the interagency consultation process used in demonstrating conformity of federal transportation plans to the Kentucky State Implementation Plan.
- 401 KAR 52.100. *Public, affected state, and US EPA review.* This administrative regulation establishes the procedures used by the Cabinet to provide for the review of federally-enforceable permits by the public, affected states, and the U.S. EPA.

The following Kentucky Revised Statute is not approved into the Kentucky SIP; however, it is relevant to this element and is therefore included for reference:

- KRS 224.20-130. *Concurrent jurisdiction with local district* establishes working synchronously with local districts to implement standards and procedures to implement the program in a manner consistent with the objective of KRS Chapter 224.

Appendix A

EPA March 27, 2018 Memorandum

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)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

MAR 2 7 2018

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: 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)

FROM: Peter Tsirigotis
Director

TO: Regional Air Division Directors, Regions 1–10

The purpose of this memorandum is to provide information to states and the Environmental Protection Agency Regional offices as they develop or review state implementation plans (SIPs) that address section 110(a)(2)(D)(i)(I) of Clean Air Act (CAA), also called the "good neighbor" provision, as it pertains to the 2015 ozone National Ambient Air Quality Standards (NAAQS). Specifically, this memorandum includes EPA's air quality modeling data for ozone for the year 2023, including newly available contribution modeling results, and a discussion of elements previously used to address interstate transport. In addition, the memorandum is accompanied by Attachment A, which provides a preliminary list of potential flexibilities in analytical approaches for developing a good neighbor SIP that may warrant further discussion between EPA and states.

The information in this memorandum provides an update to the contribution modeling analyses provided in EPA's January 2017 Notice of Data Availability (NODA) of ozone transport modeling data for the 2015 ozone NAAQS and builds upon information provided in the October 2017 interstate transport memorandum.[1] The October 2017 memorandum provided projected ozone design values for 2023 based on EPA's updated nationwide ozone modeling with the primary goal of assisting states in completing good neighbor transport actions for the 2008 ozone NAAQS.

[1] *See* 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), 82 FR 1733 (January 6, 2017). This memorandum also supplements the information provided in the memorandum, *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).* Memorandum from Stephen D. Page, Director, U.S. EPA Office of Air Quality Planning and Standards, to Regional Air Division Directors, Regions 1–10. October 27, 2017. Available at *https://www.epa.gov/sites/production/files/2017-10/documents/final_2008_o3_naaqs_transport_memo_10-27-17b.pdf.* (The October 27, 2017, memorandum includes links to all supporting documentation, including modeling and emissions technical support documents.)

EPA's goal in providing this information is to assist states' efforts to develop good neighbor SIPs for the 2015 ozone NAAQS to address their interstate transport obligations. While the information in this memorandum and the associated air quality analysis data could be used to inform the development of these SIPs, the information is not a final determination regarding states' obligations under the good neighbor provision. Any such determination would be made through notice-and-comment rulemaking.

The Good Neighbor Provision

Under CAA sections 110(a)(1) and 110(a)(2), each state is required to submit a SIP that provides for the implementation, maintenance and enforcement of each primary and secondary NAAQS. Section 110(a)(1) requires each state to make this new SIP submission within 3 years after promulgation of a new or revised NAAQS. This type of SIP submission is commonly referred to as an "infrastructure SIP." Section 110(a)(2) identifies specific elements that each plan submission must meet. Conceptually, an infrastructure SIP provides assurance that a state's SIP contains the necessary structural requirements to implement the new or revised NAAQS, whether by demonstrating that the state's SIP already contains or sufficiently addresses the necessary provisions, or by making a substantive SIP revision to update the plan provisions to meet the new standards.

In particular, CAA section 110(a)(2)(D)(i)(I) requires each state to submit to EPA new or revised SIPs that "contain adequate provisions ... prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will ... contribute significantly to nonattainment in, or interfere with maintenance by, any other state with respect to any such national primary or secondary ambient air quality standard." EPA often refers to section 110(a)(2)(D)(i)(I) as the good neighbor provision and to SIP revisions addressing this requirement as good neighbor SIPs.

On October 1, 2015, EPA promulgated a revision to the ozone NAAQS, lowering the level of both the primary and secondary standards to 70 parts per billion (ppb).[2] Pursuant to CAA section 110(a), good neighbor SIPs are, therefore, due by October 1, 2018. As noted earlier, EPA intends that the information conveyed through this memorandum should assist states in their efforts to develop good neighbor SIPs for the 2015 ozone NAAQS to address their interstate transport obligations.

Framework to Address the Good Neighbor Provision

Through the development and implementation of several previous rulemakings, including most recently the Cross-State Air Pollution Rule (CSAPR) Update,[3] 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

[2] National Ambient Air Quality Standards for Ozone Final Rule, 80 FR 65292 (October 26, 2015).
[3] *See* Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone (also known as the NO_X SIP Call), 63 FR 57356 (October 27, 1998); Clean Air Interstate Rule (CAIR) Final Rule, 70 FR 25162 (May 12, 2005); CSAPR Final Rule, 76 FR 48208 (August 8, 2011); CSAPR Update for the 2008 Ozone NAAQS (CSAPR Update) Final Rule, 81 FR 74504 (October 26, 2016).

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 emissions reductions. EPA notes that, in applying this framework or other approaches consistent with the CAA, various analytical approaches may be used to assess each step. EPA has undertaken several previous regional rulemakings applying this framework, and its analytical approaches have varied over time due to continued evolution of relevant tools and information, as well as their specific application.

This memo presents information regarding EPA's latest analysis for purposes of assisting states in developing SIPs for the 2015 ozone NAAQS, and, in doing so, generally follows approaches that EPA has taken in its regional rulemaking actions addressing prior ozone NAAQS. EPA also notes that, in developing their own rules, states have flexibility to follow the familiar four-step transport framework (using EPA's analytical approach or somewhat different analytical approaches within these steps) or alternative frameworks, so long as their chosen approach has adequate technical justification and is consistent with the requirements of the CAA. In various discussions, states and other stakeholders have suggested specific approaches that may warrant further consideration, and have indicated that they may be exploring other approaches as well. Over the next few months, EPA will be working with states to evaluate potential additional flexibilities for states to consider as they develop their good neighbor SIPs for the 2015 ozone NAAQS. Such potential flexibilities could apply to modeling conducted by states or to states' use of EPA's updated modeling presented here. Attachment A provides a preliminary list of potential flexibilities that may warrant further discussion. EPA looks forward to discussing these and other potential flexibilities with states over the next few months, which will help inform states' development of their good neighbor SIP submittals, as well as EPA's development of further information on good neighbor SIPs.

Air Quality Modeling Projection of 2023 Ozone Design Values

As noted previously and as described in more detail in both the 2017 NODA and the October 2017 memorandum, EPA uses modeling to identify potential downwind air quality problems. A first step in the modeling process is selecting a future analytic year that considers both the relevant attainment dates of downwind nonattainment areas impacted by interstate transport[4] and the timeframes that may be required for implementing further emissions reductions as expeditiously as practicable.[5] For the 2015 ozone NAAQS, EPA selected 2023 as the analytic year in our modeling analyses primarily because it aligns with the anticipated attainment year for Moderate ozone nonattainment areas.[6]

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[4] *North Carolina v. EPA*, 531 F.3d 896, 911–12 (D.C. Cir. 2008) (holding that compliance timeframes for necessary emission reductions must consider downwind attainment deadlines).

[5] *See* October 2017 memorandum, pp. 4-6 (discussion of timing of controls).

[6] On November 16, 2017 (82 FR 54232), EPA established initial air quality designations for most areas in the United States. On December 22, 2017 (83 FR 651), EPA responded to state and tribal recommendations by indicating the anticipated area designations for the remaining portions of the U.S. In addition, EPA proposed the maximum attainment dates for nonattainment areas in each classification, which for Moderate ozone nonattainment is 6 years (81 FR 81276, November 17, 2016). Based on the expected timing for final designations, 6 years from the likely effective date for designations would be summer 2024. Therefore, the 2023 ozone season would be the last full ozone season before the 2024 attainment date.

As noted in the aforementioned October 2017 memorandum, EPA then used the Comprehensive Air Quality Model with Extensions (CAMx v6.40)[7] to model emissions in 2011 and 2023, based on updates provided to EPA from states and other stakeholders.[8] 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 monitoring sites nationwide. In projecting these future year design values, EPA applied its own modeling guidance,[9] which recommends using model predictions from the "3 x 3" array of grid cells surrounding the location of the monitoring site.[10] In light of comments on the January 2017 NODA and other analyses, EPA also projected 2023 design values based on a modified version of the "3 x 3" approach for those monitoring sites located in coastal areas. Briefly, in this alternative approach, EPA incorporated the flexibility of eliminating from the design value calculations those modeling data in grid cells that are dominated by water (*i.e.*, more than 50 percent of the area in the grid cell is water) and that do not contain a monitoring site (*i.e.*, if a grid cell is more than 50 percent water but contains an air quality monitor, that cell would remain in the calculation).[11] For each individual monitoring site, the base period 2009-2013 average and maximum design values, 2023 projected average and maximum design values based on both the "3 x 3" approach and the alternative approach affecting coastal sites, and 2014-2016 measured design values are provided in an attachment to the October 27 memorandum. The same information is available in Excel format at *https://www.epa.gov/airmarkets/october-2017-memo-and-information-interstate-transport-sips-2008-ozone-naaqs*.

In the CSAPR Update rulemaking process, EPA considered a combination of monitoring data and modeling projections to identify receptor sites that are projected to have problems attaining or maintaining the NAAQS.[12] Specifically, EPA identified nonattainment receptors as those monitoring sites with current measured values exceeding the NAAQS that also have projected (*i.e.*, in 2023) average design values exceeding the NAAQS. EPA identified maintenance receptors as those monitoring sites with maximum design values exceeding the NAAQS. This included sites with current measured values below the NAAQS with projected average and maximum design values exceeding the NAAQS, and monitoring sites with projected average design values below the NAAQS but with projected maximum design values exceeding the NAAQS. The projected 2023 ozone design values and 2014-2016 measured design values for monitors in the United States have not changed since they were first presented in the October 2017 memorandum.

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[7] CAMx v6.40 was the most recent public release version of CAMx at the time EPA updated its modeling in fall 2017. ("Comprehensive Air Quality Model with Extension version 6.40 User's Guide" Ramboll Environ, December 2016. *http://www.camx.com/*.)

[8] For the updated modeling, 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 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-interstate-ozone-transport-modeling-data-2015-ozone*.

[9] *http://www.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf*.

[10] EPA's modeling uses 12 kilometer^2 grid cells.

[11] A model grid cell is identified as a "water" cell if more than 50 percent of the grid cell is water based on the 2006 National Land Cover Database. Grid cells that meet this criterion are treated as entirely over water in the Weather Research Forecast (WRF) modeling used to develop the 2011 meteorology for EPA's air quality modeling.

[12] *See* 81 FR 74530-74532 (October 26, 2016).

In this memorandum, EPA is identifying 2023 potential nonattainment and maintenance receptors with respect to the 2015 NAAQS, following its approach taken for previous NAAQS. This information is based on applying the CSAPR method for identifying potential nonattainment and maintenance receptors, and presents the design values in two ways: first, following the "3 x 3" approach to evaluating all sites, and second, following the modified approach for coastal monitoring sites in which "overwater" modeling data were not included in the calculation of future year design values. After incorporating these approaches, the modeling results suggest, based on the approach used for previous NAAQS, 11 monitoring sites outside of California as potential nonattainment receptors and 14 monitoring sites outside of California as potential maintenance receptors. *See* Attachment B for this receptor information.

Air Quality Modeling of 2023 Contributions

After identifying potential downwind air quality problems by projecting base period 2009-2013 average and maximum ozone design values to 2023 at monitoring sites nationwide, EPA next performed nationwide, state-level ozone source apportionment modeling using the CAMx Anthropogenic Precursor Culpability Analysis (APCA) technique[13] to provide information regarding the expected contribution of 2023 base case nitrogen oxides (NO_X) and volatile organic compound (VOC) emissions from all sources in each state to projected 2023 ozone concentrations at each air quality monitoring site. In the source apportionment model run, EPA tracked the ozone formed from each of the following contribution categories (*i.e.*, "tags"):

- States – anthropogenic NO_X and VOC emissions from each of the contiguous 48 states and the District of Columbia tracked individually (EPA combined emissions from all anthropogenic sectors in a given state);
- Biogenics – biogenic NO_X and VOC emissions domain-wide (*i.e.*, not by state);
- Initial and Boundary Concentrations – concentrations transported into the modeling domain from the lateral boundaries;
- Tribal Lands – the emissions from those tribal lands for which EPA has point source inventory data in the 2011 NEI (EPA did not model the contributions from individual tribes);
- Canada and Mexico – anthropogenic emissions from sources in those portions of Canada and Mexico included in the modeling domain (EPA did not separately model contributions from Canada or Mexico);
- Fires – combined emissions from wild and prescribed fires domain-wide (*i.e.*, not by state); and
- Offshore – combined emissions from offshore marine vessels and offshore drilling platforms (*i.e.*, not by state).

EPA performed the CAMx source apportionment model simulation for the period May 1 through September 30 using the 2023 future base case emissions and 2011 meteorology for this

[13] As part of this technique, ozone formed from reactions between biogenic and anthropogenic VOC and NOx are assigned to the anthropogenic emissions.

time period.[14] EPA processed hourly contributions[15] from each tag to obtain the 8-hour average contributions corresponding to the time period of the 8-hour daily maximum concentration on each day in the 2023 model simulation. This step was performed for those model grid cells containing monitoring sites to obtain 8-hour average contributions for each day at the location of each site. EPA then processed the model-predicted contributions on each day at each monitoring site location to identify the contributions on the subset of days in the 2023 modeling with the top 10 model-predicted maximum daily 8-hour average concentrations. The daily 8-hour average contributions on the top 10 concentration days in 2023 were applied in a relative sense to quantify the contributions to the 2023 average design value at each site.

In the CSAPR and CSAPR Update modeling efforts, EPA had used a slightly different approach by basing the average future year contribution on future year modeled values that exceeded the NAAQS or the top 5 days, whichever was greater. While technically sound, EPA's previous approach resulted in different contributions for an individual linkage depending on the level of the NAAQS. For the modeling effort described in this memorandum, EPA considered comments on the January 2017 NODA and developed and incorporated the flexibility of calculating the contribution metric using contributions on the top 10 future year days. As some commenters have indicated, this approach makes the contribution metric values more consistent across monitoring sites and more robust in terms of being independent of the level of the NAAQS. The contributions from each tag to each monitoring site identified as a potential nonattainment or maintenance receptor in 2023 are provided in Attachment C.[16]

Conclusion

States may consider using this national modeling to develop SIPs that address requirements of the good neighbor provision for the 2015 ozone NAAQS. When doing so, EPA recommends that states include in any such submission state-specific information to support their reliance on the 2023 modeling data. Further, states may supplement the information provided in this memorandum with any additional information that they believe is relevant to addressing the good neighbor provision requirements. States may also choose to use other information to identify nonattainment and maintenance receptors relevant to development of their good neighbor SIPs. If this is the case, states should submit that information along with a full explanation and technical analysis. EPA encourages collaboration among states linked to a common receptor and among linked upwind and downwind states in developing and implementing a regionally consistent approach. We recommend that states reach out to EPA Regional offices and work together to accomplish the goal of developing, submitting, and reviewing approvable SIPs that address the good neighbor provision for the 2015 ozone NAAQS.

Finally, as indicated previously in this memorandum, in addition to the flexibilities already incorporated into EPA's modeling effort (*i.e.*, considering the removal of modeled values in "over water" grid cells and EPA's modified approach for calculating the contribution metric), EPA is

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[14] *See* the October 2017 memorandum for a description of these model inputs.

[15] Ozone contributions from anthropogenic emissions under "NOx-limited" and "VOC-limited" chemical regimes were combined to obtain the net contribution from NOx and VOC anthropogenic emissions in each state.

[16] Given stakeholder input on the 2017 NODA and other analyses, EPA elected to represent the contribution information in this memorandum using the alternative approach for projecting design values for sites in coastal areas.

evaluating whether states may have additional flexibilities as they work to prepare and submit approvable good neighbor SIPs for the 2015 ozone NAAQS (*see* Attachment A). EPA looks forward to discussing these and other potential flexibilities with states over the next few months, which will help inform states' development of their good neighbor SIP submittals, as well as EPA's development of further information on good neighbor SIPs.

Please share this information with the air agencies in your Region.

For Further Information

If you have any questions concerning this memorandum, please contact Norm Possiel at (919) 541-5692, *possiel.norm@epa.gov* for modeling information or Beth Palma at (919) 541-5432, *palma.elizabeth@epa.gov* for any other information.

Attachments

A. Preliminary List of Potential Flexibilities Related to Analytical Approaches for Developing a Good Neighbor State Implementation Plan
B. Projected Ozone Design Values at Potential Nonattainment and Maintenance Receptors Based on EPA's Updated 2023 Transport Modeling
C. Contributions to 2023 8-hour Ozone Design Values at Projected 2023 Nonattainment and Maintenance Sites

Attachment A

Preliminary List of Potential Flexibilities Related to Analytical Approaches for Developing a Good Neighbor State Implementation Plan

The Environmental Protection Agency believes states may be able to consider certain approaches as they develop good neighbor state implementation plans (SIPs) addressing the 2015 ozone National Ambient Air Quality Standards (NAAQS). To that end, EPA has reviewed comments provided in various forums, including comments on EPA's January 2017 Notice of Data Availability (NODA) regarding ozone transport modeling data for the 2015 ozone NAAQS, and seeks feedback from interested stakeholders on the following concepts. This list is organized in the familiar four-step transport framework discussed on pages 2-3 of the memorandum above, but EPA is open to alternative frameworks to address good neighbor obligations or considerations outside the four-step process. The purpose of this attachment is to identify potential flexibilities to inform SIP development and seek feedback on these concepts. EPA is not at this time making any determination that the ideas discussed below are consistent with the requirements of the CAA, nor are we specifically recommending that states use these approaches. Determinations regarding states' obligations under the good neighbor provision would be made through notice-and-comment rulemaking.

EPA has identified several guiding principles to consider when evaluating the appropriateness of the concepts introduced in this attachment, including:

- Supporting states' position as "first actors" in developing SIPs that address section 110(a)(2)(D) of the CAA;
- Consistency with respect to EPA's SIP actions is legally required by the statute and regulations (*see* CAA § 301(a)(2) and 40 CFR part 56) and is a particularly acute issue with respect to regional transport issues in which multiple states may be implicated;
- Compliance with statutory requirements and legal precedent from court decisions interpreting the CAA requirements;
- Encouraging collaboration among states linked to a common receptor and among linked upwind and downwind states in developing and applying a regionally consistent approach to identify and implement good neighbor obligations; and
- The potential value of considering different modeling tools or analyses in addition to 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.

EPA intends to reflect on feedback received on these concepts and communicate closely with air agencies as they prepare and submit SIPs to address the good neighbor provisions for the 2015 ozone NAAQS.

Analytics

- Consideration of appropriate alternate base years to those used in EPA's most recent modeling (*e.g.*, appropriate alternative base years should be selected consistent with EPA's air quality modeling guidance suggesting that years with meteorology conducive to ozone formation are appropriate).
- Consideration of an alternate future analytic year. EPA has identified 2023 as an appropriate analytic year to consider when evaluating transport obligations for the 2015 ozone NAAQS; however, another year may also be appropriate.
- Use of alternative power sector modeling consistent with EPA's emission inventory guidance.
- Consideration of state-specific information in identifying emissions sources [*e.g.*, electric generating units (EGUs) and non-EGUs] and controls (*e.g.*, combustion/process controls, post-combustion controls) that are appropriate to evaluate.

Step 1 – Identify downwind air quality problems

- Identification of maintenance receptors.
  - Evaluate alternative methodologies to give independent meaning to the term "interfere with maintenance" under CAA section 110(a)(2)(D)(i)(I).
  - Identify maintenance receptors that are at risk of exceeding the NAAQS (even if they do not currently violate the standard) using an alternative approach that does not rely on the projection of maximum design values.
  - Identify maintenance receptors where current, presumably "clean," measured data are shown through analysis to occur during meteorological conditions conducive to ozone formation such that exceedances are unlikely to reoccur in the future.
- Consideration of downwind air quality context.
  - Consider the role of designations issued in FY 2018 based on approved air quality monitors.
  - Assess current and projected local emissions reductions and whether downwind areas have considered and/or used available mechanisms for regulatory relief.
- Consideration of model performance.
  - Consider removal of certain data from modeling analysis for the purposes of projecting design values and calculating the contribution metric where data removal is based on model performance and technical analyses support the exclusion.

Step 2 – Identify upwind states that contribute to those downwind air quality problems to warrant further review and analysis

- Considerations related to determining contributions.
  - EPA has used the Anthropogenic Precursor Culpability Analysis (APCA) approach for the purpose of quantifying contribution to downwind receptors. We have received questions regarding the use of other modeling approaches (*e.g.*, Ozone Source Apportionment Technology, Decoupled Direct Method, and zero-out brute force sensitivity runs) to help quantify ozone impacts from upwind states.
- Considerations related to evaluating contributions (contributions contained in Attachment C are not based upon a particular significance threshold).
  - Establishing a contribution threshold based on variability in ozone design values that leverage some of the analytics and statistical data created to support the development of the Significant Impact Level for ozone.

– Consideration of different contribution thresholds for different regions based on regional differences in the nature and extent of the transport problem.
– An evaluation of "collective contribution" in the receptor region to determine the extent to which a receptor is "transport influenced." The results of this analysis could be applied before assessing whether an individual state is linked to a downwind receptor (*i.e.*, above the contribution threshold).

Step 3 – Identifying air quality, cost, and emission reduction factors to be evaluated in a multifactor test to identify emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind, if any

- Consideration of international emissions, in a manner consistent with EPA's Ozone Cooperative Compliance Task Force efforts to fully understand the role of background ozone levels and appropriately account for international transport.[17]
  – Develop consensus on evaluation of the magnitude of international ozone contributions relative to domestic, anthropogenic ozone contributions for receptors identified in step 1. As contained in Attachment C, EPA recognizes that a number of non-U.S. and non-anthropogenic sources contribute to downwind nonattainment and maintenance receptors.
  – Consider whether the air quality, cost, or emission reduction factors should be weighted differently in areas where international contributions are relatively high.
- 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 NO_X 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.
- Considerations for states linked to maintenance receptors.
  – Consider whether the remedy for upwind states linked to maintenance receptors could be less stringent than for those linked to nonattainment receptors.
  – For example, consider whether upwind states could satisfy linkage(s) to maintenance receptors based on recent historic or base case emissions levels.

Step 4 – Adopt permanent and enforceable measures needed to achieve emissions reductions (translating the control levels identified in Step 3 into enforceable emissions limits)

- EPA welcomes concepts from stakeholders regarding Step 4, including potential EPA actions that could serve as a model as well as the relationship to previous transport rules.

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[17] See *Final Report on Review of Agency Actions that Potentially Burden the Safe, Efficient Development of Domestic Energy Resources Under Executive Order 13783* (October 25, 2017) and *Report to Congress on Administrative Options to Enable States to Enter into Cooperative Agreements to Provide Regulatory Relief for Implementing Ozone Standards* (August 14, 2017).

Attachment B

Projected Ozone Design Values at Potential Nonattainment and Maintenance Receptors Based on EPA's Updated 2023 Transport Modeling

This attachment contains projected ozone design values at those individual monitoring sites that are projected to be potential nonattainment or maintenance receptors based on the Environmental Protection Agency's updated transport modeling for 2023. The scenario name for the updated modeling is "2023en." The data are in units of parts per billion (ppb).

The following data are provided in the table below:

1. Base period 2009 – 2013 average and maximum design values based on 2009 – 2013 measured data.

2. Projected 2023 average and maximum design values 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 monitors are excluded from the projection calculations ("No Water"). Note that the modified approach only affects the projection of design values for monitoring sites in or near coastal areas.

3. 2016 ozone design values based on 2014 – 2016 measured data (N/A indicates that a 2016 design value is not available). The following Web site has additional information on the 2016 design values: *https://www.epa.gov/air-trends/air-quality-design-values#report*.

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.

Note also: Site 550790085 in Milwaukee Co., WI would be a nonattainment receptor using projected design values based on the "No Water" cell approach, but would not be a receptor with the "3 x 3" approach. Conversely, site 360850067 in Richmond Co., NY would be a nonattainment receptor using the "3 x 3" approach, but would not be a receptor with the "No Water" cell approach.

Site ID	St	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
40130019	AZ	Maricopa	76.7	79	69.3	71.4	69.3	71.4	73
40131004	AZ	Maricopa	79.7	81	69.8	71.0	69.8	71.0	75
60190007	CA	Fresno	94.7	95	79.2	79.4	79.2	79.4	86
60190011	CA	Fresno	93.0	96	78.6	81.2	78.6	81.2	89
60190242	CA	Fresno	91.7	95	79.4	82.2	79.4	82.2	86
60194001	CA	Fresno	90.7	92	73.3	74.4	73.3	74.4	91
60195001	CA	Fresno	97.0	99	79.6	81.2	79.6	81.2	94
60250005	CA	Imperial	74.7	76	73.3	74.6	73.3	74.6	76
60251003	CA	Imperial	81.0	82	79.0	80.0	79.0	80.0	76
60290007	CA	Kern	91.7	96	77.7	81.3	77.7	81.3	87

Site ID	St	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
60290008	CA	Kern	86.3	88	71.3	72.8	71.3	72.8	81
60290014	CA	Kern	87.7	89	74.1	75.2	74.1	75.2	84
60290232	CA	Kern	87.3	89	73.7	75.2	73.7	75.2	77
60295002	CA	Kern	90.0	91	75.9	76.8	75.9	76.8	87
60296001	CA	Kern	84.3	86	70.9	72.4	70.9	72.4	81
60311004	CA	Kings	87.0	90	71.7	74.2	71.7	74.2	84
60370002	CA	Los Angeles	80.0	82	73.3	75.1	73.3	75.1	88
60370016	CA	Los Angeles	94.0	97	86.1	88.9	86.1	88.9	96
60371201	CA	Los Angeles	90.0	90	79.8	79.8	79.8	79.8	85
60371701	CA	Los Angeles	84.0	85	78.1	79.1	78.1	79.1	90
60372005	CA	Los Angeles	79.5	82	72.3	74.6	72.3	74.6	83
60376012	CA	Los Angeles	97.3	99	85.9	87.4	85.9	87.4	96
60379033	CA	Los Angeles	90.0	91	76.3	77.2	76.3	77.2	88
60392010	CA	Madera	85.0	86	72.1	72.9	72.1	72.9	83
60470003	CA	Merced	82.7	84	69.9	71.0	69.9	71.0	82
60650004	CA	Riverside	85.0	85	76.7	76.7	76.7	76.7	N/A
60650012	CA	Riverside	97.3	99	83.6	85.1	83.6	85.1	93
60651016	CA	Riverside	100.7	101	85.2	85.5	85.2	85.5	97
60652002	CA	Riverside	84.3	85	72.4	73.0	72.4	73.0	81
60655001	CA	Riverside	92.3	93	79.5	80.1	79.5	80.1	87
60656001	CA	Riverside	94.0	98	78.3	81.6	78.3	81.6	91
60658001	CA	Riverside	97.0	98	87.0	87.9	87.0	87.9	94
60658005	CA	Riverside	92.7	94	83.2	84.4	83.2	84.4	91
60659001	CA	Riverside	88.3	91	73.7	75.9	73.7	75.9	86
60670012	CA	Sacramento	93.3	95	74.5	75.9	74.5	75.9	83
60675003	CA	Sacramento	86.3	88	69.9	71.3	69.9	71.3	79
60710005	CA	San Bernardino	105.0	107	96.2	98.1	96.2	98.1	108
60710012	CA	San Bernardino	95.0	97	84.1	85.8	84.1	85.8	91
60710306	CA	San Bernardino	83.7	85	76.2	77.4	76.2	77.4	86
60711004	CA	San Bernardino	96.7	98	89.8	91.0	89.8	91.0	101
60712002	CA	San Bernardino	101.0	103	93.1	95.0	93.1	95.0	97
60714001	CA	San Bernardino	94.3	97	86.0	88.5	86.0	88.5	90
60714003	CA	San Bernardino	105.0	107	94.1	95.8	94.1	95.8	101
60719002	CA	San Bernardino	92.3	94	80.0	81.4	80.0	81.4	86
60719004	CA	San Bernardino	98.7	99	88.4	88.7	88.4	88.7	104
60990006	CA	Stanislaus	87.0	88	74.8	75.7	74.8	75.7	83
61070006	CA	Tulare	81.7	85	69.1	71.9	69.1	71.9	84
61070009	CA	Tulare	94.7	96	76.1	77.2	76.1	77.2	89

Site ID	St	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
61072002	CA	Tulare	85.0	88	68.9	71.4	68.9	71.4	80
61072010	CA	Tulare	89.0	90	73.1	73.9	73.1	73.9	83
61112002	CA	Ventura	81.0	83	70.5	72.2	70.5	72.2	77
80050002	CO	Arapahoe	76.7	79	69.3	71.3	69.3	71.3	N/A
80350004	CO	Douglas	80.7	83	71.1	73.2	71.1	73.2	77
80590006	CO	Jefferson	80.3	83	71.3	73.7	71.3	73.7	77
80590011	CO	Jefferson	78.7	82	70.9	73.9	70.9	73.9	80
80690011	CO	Larimer	78.0	80	71.2	73.0	71.2	73.0	75
81230009	CO	Weld	74.7	76	70.2	71.4	70.2	71.4	70
90010017	CT	Fairfield	80.3	83	69.8	72.1	68.9	71.2	80
90013007	CT	Fairfield	84.3	89	71.2	75.2	71.0	75.0	81
90019003	CT	Fairfield	83.7	87	72.7	75.6	73.0	75.9	85
90099002	CT	New Haven	85.7	89	71.2	73.9	69.9	72.6	76
240251001	MD	Harford	90.0	93	71.4	73.8	70.9	73.3	73
260050003	MI	Allegan	82.7	86	69.0	71.8	69.0	71.7	75
261630019	MI	Wayne	78.7	81	69.0	71.0	69.0	71.0	72
360810124	NY	Queens	78.0	80	70.1	71.9	70.2	72.0	69
360850067	NY	Richmond	81.3	83	71.9	73.4	67.1	68.5	76
361030002	NY	Suffolk	83.3	85	72.5	74.0	74.0	75.5	72
480391004	TX	Brazoria	88.0	89	74.0	74.9	74.0	74.9	75
481210034	TX	Denton	84.3	87	69.7	72.0	69.7	72.0	80
482010024	TX	Harris	80.3	83	70.4	72.8	70.4	72.8	79
482011034	TX	Harris	81.0	82	70.8	71.6	70.8	71.6	73
482011039	TX	Harris	82.0	84	71.8	73.6	71.8	73.5	67
484392003	TX	Tarrant	87.3	90	72.5	74.8	72.5	74.8	73
550790085	WI	Milwaukee	80.0	82	65.4	67.0	71.2	73.0	71
551170006	WI	Sheboygan	84.3	87	70.8	73.1	72.8	75.1	79

Attachment C

Contributions to 2023 8-hour Ozone Design Values at Projected 2023 Nonattainment and Maintenance Sites

This attachment contains tables with the projected ozone contributions from 2023 anthropogenic nitrogen oxide and volatile organic compound emissions in each state to each potential nonattainment receptor and maintenance receptor (based on the 2015 ozone National Ambient Air Quality Standards) in the United States, following the approach for identification of such receptors EPA has used in the past, with slight modification.[18] In addition to the state contributions, we have included the contributions from each of the other categories tracked in the contribution modeling, including point source emissions on Tribal lands, anthropogenic emissions in Canada and Mexico, emissions from offshore sources, fires, biogenics, and contributions from initial and boundary concentrations.

The contribution information is provided in a three-part table for all of the projected receptors throughout the country, except California, and a separate three-part table for the projected receptors in California. For each monitoring site, we provide the site ID, county name, and state name in the first three columns of the table. This information is followed by columns containing the projected 2023 average and maximum design values based on the "No Water" cell approach. Next, in Parts 1 and 2 of each table, we provide the contributions from each state and the District of Columbia, individually. Finally, in Part 3 of each table, we provide the contributions from the Tribal lands, Canada and Mexico, offshore, fires, initial and boundary concentrations (Boundary), and biogenics categories. The units of the 2023 design values and contributions are parts per billion (ppb). Note that the contributions presented in these tables may not sum exactly to the 2023 average design value due to truncation of the contributions to two places to the right of the decimal.

[18] For the purposes of creating the contribution tables, data are provided for sites identified as potential nonattainment and maintenance receptors using projected design values based on the "No Water" cell approach. In addition, we provide the contributions to the Richmond Co., NY site that would be a nonattainment receptor in the "3 x 3" approach.

Contributions to 2023 Nonattainment and Maintenance Sites Outside of California (Part 1)

Site ID	County	State	2023en Average	2023en Maximum	AL	AZ	AR	CA	CO	CT	DE	DC	FL	GA	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT
40130019	Maricopa	AZ	69.3	71.4	0.00	25.19	0.00	1.87	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40131004	Maricopa	AZ	69.8	71.0	0.00	27.40	0.00	2.03	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80050002	Arapahoe	CO	69.3	71.3	0.00	0.29	0.00	1.20	22.94	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.28	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
80350004	Douglas	CO	71.1	73.2	0.00	0.38	0.01	1.27	24.71	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.26	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
80590006	Jefferson	CO	71.3	73.7	0.01	0.49	0.03	1.32	25.52	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.27	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03
80590011	Jefferson	CO	70.9	73.9	0.01	0.30	0.02	1.50	24.72	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.32	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
80690011	Larimer	CO	71.2	73.0	0.00	0.46	0.00	1.55	21.74	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.10	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
81230009	Weld	CO	70.2	71.4	0.01	0.49	0.02	0.95	24.44	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.09	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04
90010017	Fairfield	CT	68.9	71.2	0.08	0.03	0.07	0.03	0.07	8.70	0.18	0.04	0.02	0.09	0.01	0.39	0.44	0.11	0.09	0.34	0.05	0.01	1.18	0.06	0.50	0.17	0.03	0.21	0.03
90013007	Fairfield	CT	71.0	75.0	0.14	0.05	0.13	0.05	0.09	4.64	0.35	0.06	0.05	0.17	0.01	0.72	0.97	0.16	0.13	0.89	0.11	0.01	1.80	0.12	0.70	0.15	0.07	0.38	0.02
90019003	Fairfield	CT	73.0	75.9	0.14	0.05	0.13	0.05	0.09	3.71	0.40	0.08	0.05	0.17	0.01	0.67	0.83	0.17	0.13	0.79	0.11	0.00	2.17	0.10	0.63	0.14	0.07	0.37	0.02
90099002	New Haven	CT	69.9	72.6	0.06	0.04	0.08	0.05	0.08	9.10	0.30	0.04	0.02	0.07	0.02	0.46	0.50	0.16	0.14	0.32	0.08	0.01	1.37	0.18	0.73	0.19	0.04	0.29	0.04
240251001	Harford	MD	70.9	73.3	0.31	0.07	0.17	0.07	0.12	0.00	0.03	0.65	0.11	0.32	0.02	0.84	1.35	0.23	0.23	1.52	0.19	0.00	22.60	0.00	0.79	0.13	0.08	0.59	0.04
260050003	Allegan	MI	69.0	71.7	0.35	0.08	1.64	0.09	0.18	0.00	0.00	0.00	0.09	0.18	0.03	19.62	7.11	0.77	0.77	0.58	0.70	0.00	0.01	0.00	3.32	0.11	0.40	2.61	0.06
261630019	Wayne	MI	69.0	71.0	0.11	0.07	0.27	0.13	0.17	0.00	0.00	0.00	0.05	0.09	0.05	2.37	2.51	0.44	0.44	0.65	0.22	0.00	0.02	0.00	20.39	0.31	0.09	0.92	0.08
360810124	Queens	NY	70.2	72.0	0.11	0.06	0.09	0.08	0.11	0.57	0.38	0.05	0.07	0.16	0.03	0.73	0.69	0.26	0.19	0.42	0.13	0.00	1.56	0.24	1.26	0.17	0.04	0.38	0.05
360850067	Richmond	NY	67.1	68.5	0.24	0.08	0.13	0.09	0.12	0.27	0.43	0.05	0.09	0.28	0.02	0.80	0.92	0.23	0.21	0.84	0.16	0.00	1.74	0.03	0.98	0.12	0.08	0.46	0.03
361030002	Suffolk	NY	74.0	75.5	0.12	0.06	0.12	0.08	0.11	0.83	0.22	0.04	0.04	0.12	0.03	0.64	0.69	0.20	0.20	0.49	0.13	0.01	1.24	0.04	0.94	0.18	0.06	0.39	0.06
480391004	Brazoria	TX	74.0	74.9	0.35	0.08	0.90	0.21	0.30	0.00	0.00	0.00	0.21	0.14	0.08	1.00	0.32	0.40	0.47	0.14	3.80	0.00	0.00	0.00	0.22	0.34	0.63	0.88	0.10
481210034	Denton	TX	69.7	72.0	0.49	0.07	0.58	0.13	0.27	0.00	0.00	0.00	0.27	0.34	0.06	0.23	0.16	0.10	0.40	0.11	1.92	0.00	0.01	0.00	0.08	0.11	0.33	0.24	0.07
482010024	Harris	TX	70.4	72.8	0.39	0.04	0.29	0.12	0.13	0.00	0.00	0.00	0.39	0.26	0.05	0.34	0.13	0.17	0.17	0.10	3.06	0.00	0.00	0.00	0.06	0.06	0.50	0.38	0.05
482011034	Harris	TX	70.8	71.6	0.32	0.03	0.54	0.10	0.15	0.00	0.00	0.00	0.53	0.16	0.04	0.51	0.12	0.27	0.32	0.05	3.38	0.00	0.00	0.00	0.17	0.23	0.39	0.63	0.05
482011039	Harris	TX	71.8	73.5	0.37	0.04	0.99	0.12	0.20	0.00	0.00	0.00	0.23	0.13	0.05	0.88	0.24	0.33	0.33	0.11	4.72	0.00	0.00	0.00	0.27	0.20	0.79	0.88	0.07
484392003	Tarrant	TX	72.5	74.8	0.37	0.08	0.78	0.15	0.33	0.00	0.00	0.00	0.18	0.26	0.07	0.29	0.18	0.19	0.69	0.13	1.71	0.00	0.01	0.00	0.13	0.15	0.27	0.38	0.10
550790085	Milwaukee	WI	71.2	73.0	0.14	0.04	0.40	0.07	0.08	0.00	0.00	0.00	0.06	0.06	0.03	15.10	5.28	0.79	0.35	0.77	0.72	0.00	0.03	0.00	2.01	0.40	0.28	0.93	0.10
551170006	Sheboygan	WI	72.8	75.1	0.14	0.08	0.51	0.12	0.11	0.00	0.00	0.00	0.07	0.07	0.04	15.73	7.11	0.45	0.46	0.81	0.84	0.00	0.03	0.00	2.06	0.28	0.30	1.37	0.06

Contributions to 2023 Nonattainment and Maintenance Sites Outside of California (Part 2)

Site ID	County	State	2023en Average	2023en Maximum	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
40130019	Maricopa	AZ	69.3	71.4	0.00	0.09	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.00	0.00	0.22	0.06	0.00	0.00	0.02	0.00	0.00	0.01
40131004	Maricopa	AZ	69.8	71.0	0.00	0.14	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.11	0.06	0.00	0.00	0.03	0.00	0.00	0.00
80050002	Arapahoe	CO	69.3	71.3	0.34	0.33	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.12	0.11	0.00	0.00	0.00	0.02	0.00	0.30	1.23	0.00	0.00	0.04	0.00	0.00	1.04
80350004	Douglas	CO	71.1	73.2	0.32	0.32	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.12	0.10	0.00	0.00	0.00	0.02	0.00	0.36	1.08	0.00	0.00	0.04	0.00	0.00	1.00
80590006	Jefferson	CO	71.3	73.7	0.41	0.31	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.24	0.10	0.00	0.00	0.00	0.02	0.00	1.02	0.83	0.00	0.00	0.04	0.00	0.00	0.81
80590011	Jefferson	CO	70.9	73.9	0.36	0.38	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.18	0.10	0.00	0.00	0.00	0.02	0.00	0.94	1.04	0.00	0.00	0.03	0.00	0.00	1.03
80690011	Larimer	CO	71.2	73.0	0.25	0.37	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.03	0.00	0.40	1.05	0.00	0.00	0.10	0.00	0.00	0.88
81230009	Weld	CO	70.2	71.4	0.27	0.24	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.08	0.04	0.00	0.00	0.00	0.03	0.00	1.05	0.54	0.00	0.00	0.05	0.00	0.00	0.58
90010017	Fairfield	CT	68.9	71.2	0.06	0.00	0.01	6.24	0.04	17.31	0.29	0.07	1.04	0.15	0.00	5.11	0.01	0.06	0.03	0.15	0.30	0.03	0.01	1.27	0.02	0.68	0.26	0.07
90013007	Fairfield	CT	71.0	75.0	0.07	0.01	0.02	6.94	0.06	14.12	0.40	0.07	1.84	0.21	0.00	6.32	0.02	0.11	0.02	0.31	0.44	0.04	0.01	1.51	0.01	1.10	0.24	0.08
90019003	Fairfield	CT	73.0	75.9	0.07	0.01	0.02	7.75	0.06	15.80	0.43	0.06	1.60	0.21	0.01	6.56	0.02	0.12	0.02	0.28	0.45	0.04	0.01	1.91	0.01	1.14	0.20	0.08
90099002	New Haven	CT	69.9	72.6	0.09	0.01	0.03	5.06	0.04	15.03	0.32	0.15	1.17	0.24	0.01	4.87	0.02	0.04	0.04	0.12	0.41	0.04	0.02	1.26	0.04	0.61	0.25	0.10
240251001	Harford	MD	70.9	73.3	0.13	0.01	0.00	0.07	0.09	0.16	0.42	0.07	2.77	0.35	0.02	4.32	0.00	0.11	0.04	0.43	0.74	0.05	0.00	5.05	0.04	2.78	0.24	0.12
260050003	Allegan	MI	69.0	71.7	0.16	0.02	0.00	0.00	0.16	0.00	0.05	0.09	0.19	1.31	0.01	0.05	0.00	0.04	0.05	0.65	2.39	0.06	0.00	0.04	0.05	0.11	1.95	0.12
261630019	Wayne	MI	69.0	71.0	0.17	0.03	0.00	0.01	0.08	0.06	0.20	0.12	3.81	0.62	0.05	0.18	0.00	0.05	0.04	0.27	1.12	0.09	0.00	0.16	0.07	0.23	1.08	0.18
360810124	Queens	NY	70.2	72.0	0.12	0.02	0.06	8.57	0.07	13.55	0.35	0.12	1.88	0.32	0.02	7.16	0.04	0.09	0.05	0.13	0.58	0.07	0.07	1.56	0.03	1.01	0.38	0.14
360850067	Richmond	NY	67.1	68.5	0.12	0.02	0.00	10.53	0.09	6.57	0.37	0.09	2.05	0.36	0.01	10.41	0.00	0.10	0.04	0.36	0.70	0.07	0.00	1.67	0.02	1.54	0.30	0.12
361030002	Suffolk	NY	74.0	75.5	0.12	0.02	0.01	8.88	0.06	18.11	0.23	0.20	1.76	0.34	0.03	6.86	0.00	0.05	0.05	0.22	0.60	0.07	0.02	0.99	0.06	0.81	0.25	0.14
480391004	Brazoria	TX	74.0	74.9	0.23	0.06	0.00	0.00	0.08	0.00	0.04	0.06	0.06	0.90	0.05	0.01	0.00	0.04	0.05	0.28	26.00	0.14	0.00	0.02	0.06	0.02	0.40	0.27
481210034	Denton	TX	69.7	72.0	0.15	0.04	0.00	0.00	0.13	0.01	0.09	0.03	0.08	1.23	0.03	0.04	0.00	0.09	0.03	0.14	26.69	0.10	0.00	0.05	0.05	0.04	0.08	0.25
482010024	Harris	TX	70.4	72.8	0.08	0.03	0.00	0.00	0.05	0.00	0.14	0.04	0.05	0.20	0.03	0.02	0.00	0.14	0.02	0.26	25.62	0.08	0.00	0.06	0.03	0.05	0.07	0.14
482011034	Harris	TX	70.8	71.6	0.16	0.03	0.00	0.00	0.04	0.00	0.09	0.04	0.05	0.68	0.02	0.01	0.00	0.10	0.03	0.09	25.66	0.07	0.00	0.03	0.02	0.03	0.22	0.15
482011039	Harris	TX	71.8	73.5	0.19	0.03	0.00	0.00	0.06	0.00	0.04	0.06	0.05	0.58	0.03	0.01	0.00	0.03	0.04	0.30	22.82	0.08	0.00	0.02	0.04	0.01	0.28	0.20
484392003	Tarrant	TX	72.5	74.8	0.30	0.04	0.00	0.00	0.14	0.01	0.09	0.05	0.10	1.71	0.05	0.05	0.00	0.08	0.07	0.15	27.64	0.15	0.00	0.05	0.09	0.05	0.13	0.28
550790085	Milwaukee	WI	71.2	73.0	0.06	0.01	0.00	0.00	0.08	0.02	0.04	0.23	0.87	0.76	0.02	0.33	0.00	0.02	0.03	0.31	1.22	0.04	0.00	0.12	0.09	0.59	13.39	0.09
551170006	Sheboygan	WI	72.8	75.1	0.06	0.03	0.00	0.00	0.14	0.02	0.04	0.10	1.10	0.95	0.04	0.41	0.00	0.02	0.02	0.31	1.65	0.06	0.00	0.10	0.07	0.64	9.09	0.12

Contributions to 2023 Nonattainment and Maintenance Sites Outside of California (Part 3)

Site ID	County	State	2023en Average	2023en Maximum	Tribal	Canada/ Mexco	Offshore	Fire	Boundary	Biogenic
40130019	Maricopa	AZ	69.3	71.4	0.06	3.29	0.37	0.49	34.74	2.52
40131004	Maricopa	AZ	69.8	71.0	0.06	2.70	0.34	0.56	33.85	2.24
80050002	Arapahoe	CO	69.3	71.3	0.22	0.55	0.14	0.46	34.84	4.24
80350004	Douglas	CO	71.1	73.2	0.21	0.71	0.16	0.47	34.74	4.19
80590006	Jefferson	CO	71.3	73.7	0.21	0.90	0.17	0.66	31.41	5.40
80590011	Jefferson	CO	70.9	73.9	0.16	0.70	0.16	0.45	32.96	4.74
80690011	Larimer	CO	71.2	73.0	0.25	0.78	0.19	1.74	34.54	5.71
81230009	Weld	CO	70.2	71.4	0.23	1.04	0.15	1.57	31.11	6.08
90010017	Fairfield	CT	68.9	71.2	0.00	1.64	0.65	0.20	16.73	3.28
90013007	Fairfield	CT	71.0	75.0	0.01	1.35	1.93	0.34	17.17	4.01
90019003	Fairfield	CT	73.0	75.9	0.01	1.37	1.96	0.33	17.00	4.09
90099002	New Haven	CT	69.9	72.6	0.01	1.58	2.15	0.22	17.17	4.13
240251001	Harford	MD	70.9	73.3	0.01	0.79	0.32	0.42	15.28	5.32
260050003	Allegan	MI	69.0	71.7	0.02	0.54	0.36	0.93	11.85	8.91
261630019	Wayne	MI	69.0	71.0	0.02	3.13	0.17	0.44	20.06	6.93
360810124	Queens	NY	70.2	72.0	0.01	1.73	1.39	0.25	17.87	4.45
360850067	Richmond	NY	67.1	68.5	0.01	1.44	0.83	0.35	15.46	4.75
361030002	Suffolk	NY	74.0	75.5	0.01	1.85	1.24	0.30	18.94	4.49
480391004	Brazoria	TX	74.0	74.9	0.02	0.44	2.31	2.05	24.02	5.60
481210034	Denton	TX	69.7	72.0	0.01	0.92	1.23	0.87	24.69	6.42
482010024	Harris	TX	70.4	72.8	0.01	0.28	4.83	0.77	27.83	2.66
482011034	Harris	TX	70.8	71.6	0.01	0.24	3.91	1.75	25.71	3.44
482011039	Harris	TX	71.8	73.5	0.01	0.47	4.04	2.09	24.67	4.50
484392003	Tarrant	TX	72.5	74.8	0.02	1.24	1.18	1.34	24.38	6.44
550790085	Milwaukee	WI	71.2	73.0	0.01	0.82	0.43	0.37	16.67	6.70
551170006	Sheboygan	WI	72.8	75.1	0.01	0.69	0.55	0.64	17.53	7.51

Contributions to 2023 Nonattainment and Maintenance Sites in California (Part 1)

Site ID	County	State	2023 Average	2023 Maximum	AL	AZ	AR	CA	CO	CT	DE	DC	FL	GA	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT
60190007	Fresno	CA	79.2	79.4	0.00	0.16	0.00	35.68	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60190011	Fresno	CA	78.6	81.2	0.00	0.15	0.00	35.20	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60190242	Fresno	CA	79.4	82.2	0.00	0.21	0.00	31.98	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60194001	Fresno	CA	73.3	74.4	0.00	0.03	0.00	34.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60195001	Fresno	CA	79.6	81.2	0.00	0.12	0.00	35.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60250005	Imperial	CA	73.3	74.6	0.00	0.62	0.00	9.28	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60251003	Imperial	CA	79.0	80.0	0.00	0.67	0.00	11.34	0.07	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290007	Kern	CA	77.7	81.3	0.00	0.07	0.00	29.99	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290008	Kern	CA	71.3	72.8	0.00	0.17	0.00	26.44	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290014	Kern	CA	74.1	75.2	0.00	0.11	0.00	31.54	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290232	Kern	CA	73.7	75.2	0.00	0.03	0.00	32.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60295002	Kern	CA	75.9	76.8	0.00	0.13	0.00	28.33	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60296001	Kern	CA	70.9	72.4	0.00	0.16	0.00	28.50	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60370002	Los Angeles	CA	73.3	75.1	0.00	0.23	0.00	39.68	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60370016	Los Angeles	CA	86.1	88.9	0.00	0.27	0.00	46.61	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60371201	Los Angeles	CA	79.8	79.8	0.00	0.37	0.00	35.55	0.06	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60371701	Los Angeles	CA	78.1	79.1	0.00	0.27	0.00	42.09	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60372005	Los Angeles	CA	72.3	74.6	0.00	0.32	0.00	37.39	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60376012	Los Angeles	CA	85.9	87.4	0.00	0.42	0.00	39.86	0.08	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60379033	Los Angeles	CA	76.3	77.2	0.00	0.34	0.00	25.79	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60392010	Madera	CA	72.1	72.9	0.00	0.20	0.00	28.39	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60470003	Merced	CA	69.9	71.0	0.00	0.10	0.00	28.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60650004	Riverside	CA	76.7	76.7	0.00	0.22	0.00	41.92	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60650012	Riverside	CA	83.6	85.1	0.00	0.21	0.00	38.65	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60651016	Riverside	CA	85.2	85.5	0.00	0.22	0.00	35.47	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60652002	Riverside	CA	72.4	73.0	0.00	0.27	0.00	16.57	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60655001	Riverside	CA	79.5	80.1	0.00	0.20	0.00	24.70	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60656001	Riverside	CA	78.3	81.6	0.00	0.17	0.00	39.14	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60658001	Riverside	CA	87.0	87.9	0.00	0.27	0.00	47.69	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60658005	Riverside	CA	83.2	84.4	0.00	0.25	0.00	45.60	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60659001	Riverside	CA	73.7	75.9	0.00	0.16	0.00	37.28	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60670012	Sacramento	CA	74.5	75.9	0.00	0.01	0.00	35.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60675003	Sacramento	CA	69.9	71.3	0.00	0.00	0.00	34.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60710005	San Bernardino	CA	96.2	98.1	0.00	0.23	0.00	48.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60710012	San Bernardino	CA	84.1	85.8	0.00	0.46	0.00	24.28	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60710306	San Bernardino	CA	76.2	77.4	0.00	0.14	0.00	29.72	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60711004	San Bernardino	CA	89.8	91.0	0.00	0.35	0.00	47.69	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60712002	San Bernardino	CA	93.1	95.0	0.00	0.14	0.00	51.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60714001	San Bernardino	CA	86.0	88.5	0.00	0.21	0.00	41.23	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60714003	San Bernardino	CA	94.1	95.8	0.00	0.10	0.00	52.53	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60719002	San Bernardino	CA	80.0	81.4	0.00	0.45	0.00	22.21	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60719004	San Bernardino	CA	88.4	88.7	0.00	0.10	0.00	49.35	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60990006	Stanislaus	CA	74.8	75.7	0.00	0.03	0.00	34.16	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61070006	Tulare	CA	69.1	71.9	0.00	0.06	0.00	7.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61070009	Tulare	CA	76.1	77.2	0.00	0.07	0.00	23.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61072002	Tulare	CA	68.9	71.4	0.00	0.12	0.00	30.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61072010	Tulare	CA	73.1	73.9	0.00	0.03	0.00	30.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61112002	Ventura	CA	70.5	72.2	0.00	0.32	0.00	29.51	0.06	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Contributions to 2023 Nonattainment and Maintenance Sites in California (Part 2)

Site ID	County	State	2023 Average	2023 Maximum	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
60190007	Fresno	CA	79.2	79.4	0.00	0.51	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.00	0.00	0.05	0.00	0.00	0.01
60190011	Fresno	CA	78.6	81.2	0.00	0.44	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.00	0.00	0.05	0.00	0.00	0.01
60190242	Fresno	CA	79.4	82.2	0.00	0.64	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.03	0.10	0.00	0.00	0.07	0.00	0.00	0.01
60194001	Fresno	CA	73.3	74.4	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
60195001	Fresno	CA	79.6	81.2	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
60250005	Imperial	CA	73.3	74.6	0.00	0.09	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.20	0.05	0.00	0.00	0.02	0.00	0.00	0.04
60251003	Imperial	CA	79.0	80.0	0.00	0.25	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.09	0.06	0.00	0.00	0.02	0.00	0.00	0.03
60290007	Kern	CA	77.7	81.3	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.00	0.15	0.00	0.00	0.03
60290008	Kern	CA	71.3	72.8	0.00	0.31	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.10	0.00	0.00	0.01
60290014	Kern	CA	74.1	75.2	0.00	0.38	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.08	0.00	0.00	0.00
60290232	Kern	CA	73.7	75.2	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.17	0.00	0.00	0.00
60295002	Kern	CA	75.9	76.8	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.00	0.00	0.05	0.00	0.00	0.02
60296001	Kern	CA	70.9	72.4	0.00	0.58	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.02	0.00	0.00	0.00
60370002	Los Angeles	CA	73.3	75.1	0.00	0.12	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.16	0.03	0.00	0.00	0.04	0.00	0.00	0.01
60370016	Los Angeles	CA	86.1	88.9	0.00	0.14	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.18	0.03	0.00	0.00	0.05	0.00	0.00	0.02
60371201	Los Angeles	CA	79.8	79.8	0.00	0.17	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.13	0.09	0.00	0.00	0.05	0.00	0.00	0.03
60371701	Los Angeles	CA	78.1	79.1	0.00	0.11	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.19	0.03	0.00	0.00	0.05	0.00	0.00	0.02
60372005	Los Angeles	CA	72.3	74.6	0.00	0.08	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.00	0.00	0.00	0.00	0.21	0.06	0.00	0.00	0.04	0.00	0.00	0.02
60376012	Los Angeles	CA	85.9	87.4	0.00	0.18	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.03	0.16	0.00	0.00	0.00	0.00	0.00	0.21	0.08	0.00	0.00	0.07	0.00	0.00	0.04
60379033	Los Angeles	CA	76.3	77.2	0.00	0.15	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.02	0.19	0.00	0.00	0.00	0.00	0.00	0.15	0.04	0.00	0.00	0.07	0.00	0.00	0.02
60392010	Madera	CA	72.1	72.9	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.00	0.00	0.06	0.00	0.00	0.02
60470003	Merced	CA	69.9	71.0	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
60650004	Riverside	CA	76.7	76.7	0.00	0.14	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.00	0.00	0.03	0.00	0.00	0.01
60650012	Riverside	CA	83.6	85.1	0.00	0.24	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.08	0.00	0.00	0.00
60651016	Riverside	CA	85.2	85.5	0.00	0.28	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00
60652002	Riverside	CA	72.4	73.0	0.00	0.18	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.22	0.04	0.00	0.00	0.02	0.00	0.00	0.02
60655001	Riverside	CA	79.5	80.1	0.00	0.11	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.04	0.12	0.00	0.00	0.00	0.00	0.00	0.26	0.03	0.00	0.00	0.07	0.00	0.00	0.02
60656001	Riverside	CA	78.3	81.6	0.00	0.19	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.00	0.00	0.02	0.00	0.00	0.02
60658001	Riverside	CA	87.0	87.9	0.00	0.15	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.12	0.03	0.00	0.00	0.06	0.00	0.00	0.01
60658005	Riverside	CA	83.2	84.4	0.00	0.14	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.00	0.00	0.06	0.00	0.00	0.01
60659001	Riverside	CA	73.7	75.9	0.00	0.15	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.00	0.04	0.00	0.00	0.01
60670012	Sacramento	CA	74.5	75.9	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.20	0.00	0.00	0.00
60675003	Sacramento	CA	69.9	71.3	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00
60710005	San Bernardino	CA	96.2	98.1	0.00	0.25	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.20	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.00	0.00	0.07	0.00	0.00	0.01
60710012	San Bernardino	CA	84.1	85.8	0.00	0.15	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.02	0.11	0.00	0.00	0.00	0.00	0.00	0.12	0.06	0.00	0.00	0.04	0.00	0.00	0.03
60710306	San Bernardino	CA	76.2	77.4	0.00	0.06	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.04	0.00	0.00	0.00
60711004	San Bernardino	CA	89.8	91.0	0.00	0.14	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.22	0.04	0.00	0.00	0.05	0.00	0.00	0.02
60712002	San Bernardino	CA	93.1	95.0	0.00	0.16	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.23	0.00	0.00	0.00	0.00	0.00	0.13	0.01	0.00	0.00	0.08	0.00	0.00	0.00
60714001	San Bernardino	CA	86.0	88.5	0.00	0.19	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.05	0.00	0.00	0.00
60714003	San Bernardino	CA	94.1	95.8	0.00	0.21	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.25	0.00	0.00	0.00	0.00	0.00	0.12	0.08	0.00	0.00	0.15	0.00	0.00	0.01
60719002	San Bernardino	CA	80.0	81.4	0.00	0.14	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.00	0.00	0.28	0.05	0.00	0.00	0.04	0.00	0.00	0.04
60719004	San Bernardino	CA	88.4	88.7	0.00	0.20	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.23	0.00	0.00	0.00	0.00	0.00	0.11	0.07	0.00	0.00	0.14	0.00	0.00	0.01
60990006	Stanislaus	CA	74.8	75.7	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.11	0.00	0.00	0.01
61070006	Tulare	CA	69.1	71.9	0.00	0.05	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00
61070009	Tulare	CA	76.1	77.2	0.00	0.11	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.07	0.00	0.00	0.00
61072002	Tulare	CA	68.9	71.4	0.00	0.21	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.16	0.00	0.00	0.00
61072010	Tulare	CA	73.1	73.9	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.17	0.00	0.00	0.00
61112002	Ventura	CA	70.5	72.2	0.00	0.18	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.02	0.16	0.00	0.00	0.00	0.00	0.00	0.13	0.08	0.00	0.00	0.08	0.00	0.00	0.03

Contributions to 2023 Nonattainment and Maintenance Sites in California (Part 3)

Site ID	County	State	2023 Average	2023 Maximum	Tribal	Canada/ Mexco	Offshore	Fire	Boundary	Biogenic
60190007	Fresno	CA	79.2	79.4	0.00	0.29	1.19	1.39	32.52	6.85
60190011	Fresno	CA	78.6	81.2	0.01	0.33	1.13	1.62	32.34	6.78
60190242	Fresno	CA	79.4	82.2	0.00	0.31	1.24	1.48	34.92	7.88
60194001	Fresno	CA	73.3	74.4	0.00	0.12	1.68	0.87	27.76	7.90
60195001	Fresno	CA	79.6	81.2	0.00	0.20	1.75	1.12	32.10	7.66
60250005	Imperial	CA	73.3	74.6	0.01	19.87	1.17	0.71	38.68	2.11
60251003	Imperial	CA	79.0	80.0	0.01	18.74	1.14	0.61	43.58	2.08
60290007	Kern	CA	77.7	81.3	0.00	0.30	1.59	3.27	33.68	7.70
60290008	Kern	CA	71.3	72.8	0.01	0.67	1.96	1.05	32.77	7.30
60290014	Kern	CA	74.1	75.2	0.00	0.31	1.68	0.85	31.31	7.37
60290232	Kern	CA	73.7	75.2	0.00	0.13	1.67	1.11	29.43	7.73
60295002	Kern	CA	75.9	76.8	0.00	0.35	1.34	3.80	33.45	7.68
60296001	Kern	CA	70.9	72.4	0.00	0.50	1.59	0.63	30.55	7.98
60370002	Los Angeles	CA	73.3	75.1	0.01	1.47	3.53	0.82	24.67	2.15
60370016	Los Angeles	CA	86.1	88.9	0.01	1.73	4.14	0.97	28.98	2.53
60371201	Los Angeles	CA	79.8	79.8	0.02	1.74	4.20	1.29	32.92	2.83
60371701	Los Angeles	CA	78.1	79.1	0.01	1.82	4.16	0.97	25.57	2.35
60372005	Los Angeles	CA	72.3	74.6	0.01	1.76	4.10	1.17	24.34	2.37
60376012	Los Angeles	CA	85.9	87.4	0.02	2.27	4.69	1.22	32.85	3.43
60379033	Los Angeles	CA	76.3	77.2	0.01	1.82	3.52	0.45	40.73	2.75
60392010	Madera	CA	72.1	72.9	0.00	0.23	1.22	1.30	32.12	7.30
60470003	Merced	CA	69.9	71.0	0.00	0.37	1.94	1.12	30.92	5.97
60650004	Riverside	CA	76.7	76.7	0.01	1.37	3.64	0.72	25.79	2.34
60650012	Riverside	CA	83.6	85.1	0.00	1.30	3.33	0.31	36.48	2.66
60651016	Riverside	CA	85.2	85.5	0.00	1.60	3.00	3.09	38.71	2.54
60652002	Riverside	CA	72.4	73.0	0.01	2.29	1.39	2.24	46.66	2.08
60655001	Riverside	CA	79.5	80.1	0.01	2.71	2.67	3.03	42.81	2.40
60656001	Riverside	CA	78.3	81.6	0.00	1.13	4.03	0.53	30.14	2.55
60658001	Riverside	CA	87.0	87.9	0.01	1.76	4.77	0.77	28.27	2.68
60658005	Riverside	CA	83.2	84.4	0.01	1.68	4.56	0.73	27.04	2.57
60659001	Riverside	CA	73.7	75.9	0.00	1.71	4.96	1.03	25.56	2.43
60670012	Sacramento	CA	74.5	75.9	0.00	0.12	0.88	1.16	29.33	5.92
60675003	Sacramento	CA	69.9	71.3	0.00	0.06	0.79	1.26	26.47	6.04
60710005	San Bernardino	CA	96.2	98.1	0.00	1.36	3.68	0.44	38.71	2.77
60710012	San Bernardino	CA	84.1	85.8	0.02	1.33	1.83	0.33	53.12	1.93
60710306	San Bernardino	CA	76.2	77.4	0.00	0.67	2.10	0.50	40.62	2.02
60711004	San Bernardino	CA	89.8	91.0	0.01	2.03	4.00	0.95	31.07	2.74
60712002	San Bernardino	CA	93.1	95.0	0.00	1.58	4.58	0.75	31.34	2.82
60714001	San Bernardino	CA	86.0	88.5	0.00	0.91	2.69	0.37	37.56	2.45
60714003	San Bernardino	CA	94.1	95.8	0.00	0.98	4.15	0.69	31.70	2.90
60719002	San Bernardino	CA	80.0	81.4	0.01	2.80	2.23	3.20	45.72	2.29
60719004	San Bernardino	CA	88.4	88.7	0.00	0.92	3.90	0.65	29.78	2.72
60990006	Stanislaus	CA	74.8	75.7	0.00	0.34	2.19	1.77	30.24	5.06
61070006	Tulare	CA	69.1	71.9	0.00	0.33	0.55	4.43	53.61	2.46
61070009	Tulare	CA	76.1	77.2	0.00	0.43	1.44	3.40	39.41	7.08
61072002	Tulare	CA	68.9	71.4	0.00	0.25	1.58	0.95	26.88	7.42
61072010	Tulare	CA	73.1	73.9	0.00	0.15	1.78	1.17	30.26	8.67
61112002	Ventura	CA	70.5	72.2	0.02	1.65	4.60	1.01	29.69	2.75

Appendix B

EPA August 31, 2018 Memorandum

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

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

AUG 31 2018

MEMORANDUM

SUBJECT: 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

FROM: Peter Tsirigotis
Director

TO: Regional Air Division Directors, Regions 1–10

The purpose of this memorandum is to provide analytical information regarding the degree to which certain air quality threshold amounts capture the collective amount of upwind contribution from upwind states to downwind receptors for the 2015 ozone National Ambient Air Quality Standards (NAAQS). It also interprets that information to make recommendations about what thresholds may be appropriate for use in state implementation plan (SIP) revisions addressing the good neighbor provision for that NAAQS. This document does not substitute for provisions or regulations of the Clean Air Act (CAA), nor is it a regulation itself. Rather, it provides recommendations for states using the included analytical information in developing SIP submissions, and for the Environmental Protection Agency (EPA) Regional offices in acting on them. Thus, it does not impose binding, enforceable requirements on any party. State air agencies retain the discretion to develop good neighbor SIP revisions that differ from this guidance.

Following these recommendations does not ensure that the EPA will approve a SIP revision in all instances where the recommendations are followed, as the guidance may not apply to the facts and circumstances underlying a particular SIP. Final decisions by the EPA to approve a particular SIP revision will only be made based on the requirements of the statute and will only be made following an air agency's final submission of the SIP revision to the EPA, and after appropriate notice and opportunity for public review and comment. Interested parties may raise comment about the appropriateness of the application of this guidance to a particular SIP revision. The EPA and air agencies should consider whether the recommendations in this guidance are appropriate for each situation.

Introduction

CAA section 110(a)(2)(D)(i)(I), otherwise known as the good neighbor provision, requires SIPs to prohibit emissions "which will contribute significantly to nonattainment in, or interfere with maintenance by, any other state with respect to any" NAAQS. The EPA has historically used a 4-step framework to address upwind state obligations under the good neighbor provision for regional pollutants like ozone, which includes the following steps: (1) identify downwind areas, referred to as "receptors," expected to have problems attaining or maintaining the NAAQS; (2) identify upwind states that contribute to those downwind air quality problems and warrant further review and analysis; (3) identify the emissions reductions (if any) necessary to eliminate an upwind state's significant contribution to nonattainment and/or interference with maintenance of the NAAQS in the downwind areas, considering cost and air quality factors; and (4) adopt permanent and enforceable measures needed to achieve those emissions reductions. The EPA notes that, in developing their SIP revisions for the 2015 ozone NAAQS, states have flexibility to follow this framework or develop alternative frameworks to evaluate interstate transport obligations, so long as a state's chosen approach has adequate technical justification and is consistent with the requirements of the CAA

At Step 2, the EPA has used an air quality screening threshold to determine whether or not a state contributes to a downwind air quality problem in amounts that warrant further evaluation as part of a multi-factor analysis in Step 3. Upwind states that impact a downwind receptor by less than the screening threshold do not contribute to the downwind air quality problem at Step 2. The EPA has previously determined that such states do not significantly contribute to nonattainment or interfere with maintenance of the NAAQS under the good neighbor provision without additional analysis. Upwind states that impact a downwind receptor at or above the threshold are identified as contributing to a downwind air quality problem (i.e., they are said to be "linked" to that downwind receptor). The Step 3 analysis is then used to determine if the linked upwind state's contribution is "significant" or will "interfere with maintenance" of the NAAQS at the downwind receptor(s).[1]

Determining an appropriate screening threshold is a critical component of designing and then applying Step 2. Each time EPA sets a new or revised NAAQS, states and EPA can evaluate collective contribution to identify an appropriate threshold for that NAAQS. This assessment uses data and air quality analyses that are specifically applicable to the NAAQS being considered and the relevant air quality conditions (e.g., pollutant concentrations and the magnitude of interstate transport). As a result, conclusions made with respect to one NAAQS are not by default applicable to another NAAQS. In previous federal actions,[2] EPA's analysis of collective contribution concluded that a screening threshold equivalent to 1 percent of the 1997 and 2008 ozone NAAQS was appropriate at Step 2. In this document, we evaluate data pertinent to several alternative thresholds that could be applicable to the development of SIP revisions to address the 2015 ozone

[1] Note that upwind states that are linked to a downwind receptor at Step 2 may nevertheless be found to not significantly contribute to nonattainment or interfere with maintenance at the receptor depending on the outcome of the Step 3 analysis.

[2] In the Cross-State Air Pollution Rule (CSAPR), the EPA used 0.80 parts per billion (ppb) as the threshold, which is 1 percent of the 1997 ozone NAAQS. 76 FR 48208, 48238 (August 8, 2011). Most recently, in the Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS (CSAPR Update), the EPA used 0.75 ppb as the threshold, which is 1 percent of the 2008 ozone NAAQS. 81 FR 74504, 74518 (October 26, 2016).

NAAQS of 70 ppb. We compare a threshold equivalent to 1 percent of the 2015 ozone NAAQS (i.e., a threshold of 0.70 ppb), consistent with EPA's previously applied screening thresholds at Step 2, as well as two alternative thresholds: 1 ppb and 2 ppb. The purpose of this analysis is to examine the amount of collective upwind contribution—i.e., the sum of contributions from states that are linked to each receptor—for each of these alternative thresholds. The data provided in this analysis are drawn from the results of EPA's updated 2023 modeling, which was released in a memorandum in March 2018.[3] The analysis presented here is similar to the analysis of alternative thresholds conducted to select the screening thresholds used in both the CSAPR and CSAPR Update rulemakings.[4,5] 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 provision for the 2015 ozone NAAQS.

Methodology for Analyzing Alternative Thresholds

The EPA's 2023 state-by-state contribution modeling is used to calculate the absolute and relative amount of total upwind "collective contribution" captured by each of the three alternative thresholds evaluated in this analysis: 0.70 ppb (1 percent of the 2015 ozone NAAQS), 1 ppb, and 2 ppb. The ozone concentration and collective contribution data for each alternative threshold are provided in several tables, as described below. In the analysis of alternative screening thresholds, the EPA focused on data for the receptors outside of California since no other states were projected to impact any of the receptors in California at or above a threshold equivalent to 1 percent of the 2015 ozone NAAQS.[6] Data are therefore provided for each of the 2023 nonattainment and maintenance receptors outside of California identified using the CSAPR methodology for determining future year receptors.[7] In Table 1 below, we provide the projected 2023 average design value and the sum of the contributions from all upwind states (i.e., total upwind contribution) for each of these receptors. Table 1 further provides data on the amount of the total upwind contribution (ppb) that is captured by each of the three thresholds (i.e., the collective contribution) and at each receptor considered in this analysis. In Table 2 below, we express the amount of contribution captured at each alternative threshold considered in this analysis as a percent of the amount of the total upwind contribution. Finally, in Table 3 below, we compare the net amount of contribution captured at the 1 ppb and 2 ppb thresholds as a percentage of the amount of contribution captured at the 0.70 ppb, 1 percent threshold.

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[3] 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 2018). *https://www.epa.gov/airmarkets/march-2018-memo-and-supplemental-information-regarding-interstate-transport-sips-2015.*

[4] Air Quality Modeling Technical Support Document for the Final Cross State Air Pollution Rule Update (August 2016). *https://www.epa.gov/airmarkets/air-quality-modeling-technical-support-document-final-cross-state-air-pollution-rule.*

[5] Air Quality Modeling Final Rule Technical Support Document (for the Final Transport Rule now known as CSAPR; June 2011). *https://www.epa.gov/csapr/air-quality-modeling-final-rule-technical-support-document.*

[6] March 2018 Memo and Supplemental Information Regarding Interstate Transport SIPs for the 2015 Ozone NAAQS (March 2018). *https://www.epa.gov/airmarkets/march-2018-memo-and-supplemental-information-regarding-interstate-transport-sips-2015.*

[7] *See* 81 FR 74530-531.

Results

The data in the tables below indicate that, for the 2015 ozone NAAQS, the amount of upwind collective contribution captured using a 1 ppb threshold is generally comparable to the amount captured using a threshold equivalent to 1 percent of the NAAQS. In particular, the data in Table 1 indicate that using a 1 percent threshold captures 77 percent of the total upwind contribution when summed across all receptors. Overall, using a 1 ppb threshold captures 70 percent, which is a similar and only slightly lower amount of contribution. By contrast, using a 2 ppb threshold captures 55 percent, much less of the total contribution summed across all receptors. The data in Table 2 indicate that the percent of upwind contribution captured by a 1 percent and 1 ppb threshold at individual receptors are also of a similar magnitude at most sites. However, a 2 ppb threshold captures a notably lower portion of the total upwind contribution at most receptors. Finally, the data in Table 3 indicate that, on average across all receptors, a 1 ppb threshold captures 86 percent of the net contribution captured using a 1 percent threshold, whereas, a 2 ppb threshold captures only half of the net contribution using 1 percent.

Because the amount of upwind collective contribution captured with the 1 percent and 1 ppb thresholds is generally comparable, overall, we believe it may be reasonable and appropriate for states to use a 1 ppb contribution threshold, as an alternative to a 1 percent threshold, at Step 2 of the 4-step framework in developing their SIP revisions addressing the good neighbor provision for the 2015 ozone NAAQS. Although the 1 ppb threshold captures somewhat less upwind contribution across receptors than the 1 percent threshold, the 1 ppb threshold still generally captures a substantial amount of transported contribution from upwind states to downwind receptors. Thus, the use of a 1 ppb threshold to identify linked upwind states still provides the potential, at Step 3, for meaningful emission reductions in linked upwind states in order to aid downwind states with attainment and maintenance of the 2015 ozone NAAQS. However, the amount of upwind contribution captured using a 2 ppb threshold is notably less at most receptors than the amount captured with either a 1 ppb or 1 percent threshold, and therefore emission reductions from states linked at that higher threshold may be insufficient to address collective upwind state contribution to downwind air quality problems.

Please share this information with the air agencies in your Region.

For Further Information

If you have any questions concerning this memorandum, please contact Norm Possiel at (919) 541-5692, *possiel.norm@epa.gov* for modeling information or Beth Palma at (919) 541-5432, *palma.elizabeth@epa.gov* for any other information.

Table 1. Total upwind contribution and the sum of upwind contribution at each receptor captured using each alternative threshold (units are ppb).

Site	State	County	2023 Average Design Value	Total Upwind State Contribution	Sum of Upwind Contribution Captured with 0.70 ppb Threshold	Sum of Upwind Contribution Captured with 1 ppb Threshold	Sum of Upwind Contribution Captured with 2 ppb Threshold
40130019	AZ	Maricopa	69.3	2.55	1.87	1.87	0.00
40131004	AZ	Maricopa	69.8	2.58	2.03	2.03	2.03
80050002	CO	Arapahoe	69.3	5.98	3.47	3.47	0.00
80350004	CO	Douglas	71.1	5.94	3.35	3.35	0.00
80590006	CO	Jefferson	71.3	7.06	4.68	2.34	0.00
80590011	CO	Jefferson	70.9	6.98	4.51	3.57	0.00
80690011	CO	Larimer	71.2	6.33	3.48	2.60	0.00
81230009	CO	Weld	70.2	5.63	2.77	1.05	0.00
90010017	CT	Fairfield	68.9	37.44	32.15	32.15	28.66
90013007	CT	Fairfield	71.0	41.29	36.91	33.63	27.38
90019003	CT	Fairfield	73.0	44.24	38.55	36.93	32.28
90099002	CT	New Haven	69.9	35.25	29.49	28.76	24.96
240251001	MD	Harford	70.9	25.88	20.16	17.79	14.92
260050003	MI	Allegan	69.0	42.90	38.87	36.63	31.73
261630019	MI	Wayne	69.0	17.63	11.81	10.89	8.69
360810124	NY	Queens	70.2	30.68	23.73	23.00	15.73
361030002	NY	Suffolk	74.0	28.82	22.31	18.74	15.74
480391004	TX	Brazoria	74.0	13.36	7.48	4.80	3.80
481210034	TX	Denton	69.7	8.64	3.15	3.15	0.00
482010024	TX	Harris	70.4	8.19	3.06	3.06	3.06
482011034	TX	Harris	70.8	9.86	3.38	3.38	3.38
482011039	TX	Harris	71.8	13.01	8.26	4.72	4.72
484392003	TX	Tarrant	72.5	10.06	4.20	3.42	0.00

Site	State	County	2023 Average Design Value	Total Upwind State Contribution	Sum of Upwind Contribution Captured with 0.70 ppb Threshold	Sum of Upwind Contribution Captured with 1 ppb Threshold	Sum of Upwind Contribution Captured with 2 ppb Threshold
550790085	WI	Milwaukee	71.2	32.58	28.45	23.61	22.39
551170006	WI	Sheboygan	72.8	36.53	31.62	29.02	24.90
Percent of Overall Upwind Contribution Captured =>					77%	70%	55%

Table 2. Percent of the upwind contribution captured by each alternative threshold at each receptor.

Site	State	County	Percent of Upwind Contribution Captured using a 0.70 ppb Threshold	Percent of Upwind Contribution Captured using a 1 ppb Threshold	Percent of Upwind Contribution Captured using a 2 ppb Threshold
40130019	AZ	Maricopa	73.3%	73.3%	0.0%
40131004	AZ	Maricopa	78.7%	78.7%	78.7%
80050002	CO	Arapahoe	58.0%	58.0%	0.0%
80350004	CO	Douglas	56.4%	56.4%	0.0%
80590006	CO	Jefferson	66.3%	33.1%	0.0%
80590011	CO	Jefferson	64.6%	51.1%	0.0%
80690011	CO	Larimer	55.0%	41.1%	0.0%
81230009	CO	Weld	49.2%	18.7%	0.0%
90010017	CT	Fairfield	85.9%	85.9%	76.5%
90013007	CT	Fairfield	89.4%	81.4%	66.3%
90019003	CT	Fairfield	87.1%	83.5%	73.0%
90099002	CT	New Haven	83.7%	81.6%	70.8%
240251001	MD	Harford	77.9%	68.7%	57.7%
260050003	MI	Allegan	90.6%	85.4%	74.0%

Site	State	County	Percent of Upwind Contribution Captured using a 0.70 ppb Threshold	Percent of Upwind Contribution Captured using a 1 ppb Threshold	Percent of Upwind Contribution Captured using a 2 ppb Threshold
261630019	MI	Wayne	67.0%	61.8%	49.3%
360810124	NY	Queens	77.3%	75.0%	51.3%
361030002	NY	Suffolk	77.4%	65.0%	54.6%
480391004	TX	Brazoria	56.0%	35.9%	28.4%
481210034	TX	Denton	36.5%	36.5%	0.0%
482010024	TX	Harris	37.4%	37.4%	37.4%
482011034	TX	Harris	34.3%	34.3%	34.3%
482011039	TX	Harris	63.5%	36.3%	36.3%
484392003	TX	Tarrant	41.7%	34.0%	0.0%
550790085	WI	Milwaukee	87.3%	72.5%	68.7%
551170006	WI	Sheboygan	86.6%	79.4%	68.2%

Table 3. Percent of the contribution captured with a 0.70 ppb threshold that is captured using 1 ppb and 2 ppb thresholds.

Site	State	County	Contribution Captured with 1 ppb Threshold vs a 0.70 ppb Threshold	Contribution Captured with 2 ppb Threshold vs a 0.70 ppb Threshold
40130019	AZ	Maricopa	100.0%	0.0%
40131004	AZ	Maricopa	100.0%	100.0%
80050002	CO	Arapahoe	100.0%	0.0%
80350004	CO	Douglas	100.0%	0.0%
80590006	CO	Jefferson	50.0%	0.0%
80590011	CO	Jefferson	79.2%	0.0%
80690011	CO	Larimer	74.7%	0.0%
81230009	CO	Weld	37.9%	0.0%
90010017	CT	Fairfield	100.0%	89.1%

Site	State	County	Contribution Captured with 1 ppb Threshold vs a 0.70 ppb Threshold	Contribution Captured with 2 ppb Threshold vs a 0.70 ppb Threshold
90013007	CT	Fairfield	91.1%	74.2%
90019003	CT	Fairfield	95.8%	83.7%
90099002	CT	New Haven	97.5%	84.6%
240251001	MD	Harford	88.2%	74.0%
260050003	MI	Allegan	94.2%	81.6%
261630019	MI	Wayne	92.2%	73.6%
360810124	NY	Queens	96.9%	66.3%
361030002	NY	Suffolk	84.0%	70.6%
480391004	TX	Brazoria	64.2%	50.8%
481210034	TX	Denton	100.0%	0.0%
482010024	TX	Harris	100.0%	100.0%
482011034	TX	Harris	100.0%	100.0%
482011039	TX	Harris	57.1%	57.1%
484392003	TX	Tarrant	81.4%	0.0%
550790085	WI	Milwaukee	83.0%	78.7%
551170006	WI	Sheboygan	91.8%	78.7%
Average Percent Captured =>			86%	51%

Appendix C

Midwest Ozone Group Technical Support Document

"Good Neighbor" Modeling Technical Support Document for 8-Hour Ozone State Implementation Plans

"Good Neighbor" Modeling Technical Support Document for 8-Hour Ozone State Implementation Plans

Final Technical Support Document

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June 2018

Project Number: TS-524

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1.0 INTRODUCTION

1.1 OVERVIEW

Sections 110(a)(1) and (2) of the Clean Air Act (CAA) require all states to adopt and submit to the U. S. Environmental Protection Agency (EPA) any revisions to their infrastructure State Implementation Plans (SIP) which provide for the implementation, maintenance and enforcement of a new or revised national ambient air quality standard (NAAQS). CAA section 110(a)(2)(D)(i)(I) requires each state to prohibit emissions that will significantly contribute to nonattainment of a NAAQS, or interfere with maintenance of a NAAQS, in a downwind state. The EPA revised the ozone NAAQS in March 2008 and completed the designation process to identify nonattainment areas in July 2012. Under this revision, the 8-hour ozone NAAQS form is the three year average of the fourth highest daily maximum 8-hour ozone concentrations with a threshold not to be exceeded of 0.075 ppm (75 ppb).

On October 1, 2015, EPA promulgated a revision to the ozone NAAQS, lowering the level of both the primary and secondary standards to 70 parts per billion (ppb) (80 FR 65292). Pursuant to CAA section 110(a), good neighbor SIPs are, therefore, due by October 1, 2018. This promulgated revision changed the threshold as to not exceed a value of 0.070 ppm (70 ppb). This document serves to provide a technical support document for 4km air quality modeling and results recently conducted by Alpine Geophysics, LLC (Alpine) under contract to the Midwest Ozone Group (MOG) for purposes of individual state review and preparation of 8-hour ozone modeling analysis in support of revisions of the 2008 and 2015 8-hour ozone Good Neighbor State Implementation Plans (GNS).

This document describes the overall modeling activities performed and results developed in order for a state to demonstrate whether they significantly contribute to nonattainment or interfere with maintenance of the 2008 or 2015 ozone NAAQS in a neighboring state. Our initial modeling effort was developed using EPA's national 12km modeling domain (12US2) and further refined with two 4km modeling domains over a Mid-Atlantic region and Lake Michigan. A comprehensive draft Modeling Protocol for the 12km 8-hour ozone SIP revision study was prepared and provided to EPA for comment and review. Based on EPA comments, the draft document was revised (Alpine, 2017a) to include many of the comments and recommendations submitted, most importantly, but not limited to, using EPA's 2023en modeling platform (EPA, 2017a). This 2023en modeling platform represents EPA's estimation of a projected "base case" that demonstrates compliance with final CSAPR update seasonal EGU NOx budgets.
Our 4km modeling exercise largely utilized the same platform configuration with new meteorological data prepared for the 4km domains and 12km emissions nested to the 4km domains to support both attainment demonstration and source apportionment simulations.

1.2 STUDY BACKGROUND

Section 110(a)(2)(D)(i)(I) of the CAA requires that states address the interstate transport of pollutants and ensure that emissions within the state do not contribute significantly to nonattainment in, or interfere with maintenance by, any other state.

On October 26, 2016, EPA published in the Federal Register (81 FR 74504) a final update to the Cross-State Air Pollution Rule (CSAPR) for the 2008 ozone NAAQS. In this final update, EPA outlines its four-tiered approach to addressing the interstate transport of pollution related to the ozone NAAQS, or states' Good Neighbor responsibilities. EPA's approach determines which states contribute significantly to nonattainment areas or significantly interfere with air quality in maintenance areas in downwind states. EPA has determined that if a state's contribution to downwind air quality problems is below one percent of the applicable NAAQS, then it does not consider that state to be significantly contributing to the downwind area's nonattainment or maintenance concerns. EPA's approach to addressing interstate transport has been shaped by public notice and comment and refined in response to court decisions.

As part of the final CSAPR update, EPA released regional air quality modeling to support the 2008 ozone NAAQS attainment date of 2017, indicating which states significantly contribute to nonattainment or maintenance area air quality problems in other states. To make these determinations, the EPA projected future ozone nonattainment and maintenance receptors, then conducted state-level ozone source apportionment modeling to determine which states contributed pollution over a pre-identified "contribution threshold."

A follow-up technical memorandum was issued by EPA on October 27, 2017 (Page, 2017) that provided supplemental information on interstate SIP submissions for the 2008 ozone NAAQS. In this memorandum, EPA provided future year 2023 design value calculations and source contribution results with updated modeling and included background on the four-step process interstate transport framework that the EPA uses to address the good neighbor provision for regional pollutants. This document also explains EPA's choice of 2023 as the new analytic year for the 2008 ozone NAAQS, introduced the "no water" approach to calculating relative response factors (RRFs) at coastal sites, and confirmed that there are no monitoring sites, outside of California, that were projected to have nonattainment or maintenance problems with respect to the 2008 ozone NAAQS of 75 ppb in 2023.

Concurrent with EPA's modeling documented in the October 2017 memo, Alpine was conducting good neighbor SIP modeling for the Commonwealth of Kentucky (Alpine, 2017) using EPA's 2023en modeling platform. This analysis confirmed EPA's "3x3 grid cell" findings and specifically noted that none of the problem monitors identified in EPA's final rule were predicted to be in nonattainment or have issues with maintenance in 2023 and therefore Kentucky (and by extension, any other upwind state) was not required to estimate its contribution to these monitors.

On March 27, 2018, EPA released a technical memorandum (Tsirigotis, 2018) providing additional information on interstate SIP submissions for the 2015 ozone NAAQS. In this memo, EPA provided incremental results of their 12km modeling using a projection year of 2023, including updated source apportionment results, a "no water" grid cell RRF methodology, and a discussion of potential flexibilities in analytical approaches that an upwind state may consider in developing GNS. As discussed in greater detail in Section 1.3.3, the year of 2023 was selected as the analytic year in EPA's modeling primarily because it aligned with the anticipated attainment year for Moderate ozone nonattainment areas and because it reflected the timeframe for implementing further emission reductions.

EPA's goal in providing these new ozone air quality projections for 2023 was to assist states' efforts to develop GNS for the 2015 ozone NAAQS.

A number of monitors in the eastern U.S. were found to be in nonattainment of the 2015 ozone NAAQS with multiple states demonstrating contribution to projected downwind nonattainment area air quality over the one-percent threshold at EPA-identified nonattainment or maintenance monitors. These EPA-identified monitors are provided in Table 1-1 along with their current 3-yr design value for the period 2014-2016.

As EPA found that multiple state contributions to projected downwind maintenance problems at these monitors is above the one percent threshold and thus significant, additional analyses are required to identify these upwind state responsibilities under the Good Neighbor Provisions for the various ozone NAAQS.

Table 1-1. EPA-identified eastern U.S. nonattainment and maintenance monitors.

Monitor	State	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
90010017	CT	Fairfield	80.3	83	69.8	72.1	68.9	71.2	80
90013007	CT	Fairfield	84.3	89	71.2	75.2	71.0	75.0	81
90019003	CT	Fairfield	83.7	87	72.7	75.6	73.0	75.9	85
90099002	CT	New Haven	85.7	89	71.2	73.9	69.9	72.6	76
240251001	MD	Harford	90.0	93	71.4	73.8	70.9	73.3	73
260050003	MI	Allegan	82.7	86	69.0	71.8	69.0	71.7	75
261630019	MI	Wayne	78.7	81	69.0	71.0	69.0	71.0	72
360810124	NY	Queens	78.0	80	70.1	71.9	70.2	72.0	69
360850067	NY	Richmond	81.3	83	71.9	73.4	67.1	68.5	76
361030002	NY	Suffolk	83.3	85	72.5	74.0	74.0	75.5	72
480391004	TX	Brazoria	88.0	89	74.0	74.9	74.0	74.9	75
481210034	TX	Denton	84.3	87	69.7	72.0	69.7	72.0	80
482011024	TX	Harris	80.3	83	70.4	72.8	70.4	72.8	79
482011034	TX	Harris	81.0	82	70.8	71.6	70.8	71.6	73
482011039	TX	Harris	82.0	84	71.8	73.6	71.8	73.5	67
484392003	TX	Tarrant	87.3	90	72.5	74.8	72.5	74.8	73
550790085	WI	Milwaukee	80.0	82	65.4	67.0	71.2	73.0	71
551170006	WI	Sheboygan	84.3	87	70.8	73.1	72.8	75.1	79

1.2.2 Purpose

This document primarily serves to provide the air quality modeling and source apportionment results for two 4km grid domains in support of revisions that states may make to their 2008 or 2015 8-hour ozone Good Neighbor State Implementation Plan (GNS). This document demonstrates that many of the eastern state receptors demonstrate modeled attainment using a finer grid 4km modeling domain (compared to 12km results). In addition, this document demonstrates the significance of international transport, that 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 that there may be options available to other states that do demonstrate significant contribution at air quality monitoring sites that qualify as nonattainment or maintenance.

1.3 OVERVIEW OF MODELING APPROACH

The GNS 8-Hour ozone SIP modeling documented here includes an ozone simulation study using the 12 km grid based on EPA's 2023en modeling platform and preliminary source contribution assessment (EPA, 2016b) supplemented with two additional 4km modeling domains over the Mid-Atlantic region and Lake Michigan.

1.3.1 Episode Selection

Episode selection is an important component of an 8-hour ozone attainment demonstration. EPA guidance recommends that 10 days be used to project 8-hour ozone Design Values at each critical monitor. The May 1 through August 31 2011 ozone season period was selected for the ozone SIP modeling primarily due to the following reasons:

- It is aligned with the 2011 NEI year, which is the latest NEI modeled in a regulatory platform.
- It is not an unusually low ozone year.
- Ambient meteorological and air quality data are available.
- A 2011 12 km CAMx modeling platform was available from the EPA that was leveraged for the GNS ozone SIP modeling.

More details of the summer 2011 episode selection and justification using criteria in EPA's modeling guidance are contained in Section 3.

1.3.2 Model Selection

Details on the rationale for model selection are provided in Section 2. The Weather Research Forecast (WRF) prognostic meteorological model was selected for the GNS ozone modeling using both the EPA 12US2 grid and two additional 4km modeling grids. Additional emission modeling was not required for the 12km simulation as the 2023en platform was provided to Alpine in pre-merged CAMx ready format. For the base and future year simulations without source apportionment, the 12km emissions were nested onto the 4km grid projections using the built in CAMx "flexi-nesting" capability. Flexi-nesting provides a computationally efficient framework to evenly divide the low level emissions from the 12km grid onto the nine (9) 4km grids. No flexi-nesting is necessary for elevated sources since the CAMx model injects elevated sources into the highest resolution grid for all domains.

Emissions processing was completed by EPA for the 12km domain using the SMOKE emissions model for most source categories. The exceptions are that BEIS model was used for biogenic emissions and there are special processors for fires, windblown dust, lightning and sea salt emissions. The MOVES2014 on-road mobile source emissions model was used with SMOKE-MOVES to generate on-road mobile source emissions with EPA generated vehicle activity data provided in the NAAQS NODA. The CAMx photochemical grid model was also be used. The setup is based on the same WRF/SMOKE/BEIS/CAMx modeling system used in the EPA 2023en platform modeling.

For the OSAT modeling, the 12km low level emissions were windowed onto the 4km domains using the standard CAMx "WINDOW" processor[1] as CAMx does not support flexi-nesting for source apportionment.

[1] http://www.camx.com/getmedia/88755b80-6992-4f07-bcaa-596d05e1b4b8/window-6may13_1.tgz

1.3.3 Base and Future Year Emissions Data

The 2023 future year was selected for the attainment demonstration modeling based on OAQPS Director Steven Page's October 27, 2017 memo (Page, 2017, page 4) to Regional Air Directors. In this memo, Director Page identified the two primary reasons the EPA selected 2023 for their 2008 NAAQS modeling; (1) the D.C. Circuit Court's response to *North Carolina v. EPA* in considering downwind attainment dates for the 2008 NAAQS, and (2) EPA's consideration of the timeframes that may be required for implementing further emission reductions as expeditiously as possible. The 2011 base case and 2023 future year emissions were based on EPA's "en" inventories with no adjustment. This platform has been identified by EPA as the base case for compliance with the final CSAPR update seasonal EGU NOx emission budgets.

1.3.4 Input Preparation and QA/QC

Quality assurance (QA) and quality control (QC) of the emissions datasets are some of the most critical steps in performing air quality modeling studies. Because emissions processing is tedious, time consuming and involves complex manipulation of many different types of large databases, rigorous QA measures are a necessity to prevent errors in emissions processing from occurring. The GNS 8-Hour ozone modeling study utilized EPA's pre-QA/QC'd emissions platform that followed a multistep emissions QA/QC approach for the 12km domain. Additional tabular and graphical review of the 4km emissions was conducted to ensure consistency with the 12km modeling results on spatial, temporal, and speciated levels.

1.3.5 Meteorology Input Preparation and QA/QC

The CAMx 2011 12 km meteorological inputs are based on WRF meteorological modeling conducted by EPA. Details on the EPA 2011 WRF application and evaluation are provided by EPA (EPA 2014d). Additional WRF simulations were conducted to generate meteorological data fields to support the 4km modeling domains. A performance evaluation of this incremental modeling was prepared (Alpine, 2018a) and confirmed adequacy of the files for SIP attainment and contribution analyses.

1.3.6 Initial and Boundary Conditions Development

Initial concentrations (IC) and Boundary Conditions (BC) are important inputs to the CAMx model. We ran 15 days of model spin-up before the first high ozone days occur in the modeling domain so the ICs are washed out of the modeling domain before the first high ozone day of the May-August 2011 modeling period. The lateral boundary and initial species concentrations are provided by a three dimensional global atmospheric chemistry model, GEOS-Chem (Yantosca, 2004) standard version 8-03-02 with 8-02-01 chemistry.

The 4km domains were run as two-way interactive nests within the 12km simulation and therefore were provided with updated boundary conditions at each integration time step and provided up-scale feedback from the 4km domains to the 12km domain.

1.3.7 Air Quality Modeling Input Preparation and QA/QC

Each step of the air quality modeling was subjected to QA/QC procedures. These procedures included verification of model configurations, confirmation that the correct data were used and processed correctly, and other procedures.

1.3.8 Model Performance Evaluation

The Model Performance Evaluation (MPE) relied on the 12km CAMx MPE from EPA's associated modeling platforms. EPA's MPE recommendations in their ozone modeling guidance (EPA, 2007; 2014e) were followed in this evaluation. Many of EPA's MPE procedures have already been performed by EPA in their CAMx 2011 modeling database being used in the GNS ozone SIP modeling. An additional MPE was prepared by Alpine (Alpine, 2018b) to support the 4km domains and confirmed the adequacy of the analysis for SIP and contribution analyses.

1.3.9 Diagnostic Sensitivity Analyses

Since no issues were identified in confirming Alpine's 12km CAMx runs compared to EPA's using the same modeling platform and configuration, additional diagnostic sensitivity analyses were not required.

2.0 MODEL SELECTION

This section documents the models used in this 8-hour ozone GNS SIP modeling study. The selection methodology presented in this chapter mirrors EPA's and other's regulatory modeling in support of the 2008 Ozone NAAQS Preliminary Interstate Transport Assessment (Page, 2017; Alpine, 2017; EPA, 2016b) and technical memorandum providing additional information on the Interstate SIP submissions for the 2015 Ozone NAAQS (Tsirigotis, 2018).

Unlike previous ozone modeling guidance that specified a particular ozone model (e.g., EPA, 1991 that specified the Urban Airshed Model; Morris and Myers, 1990), the EPA now recommends that models be selected for ozone SIP studies on a "case-by-case" basis. The latest EPA ozone guidance (EPA, 2014) explicitly mentions the CMAQ and CAMx PGMs as the most commonly used PGMs that would satisfy EPA's selection criteria but notes that this is not an exhaustive list and does not imply that they are "preferred" over other PGMs that could also be considered and used with appropriate justification. EPA's current modeling guidelines lists the following criteria for model selection (EPA, 2014e):

- It should not be proprietary;
- It should have received a scientific peer review;
- It should be appropriate for the specific application on a theoretical basis;
- It should be used with data bases which are available and adequate to support its application;
- It should be shown to have performed well in past modeling applications;
- It should be applied consistently with an established protocol on methods and procedures;
- It should have a user's guide and technical description;
- The availability of advanced features (e.g., probing tools or science algorithms) is desirable; and
- When other criteria are satisfied, resource considerations may be important and are a legitimate concern.

For the GNS 8-hour ozone modeling, we used the WRF/SMOKE/MOVES2014/BEIS/CAMx/OSAT modeling system as the primary tool for demonstrating attainment of the ozone NAAQS at downwind monitors at downwind problem monitors. The utilized modeling system satisfies all of EPA's selection criteria. A description of the key models to be used in the GNS ozone SIP modeling follows.

<u>WRF/ARW:</u> The Weather Research and Forecasting (WRF)[2] Model is a mesoscale numerical weather prediction system designed to serve both operational forecasting and atmospheric research needs (Skamarock, 2004; 2006; Skamarock et al., 2005). The Advanced Research WRF (ARW) version of WRF was used in this ozone modeling study. It features multiple dynamical cores, a 3-dimensional variational (3DVAR) data assimilation system, and a software architecture allowing for computational parallelism and system extensibility. WRF is suitable

[2] http://www.wrf-model.org/index.php

for a broad spectrum of applications across scales ranging from meters to thousands of kilometers. The effort to develop WRF has been a collaborative partnership, principally among the National Center for Atmospheric Research (NCAR), the National Oceanic and Atmospheric Administration (NOAA), the National Centers for Environmental Prediction (NCEP) and the Forecast Systems Laboratory (FSL), the Air Force Weather Agency (AFWA), the Naval Research Laboratory, the University of Oklahoma, and the Federal Aviation Administration (FAA). WRF allows researchers the ability to conduct simulations reflecting either real data or idealized configurations. WRF provides operational forecasting a model that is flexible and efficient computationally, while offering the advances in physics, numerics, and data assimilation contributed by the research community.

SMOKE: The Sparse Matrix Operator Kernel Emissions (SMOKE)[3] modeling system is an emissions modeling system that generates hourly gridded speciated emission inputs of mobile, non-road, area, point, fire and biogenic emission sources for photochemical grid models (Coats, 1995; Houyoux and Vukovich, 1999). As with most 'emissions models', SMOKE is principally an emission processing system and not a true emissions modeling system in which emissions estimates are simulated from 'first principles'. This means that, with the exception of mobile and biogenic sources, its purpose is to provide an efficient, modern tool for converting an existing base emissions inventory data into the hourly gridded speciated formatted emission files required by a photochemical grid model. SMOKE was used by EPA to prepare 2023en emission inputs for non-road mobile, area and point sources. These files were adopted and used as-is for this analysis.

SMOKE-MOVES: SMOKE-MOVES uses an Emissions Factor (EF) Look-Up Table from MOVES, gridded vehicle miles travelled (VMT) and other activity data and hourly gridded meteorological data (typically from WRF) and generates hourly gridded speciated on-road mobile source emissions inputs.

MOVES2014: MOVES2014[4] is EPA's latest on-road mobile source emissions model that was first released in July 2014 (EPA, 2014a,b,c). MOVES2014 includes the latest on-road mobile source emissions factor information. Emission factors developed by EPA were used in this analysis.

BEIS: Biogenic emissions were modeled by EPA using version 3.61 of the Biogenic Emission Inventory System (BEIS). First developed in 1988, BEIS estimates volatile organic compound (VOC) emissions from vegetation and nitric oxide (NO) emissions from soils. Because of resource limitations, recent BEIS development has been restricted to versions that are built within the Sparse Matrix Operational Kernel Emissions (SMOKE) system.

CAMx: The Comprehensive Air quality Model with Extensions (CAMx[5]) is a state-of-science "One-Atmosphere" photochemical grid model capable of addressing ozone, particulate matter (PM), visibility and acid deposition at regional scale for periods up to one year (ENVIRON,

3 http://www.smoke-model.org/index.cfm
4 http://www.epa.gov/otaq/models/moves/
5 http://www.camx.com

2015[6]). CAMx is a publicly available open-source computer modeling system for the integrated assessment of gaseous and particulate air pollution. Built on today's understanding that air quality issues are complex, interrelated, and reach beyond the urban scale, CAMx is designed to (a) simulate air quality over many geographic scales, (b) treat a wide variety of inert and chemically active pollutants including ozone, inorganic and organic $PM_{2.5}$ and PM_{10} and mercury and toxics, (c) provide source-receptor, sensitivity, and process analyses and (d) be computationally efficient and easy to use. The U.S. EPA has approved the use of CAMx for numerous ozone and PM State Implementation Plans throughout the U.S., and has used this model to evaluate regional mitigation strategies including those for most recent regional rules (e.g., Transport Rule, CAIR, NO_X SIP Call, etc.). CAMx Version 6.40 was used in this study.

OSAT: The Ozone Source Apportionment Technique (OSAT) tool of CAMx was selected to develop source contribution and significant contribution calculations and was applied for this analysis.

SMAT-CE: The Software for the Modeled Attainment Test - Community Edition (SMAT-CE)[7] is a PC-based software tool that can perform the modeled attainment tests for particulate matter and ozone, and calculate changes in visibility at Class I areas as part of the reasonable progress analysis for regional haze. Version 1.2 (Beta) was used in this analysis.

6 http://www.camx.com/files/camxusersguide_v6-20.pdf
7 https://www.epa.gov/scram/photochemical-modeling-tools

3.0 EPISODE SELECTION

EPA's most recent 8-hour ozone modeling guidance (EPA, 2014e) contains recommended procedures for selecting modeling episodes The GNS ozone SIP revision modeling used the May through end of August 2011 modeling period because it satisfies the most criteria in EPA's modeling guidance episode selection discussion.

EPA guidance recommends that 10 days be used to project 8-hour ozone Design Values at each critical monitor. The May through August 2011 period has been selected for the ozone SIP modeling primarily due to being aligned with the 2011 NEI year, not being an unusually low ozone year and availability of a 2011 12 km CAMx modeling platform from the EPA NAAQS NODA.

4.0 MODELING DOMAIN SELECTION

This section summarizes the modeling domain definitions for the GNS 8-hour ozone modeling, including the domain coverage, resolution, and map projection. It also discusses emissions, aerometric, and other data available for use in model input preparation and performance testing.

4.1 HORIZONTAL DOMAINS

The GNS ozone SIP modeling used a 12 km continental U.S. (12US2) domain and two 4 km subnested domains; one over the Mid-Atlantic region and another over Lake Michigan and surrounding states.

The 12 km nested grid modeling domain configuration is shown in Figure 4-1 with the two 4km domains represented in Figure 4-2. The 12 km domain shown in Figure 4-1 represents the CAMx 12km air quality and SMOKE/BEIS emissions modeling domain. The WRF meteorological modeling was run on larger 12 km modeling domains than used for CAMx as demonstrated in EPA's meteorological model performance evaluation document (EPA, 2014d). The WRF meteorological modeling domains are defined larger than the air quality modeling domains because meteorological models can sometimes produce artifacts in the meteorological variables near the boundaries as the prescribed boundary conditions come into dynamic balance with the coupled equations and numerical methods in the meteorological model.

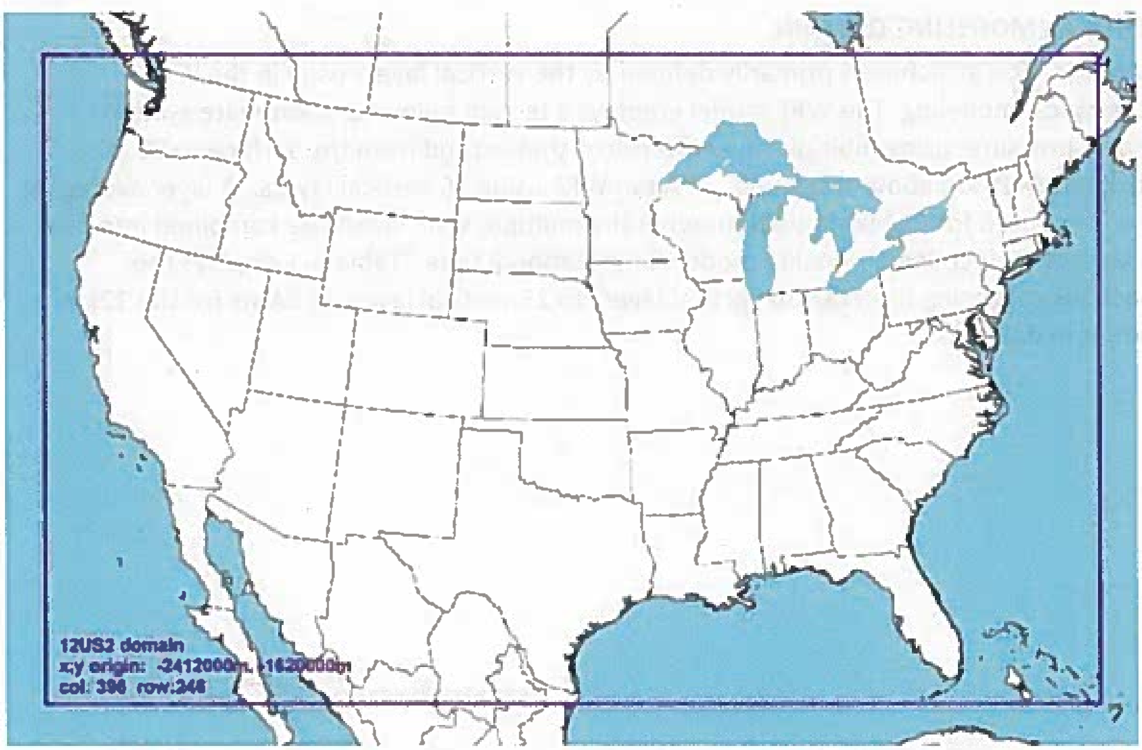

Figure 4-1. Map of 12km CAMx modeling domains. Source: EPA NAAQS NODA.

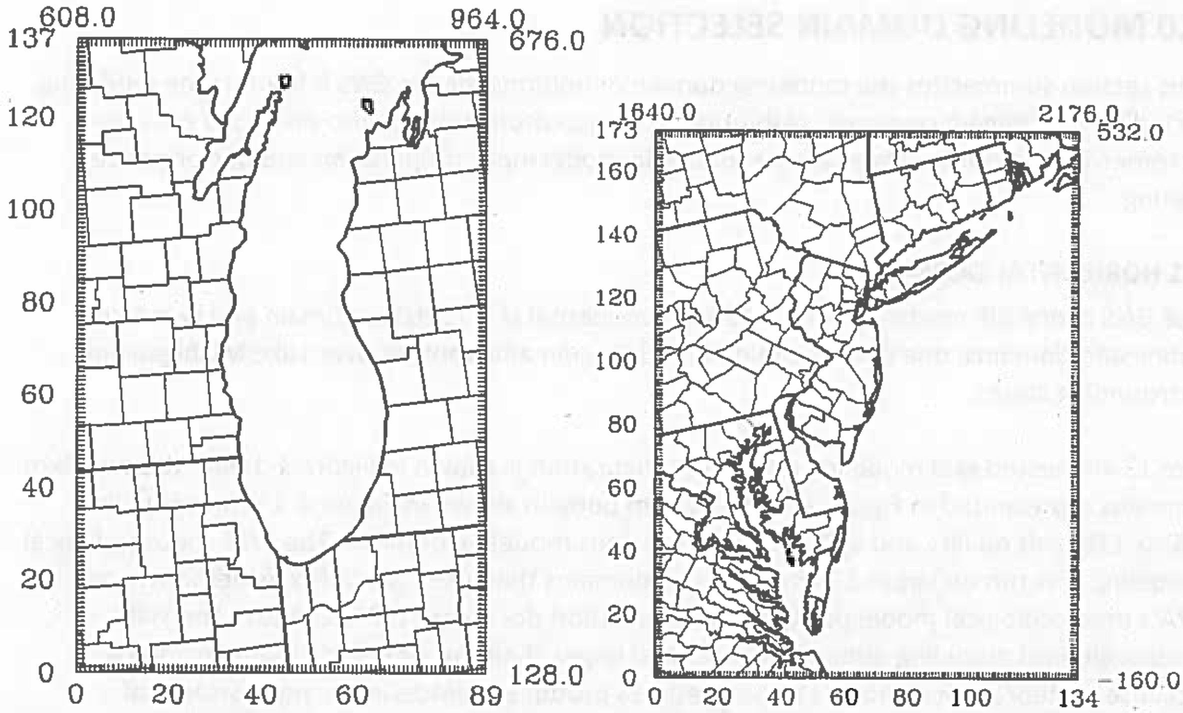

Figure 4-2. Maps of 4km CAMx modeling domains. Lake Michigan (left) and Mid-Atlantic (right).

4.2 VERTICAL MODELING DOMAIN

The CAMx vertical structure is primarily defined by the vertical layers used in the WRF meteorological modeling. The WRF model employs a terrain following coordinate system defined by pressure, using multiple layer interfaces that extend from the surface to 50 mb (approximately 19 km above sea level). EPA ran WRF using 35 vertical layers. A layer averaging scheme is adopted for CAMx simulations whereby multiple WRF layers are combined into one CAMx layer to reduce the air quality model computational time. Table 4-1 displays the approach for collapsing the WRF 35 vertical layers to 25 vertical layers in CAMx for the 12km and 4km grid domains.

Table 4-1. WRF and CAMx layers and their approximate height above ground level.

CAMx Layer	WRF Layers	Sigma P	Pressure (mb)	Approx. Height (m AGL)
25	35	0.00	50.00	17,556
	34	0.05	97.50	14,780
24	33	0.10	145.00	12,822
	32	0.15	192.50	11,282
23	31	0.20	240.00	10,002
	30	0.25	287.50	8,901
22	29	0.30	335.00	7,932
	28	0.35	382.50	7,064
21	27	0.40	430.00	6,275
	26	0.45	477.50	5,553
20	25	0.50	525.00	4,885
	24	0.55	572.50	4,264
19	23	0.60	620.00	3,683
18	22	0.65	667.50	3,136
17	21	0.70	715.00	2,619
16	20	0.74	753.00	2,226
15	19	0.77	781.50	1,941
14	18	0.80	810.00	1,665
13	17	0.82	829.00	1,485
12	16	0.84	848.00	1,308
11	15	0.86	867.00	1,134
10	14	0.88	886.00	964
9	13	0.90	905.00	797
	12	0.91	914.50	714
8	11	0.92	924.00	632
	10	0.93	933.50	551
7	9	0.94	943.00	470
	8	0.95	952.50	390
6	7	0.96	962.00	311
5	6	0.97	971.50	232
4	5	0.98	981.00	154
	4	0.99	985.75	115
3	3	0.99	990.50	77
2	2	1.00	995.25	38
1	1	1.00	997.63	19

4.3 DATA AVAILABILITY

The CAMx modeling systems requires emissions, meteorology, surface characteristics, initial and boundary conditions (IC/BC), and ozone column data for defining the inputs.

4.3.1 Emissions Data

Without exception, the 2011 base year and 2023 base case emissions inventories for ozone modeling for this analysis were based on emissions obtained from the EPA's "en" modeling platform. This platform was obtained from EPA, via LADCO, in late September of 2017 and represents EPA's best estimate of all promulgated national, regional, and local control strategies, including final implementation of the seasonal EGU NOx emission budgets outlined in CSAPR.

4.3.2 Air Quality

Data from ambient monitoring networks for gas species are used in the model performance evaluation. Table 4-2 summarizes routine ambient gaseous and PM monitoring networks available in the U.S.

4.3.4 Meteorological Data

The 12km meteorological data were generated by EPA using the WRF prognostic meteorological model (EPA, 2014d). Alpine ran WRF with identical physics options and configuration for the 4km domains as was run by EPA for the 12km domain. WRF was run on a continental U.S. 12 km grid for the NAAQS NODA platform and for two subnested 4km domains as described in earlier sections.

4.3.5 Initial and Boundary Conditions Data

The lateral boundary and initial species concentrations are provided by a three dimensional global atmospheric chemistry model, GEOS-Chem (Yantosca, 2004) standard version 8-03-02 with 8-02-01 chemistry. The global GEOS-Chem model simulates atmospheric chemical and physical processes driven by assimilated meteorological observations from the NASA's Goddard Earth Observing System (GEOS-5; additional information available at: http://gmao.gsfc.nasa.gov/GEOS/ and http://wiki.seas.harvard.edu/geos-chem/index.php/GEOS-5). This model was run for 2011 with a grid resolution of 2.0 degrees x 2.5 degrees (latitude-longitude). The predictions were used to provide one-way dynamic boundary concentrations at one-hour intervals and an initial concentration field for the CAMx simulations. The 2011 boundary concentrations from GEOS-Chem will be used for the 2011 and 2023 model simulations.

The 4km domains were run as two-way interactive nests within the 12km simulation and therefore provided with updated boundary conditions at each integration time step and provided up-scale feedback from the 4km domains to the 12km domain.

Table 4-2. Overview of routine ambient data monitoring networks.

Monitoring Network	Chemical Species Measured	Sampling Period	Data Availability/Source
The Interagency Monitoring of Protected Visual Environments (IMPROVE)	Speciated PM25 and PM10 (see species mappings)	1 in 3 days; 24 hr average	
Clean Air Status and Trends Network (CASTNET)	Speciated PM25, Ozone (see species mappings)	Approximately 1-week average	http://www.epa.gov/castnet/data.html
National Atmospheric Deposition Program (NADP)	Wet deposition (hydrogen (acidity as pH), sulfate, nitrate, ammonium, chloride, and base cations (such as calcium, magnesium, potassium and sodium)), Mercury	1-week average	http://nadp.sws.uiuc.edu/
Air Quality System (AQS) or Aerometric Information Retrieval System (AIRS)	CO, NO2, O3, SO2, PM25, PM10, Pb	Typically hourly average	http://www.epa.gov/air/data/
Chemical Speciation Network (CSN)	Speciated PM	24-hour average	http://www.epa.gov/ttn/amtic/amticpm.html
Photochemical Assessment Monitoring Stations (PAMS)	Varies for each of 4 station types.		http://www.epa.gov/ttn/amtic/pamsmain.html
National Park Service Gaseous Pollutant Monitoring Network	Acid deposition (Dry; SO4, NO3, HNO3, NH4, SO2), O3, meteorological data	Hourly	http://www2.nature.nps.gov/ard/gas/netdata1.htm

5.0 MODEL INPUT PREPARATION PROCEDURES

This section summarizes the procedures used in developing the meteorological, emissions, and air quality inputs to the CAMx model for the GNS 8-hour ozone modeling on the 12 km and 4 km grids for the May through August 2011 period. Both the 12 km and 4 km CAMx modeling databases are based on the EPA "en" platform (EPA, 2017a; Page, 2017) databases. While some of the data prepared by EPA for this platform are new, many of the files are largely based on the NAAQS NODA platform. More details on the NAAQS NODA 2011 CAMx database development are provided in EPA documentation as follows:

- Technical Support Document (TSD) Preparation of Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform (EPA, 2016a).
- Meteorological Model Performance for Annual 2011 WRF v3.4 Simulation (EPA, 2014d).
- Air Quality Modeling Technical Support Document for the 2015 Ozone NAAQS Preliminary Interstate Transport Assessment (EPA, 2016b).

The modeling procedures used in the modeling are consistent with over 20 years of EPA ozone modeling guidance documents (e.g., EPA, 1991; 1999; 2005a; 2007; 2014), other recent 8-hour ozone modeling studies conducted for various State and local agencies using these or other state-of-science modeling tools (see, for example, Morris et al., 2004a,b, 2005a,b; 2007; 2008a,b,c; Tesche et al., 2005a,b; Stoeckenius et al., 2009; ENVIRON, Alpine and UNC, 2013; Adelman, Shanker, Yang and Morris, 2014; 2015), as well as the methods used by EPA in support of the recent Transport analysis (EPA, 2010; 2015b, 2016b).

5.1 METEOROLOGICAL INPUTS

5.1.1 WRF Model Science Configuration

For the 12km domain, Version 3.4 of the WRF model, Advanced Research WRF (ARW) core (Skamarock, 2008) was used for generating the 2011 simulations. Selected physics options include Pleim-Xiu land surface model, Asymmetric Convective Model version 2 planetary boundary layer scheme, KainFritsch cumulus parameterization utilizing the moisture-advection trigger (Ma and Tan, 2009), Morrison double moment microphysics, and RRTMG longwave and shortwave radiation schemes (Gilliam and Pleim, 2010). The WRF model configuration was prepared by EPA (EPA, 2014d).

The 4km domains were prepared using a nested WRF 3.9 simulation with domains shown in Figure 5-1. This domain, a 36km continental domain and a 12km domain that extends from the western border of the Dakotas off the eastern seaboard has two focused 4km domains over Lake Michigan and the Mid-Atlantic states. The WRF configuration options used in the 4km simulation were the same as those used by EPA, with the exception that no cumulus parameterization was used on the 4km domains. A summary of the 4km WRF application and evaluation are presented elsewhere (Alpine, 2018a).

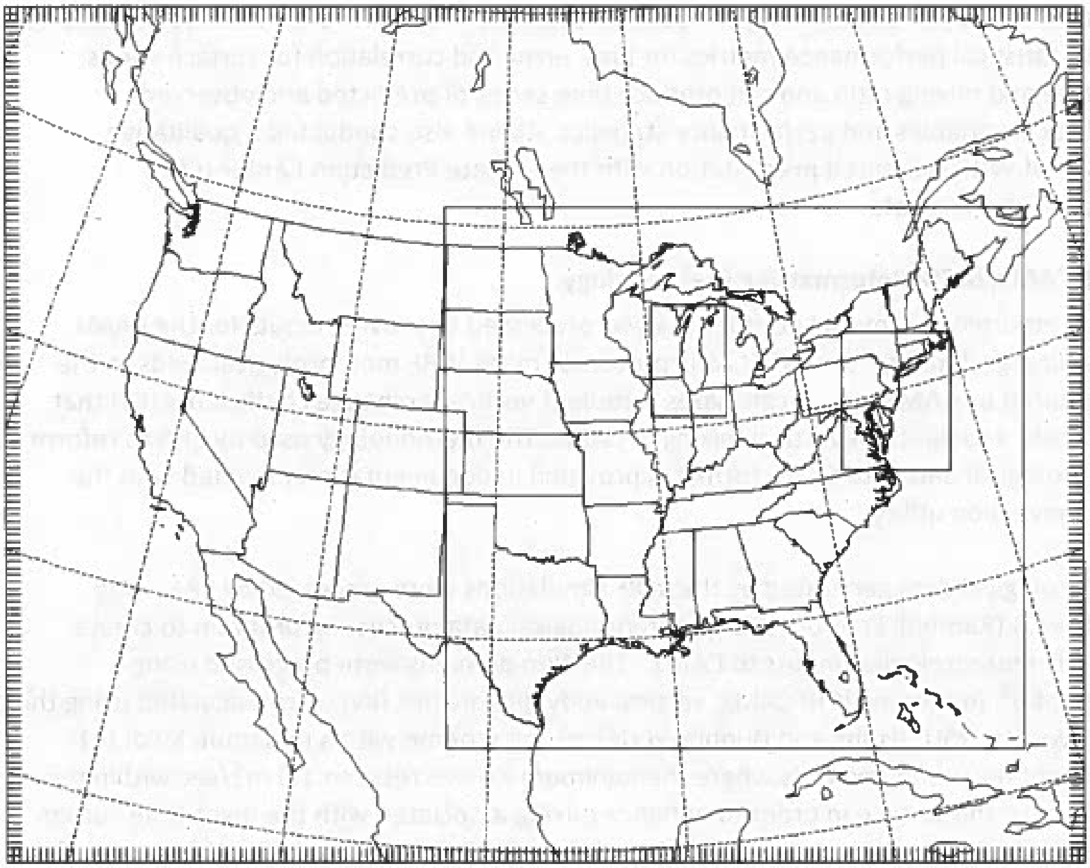

Figure 5-1. Map of WRF domains. The outer domain is the 36km CONUS domain, the large domain is the 12km domain and the inner are the Lake Michigan (left) and Mid-Atlantic (right) 4km domains.

5.1.2 WRF Input Data Preparation Procedures

For the 4km domain a summary of the WRF input data preparation procedures that were used are listed in EPA's documentation (EPA, 2014d). A summary of the 4km WRF application and evaluation are presented elsewhere (Alpine, 2018a).

5.1.3 WRF Model Performance Evaluation

The WRF model evaluation approach was based on a combination of qualitative and quantitative analyses. The quantitative analysis was divided into monthly summaries of 2-m temperature, 2-m mixing ratio, and 10-m wind speed using the boreal seasons to help generalize the model bias and error relative to a set of standard model performance benchmarks. The qualitative approach was to compare spatial plots of model estimated monthly total precipitation with the monthly PRISM precipitation. The WRF model performance evaluation for the 12km domain is provided in EPA's documentation (EPA, 2014d). A separate MPE for the 4km WRF simulations was prepared by Alpine (Alpine, 2018a). This evaluation is comprised of a quantitative and qualitative evaluation of WRF generated fields. The quantitative model performance evaluation of WRF using surface meteorological measurements was performed using the publicly available METSTAT[8] evaluation tool. METSTAT calculates statistical performance metrics for bias, error and correlation for surface winds, temperature and mixing ratio and can produce time series of predicted and observed meteorological variables and performance statistics. Alpine also conducted a qualitative comparison of WRF estimated precipitation with the Climate Prediction Center (CPC) retrospective analysis data.

5.1.4 WRFCAMx/MCIP Reformatting Methodology

The WRF meteorological model output data was processed to provide inputs for the CAMx photochemical grid model. The WRFCAMx processor maps WRF meteorological fields to the format required by CAMx. It also calculates turbulent vertical exchange coefficients (Kv) that define the rate and depth of vertical mixing in CAMx. The methodology used by EPA to reform the meteorological data into CAMx format is provided in documentation provided with the wrfcamx conversion utility.

The meteorological data generated by the WRF simulations were processed by EPA using WRFCAMx v4.3 (Ramboll Environ, 2014) meteorological data processing program to create model-ready meteorological inputs to CAMx. The 4km domains were processed using WRFCAMx v4.6[9]. In running WRFCAMx, vertical eddy diffusivities (Kv) were calculated using the Yonsei University (YSU) (Hong and Dudhia, 2006) mixing scheme with a minimum Kv of 0.1 m2/sec except for urban grid cells where the minimum Kv was reset to 1.0 m2/sec within the lowest 200 m of the surface in order to enhance mixing associated with the night time "urban heat island" effect. In addition, all domains used the subgrid convection and subgrid stratoform stratiform cloud options in our wrfcamx.

5.2 EMISSION INPUTS

5.2.1 Available Emissions Inventory Datasets

EPA's 2011 base year and 2023 future year emission inventories from the "en" modeling platform (EPA, 2017a) were used for all categories without exception.

5.2.2 Development of CAMx-Ready Emission Inventories

CAMx-ready emission inputs were generated by EPA mainly by the SMOKE and BEIS emissions models. CAMx requires two emission input files for each day: (1) low level gridded emissions that are emitted directly into the first layer of the model from sources at the surface with little or no plume rise; and (2) elevated point sources (stacks) with plume rise calculated from stack parameters and meteorological conditions. For this analysis, CAMx was operated using version 6 revision 4 of the Carbon Bond chemical mechanism (CB6r4).

Additional emission modeling was not required for the 12km simulation as the 2023en platform was provided to Alpine in pre-merged CAMx ready format. For the base and future year simulations without source apportionment, the 12km emissions were nested onto the 4km grid projections using the built in CAMx "flexi-nesting" capability. Flexi-nesting provides a

8 http://www.camx.com/download/support-software.aspx
9 http://www.camx.com/getmedia/7f3ee9dc-d430-42d6-90d5-dedb3481313f/wrfcamx-11jul17.tgz

computationally efficient framework to evenly divide the low level emissions from the 12km grid onto the nine (9) 4km grids. No flexi-nesting is necessary for elevated sources since the CAMx model injects elevated sources into the highest resolution grid for all domains.

5.2.2.1 Episodic Biogenic Source Emissions

Biogenic emissions were generated by EPA using the BEIS biogenic emissions model within SMOKE. BEIS uses high resolution GIS data on plant types and biomass loadings and the WRF surface temperature fields, and solar radiation (modeled or satellite-derived) to develop hourly emissions for biogenic species on the 12 km grids. BEIS generates gridded, speciated, temporally allocated emission files.

5.2.2.2 Point Source Emissions

2011 point source emissions were from the 2011 "en" modeling platform. Point sources were developed in two categories: (1) major point sources with Continuous Emissions Monitoring (CEM) devices; and (2) point sources without CEMs. For point sources with continuous emissions monitoring (CEM) data, day-specific hourly NOX and SO2 emissions were used for the 2011 base case emissions scenario. The VOC, CO and PM emissions for point sources with CEM data were based on the annual emissions temporally allocated to each hour of the year using the CEM hourly heat input. The locations of the point sources were converted to the LCP coordinate system used in the modeling. They were processed by EPA using SMOKE to generate the temporally varying (i.e., day-of-week and hour-of-day) speciated emissions needed by CAMx, using profiles by source category from the EPA "en" modeling platform.

5.2.2.3 Area and Non-Road Source Emissions

2011 area and non-road emissions were from the 2011 "en" modeling platform. The area and non-road sources were spatially allocated to the grid using an appropriate surrogate distribution (e.g., population for home heating, etc.). The area sources were temporally allocated by month and by hour of day using the EPA source-specific temporal allocation factors. The SMOKE source-specific CB6 speciation allocation profiles were also used.

5.2.2.4 Wildfires, Prescribed Burns, Agricultural Burns

Fire emissions in 2011NEIv2 were developed based on Version 2 of the Satellite Mapping Automated Reanalysis Tool for Fire Incident Reconciliation (SMARTFIRE) system (Sullivan, et al., 2008). SMARTFIRE2 was the first version of SMARTFIRE to assign all fires as either prescribed burning or wildfire categories. In past inventories, a significant number of fires were published as unclassified, which impacted the emissions values and diurnal emissions pattern. Recent updates to SMARTFIRE include improved emission factors for prescribed burning.

5.2.2.5 QA/QC and Emissions Merging

EPA processed the emissions by major source category in several different "streams", including area sources, on-road mobile sources, non-road mobile sources, biogenic sources, non-CEM point sources, CEM point sources using day-specific hourly emissions, and emissions from fires. Separate Quality Assurance (QA) and Quality Control (QC) were performed for each stream of emissions processing and in each step following the procedures utilized by EPA. SMOKE includes advanced quality assurance features that include error logs when emissions are dropped or added. In addition, we generated visual displays that included spatial plots of the hourly emissions for each major species (e.g., NOX, VOC, some speciated VOC, SO2, NH3, PM and CO).

Scripts to perform the emissions merging of the appropriate biogenic, on-road, non-road, area, low-level, fire, and point emission files were written to generate the CAMx-ready two-dimensional day and domain-specific hourly speciated gridded emission inputs. The point source and, as available elevated fire, emissions were processed into the day-specific hourly speciated emissions in the CAMx-ready point source format.

The resultant CAMx model-ready emissions were subjected to a final QA using spatial maps to assure that: (1) the emissions were merged properly; (2) CAMx inputs contain the same total emissions; and (3) to provide additional QA/QC information.

5.2.3 Use of the Plume-in-Grid (PiG) Subgrid-Scale Plume Treatment

Consistent with the EPA 2011 modeling platform, no PiG subgrid-scale plume treatment will be used.

5.2.4 Future-Year Emissions Modeling

Future-year emission inputs were generated by processing the 2023 emissions data provided with EPA's "en" modeling platform without exception.

5.3 PHOTOCHEMICAL MODELING INPUTS

5.3.1 CAMx Science Configuration and Input Configuration

Version of CAMx (Version 6.40) was used in the GNS ozone modeling. The CAMx model setup used is defined by EPA in its air quality modeling technical support document (EPA, 2016b, 2017).

6.0 MODEL PERFORMANCE EVALUATION

The CAMx 2011 base case model estimates are compared against the observed ambient ozone and other concentrations to establish that the model is capable of reproducing the current year observed concentrations so it is likely a reliable tool for estimating future year ozone levels.

6.1 MODEL PERFORMACE EVALUATION

6.1.1 Overview of EPA Model Performance Evaluation Recommendations

EPA current (EPA, 2007) and draft (EPA, 2014e) ozone modeling guidance recommendations for model performance evaluation (MPE) describes a MPE framework that has four components:

- Operation evaluation that includes statistical and graphical analysis aimed at determining how well the model simulates observed concentrations (i.e., does the model get the right answer).
- Diagnostic evaluation that focuses on process-oriented evaluation and whether the model simulates the important processes for the air quality problem being studied (i.e., does the model get the right answer for the right reason).
- Dynamic evaluation that assess the ability of the model air quality predictions to correctly respond to changes in emissions and meteorology.
- Probabilistic evaluation that assess the level of confidence in the model predictions through techniques such as ensemble model simulations.

EPA's guidance recommends that "At a minimum, a model used in an attainment demonstration should include a complete operational MPE using all available ambient monitoring data for the base case model simulations period" (EPA, 2014, pg. 63). And goes on to say "*Where practical, the MPE should also include some level of diagnostic evaluation.*" EPA notes that there is no single definite test for evaluation model performance, but instead there are a series of statistical and graphical MPE elements to examine model performance in as many ways as possible while building a "weight of evidence" (WOE) that the model is performing sufficiently well for the air quality problem being studied.

6.1.2 MPE Results

Because this 2011 ozone modeling is using a CAMx 2011 modeling database developed by EPA, we include by reference the air quality modeling performance evaluation as conducted by EPA (EPA, 2016b) on the national 12km domain. Alpine additionally conducted an MPE on the 4km domains (Alpine, 2018b) that generated results consistent with the 12km simulation and configuration.

In summary, EPA conducted an operational model performance evaluation for ozone to examine the ability of the CAMx v6.32 and v.6.40 modeling systems to simulate 2011 measured concentrations. This evaluation focused on graphical analyses and statistical metrics of model predictions versus observations. Details on the evaluation methodology, the calculation of performance statistics, and results are provided in Appendix A of that report.

Overall, the ozone model performance statistics for the CAMx v6.32 2011 simulation are similar to those from the CAMx v6.20 2011 simulation performed by EPA for the final CSAPR Update. The 2011 CAMx model performance statistics are within or close to the ranges found in other recent peer-reviewed applications (Simon et al, 2012). As described in Appendix A of the AQ TSD, the predictions from the 2011 modeling platform correspond closely to observed concentrations in terms of the magnitude, temporal fluctuations, and geographic differences for 8-hour daily maximum ozone.

Alpine conducted a separate operational model performance evaluation for the two 4km modeling domains (Alpine, 2018b) and found that 4km domains for the 2011en platform performed similarly to EPA's 12km MPE that fell within or close to the ranges found in other recent peer-reviewed applications (Simon et al, 2012). Thus, the model performance results demonstrate the scientific credibility of the two 4km domains using the 2011 modeling platform chosen and used for this analysis. These results provide confidence in the ability of the modeling platform to provide a reasonable projection of expected future year ozone concentrations and contributions over the two 4km grids.

7.0 FUTURE YEAR MODELING

This chapter discusses the future year modeling used in the GNS 8-hour ozone modeling effort.

7.1 FUTURE YEAR TO BE SIMULATED

As discussed in Section 1, to support the 2008 and 2015 ozone NAAQS preliminary interstate transport assessment, EPA conducted air quality modeling to project ozone concentrations at individual monitoring sites to 2023 and to estimate state-by-state contributions to those 2023 concentrations. The projected 2023 ozone concentrations were used to identify ozone monitoring sites that are projected to be nonattainment or have maintenance problems for the two ozone NAAQS in 2023 and for which upwind states have been identified as significant contributors.

7.2 FUTURE YEAR GROWTH AND CONTROLS

In September 2017, EPA released the revised "en" modeling platform that was the source for the 2023 future year emissions in this analysis. This platform has been identified by EPA as the base case for compliance with the final CSAPR update seasonal EGU NOx emission budgets. Additionally, there were several emission categories and model inputs/options that were held constant at 2011 levels as follows:

- Biogenic emissions.
- Wildfires, Prescribed Burns and Agricultural Burning (open land fires).
- Windblown dust emissions.
- Sea Salt.
- 36 km CONUS domain Boundary Conditions (BCs).
- 2011 12 km meteorological conditions.
- All model options and inputs other than emissions.

The effects of climate change on the future year meteorological conditions were not accounted. It has been argued that global warming could increase ozone due to higher temperatures producing more biogenic VOC and faster photochemical reactions (the so called climate penalty). However, the effects of inter-annual variability in meteorological conditions will be more important than climate change given the 12 year difference between the base (2011) and future (2023) years. It has also been noted that the level of ozone being transported into the U.S. from Asia has also increased.

7.3 FUTURE YEAR BASELINE AIR QUALITY SIMULATIONS

A 2023 future year base case CAMx simulation was conducted and 2023 ozone design value projection calculations were made based on EPA's latest ozone modeling guidance (EPA, 2014e) for the 12US2 and two 4km modeling domains in this analysis.

7.3.1 Identification of Future Nonattainment and Maintenance Receptors

The ozone predictions from the 2011 and 2023 CAMx model simulations were used to project 2009-2013 average and maximum ozone design values to 2023 following the approach described in the EPA's draft guidance for attainment demonstration modeling (US EPA, 2014b). Using the approach in the final CSAPR Update, we evaluated the 2023 projected average and maximum design values in conjunction with the most recent measured ozone design values (i.e., 2014-2016) to identify sites that may warrant further consideration as potential nonattainment or maintenance sites in 2023.

If the approach in the CSAPR Update is applied to evaluate the projected design values, those sites with 2023 average design values that exceed the NAAQS (i.e., 2023 average design values of 71 ppb or greater) and that are currently measuring nonattainment would be considered to be nonattainment receptors in 2023. Similarly, with the CSAPR Update approach, monitoring sites with a projected 2023 maximum design value that exceeds the NAAQS would be projected to be maintenance receptors in 2023. In the CSAPR Update approach, maintenance-only receptors include both those monitoring sites where the projected 2023 average design value is below the NAAQS, but the maximum design value is above the NAAQS, and monitoring sites with projected 2023 average design values that exceed the NAAQS, but for which current design values based on measured data do not exceed the NAAQS.

As documented in EPA's March 2018 technical memorandum (Tsirigotis, 2018), EPA used results of CAMx v6.40 to model emissions in 2011 and 2023 to project base period 2009-2013 average and maximum ozone design values to 2023 at monitoring sites nationwide. In projecting these future year design values, EPA applied its own modeling guidance, which recommends using model predictions from the "3x3" array of grid cells surrounding the location of the monitoring site. In response to comments submitted on the January 2017 NODA and other analyses, EPA also projected 2023 design values based on a modified version of the "3x3" approach for those monitoring sites located in coastal areas (Tsirigotis, 2018). This modeling was intended as an alternate approach to addressing complex meteorological monitor locations without having to rerun the simulations on finer grid scales.

Alpine's applied approach in developing and using 4km grid domains further followed EPA's guidance recommendation that "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)." (EPA, 2014e)

We used the finer grid resolution and the Software for the Modeled Attainment Test - Community Edition[10] (SMAT-CE) tool consistent with EPA's 12km attainment demonstration modeling methods calculating relative response factors and "3x3" neighborhoods (EPA, 2014e). Alpine also prepared 2023 projected average and maximum design values in conjunction with the most recent measured ozone design values (2014-2016) to identify sites in these 4km domains that may warrant further consideration as potential nonattainment or maintenance sites in 2023.

After applying the approach outlined in the final CSAPR update (and described above) to evaluate the projected design values from the 4km analysis, we developed a list of nonattainment and maintenance monitors located within these two eastern 4km domains resulting from the approach. Modeled nonattainment monitors defined using Alpine's 4km

[10] https://www.epa.gov/scram/photochemical-modeling-tools

simulation are provided in Table 7-1 along with their calculated 2023 average and maximum design values from both EPA's "no water" calculation approach and Alpine's 4km simulation and most current 2014-2016 design values. Similarly, Table 7-2 presents the modeled maintenance monitors with their calculated average and maximum design values from both simulations and the most current 2014-2016 design value data. Monitors originally designated as nonattainment or maintenance by EPA using their "no water" calculation and found to be neither nonattainment or maintenance using Alpine's 4km modeling are presented in Table 7-3. A full list of monitor locations and modeled average and maximum ozone design values for the 4km domain modeling is provided in Appendix A of this report.

Table 7-1. Alpine 4km Modeling-identified nonattainment monitors in the 4km domains.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		Alpine 4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
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 7-2. Alpine 4km Modeling-identified maintenance monitors in the 4km domains.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		Alpine 4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
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

Table 7-3. Alpine 4km modeling-identified attainment monitors in the 4km domains previously identified by EPA as nonattainment or maintenance.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		Alpine 4km Modeling		2014-2016 DV
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	
360810124	NY	Queens	78.0	70.2	72.0	68.0	69.8	69
550790085	WI	Milwaukee	80.0	71.2	73.0	67.4	70.5	71

The procedures for calculating projected 2023 average and maximum design values are described in Section 3.2 of EPA's air quality technical support document (EPA, 2016b). The only noted differences are that Alpine used 4km modeling results, compared to EPA's 12km, and did not remove "no water" cells from the calculation as further described in the March 2018 memorandum.

8.0 OZONE CONTRIBUTION MODELING

Alpine further performed region, source category-level ozone source apportionment modeling using the CAMx Ozone Source Apportionment Technology (OSAT) technique to provide information regarding the expected contribution of 2023 base case NOx and VOC emissions from each category within each region to projected 2023 concentrations at downwind air quality monitors. This OSAT modeling was conducted for the Mid-Atlantic 4km region but not the Lake Michigan 4km domain.

In the source apportionment model run, we tracked the ozone formed from each of the following contribution categories (i.e., "tags):

- EGUs – NOx and VOC emissions from each region tracked individually from electric generating units (EGUs);
- Non-EGU Point Sources - NOx and VOC emissions from each region tracked individually from elevated source non-EGU point sources;
- Nonroad - NOx and VOC emissions from each region tracked individually nonroad mobile, marine, aircraft, and railroad sources;
- Area - NOx and VOC emissions from each region tracked individually from non-point stationary sources;
- Onroad - NOx and VOC emissions from each region tracked individually from onroad mobile sources;
- Biogenics - biogenic NOX and VOC emissions from each region;
- Boundary Concentrations – concentrations transported into the modeling domain from the lateral boundaries;
- Canada and Mexico – NOx and VOC anthropogenic emissions from sources in the portions of Canada and Mexico included in the modeling domain (contributions from each country were not modeled separately; both are included as a single tag);
- Fires – combined emissions from wild and prescribed fires domain-wide (i.e., not by individual region); and
- Offshore – combined emissions from offshore marine vessels and offshore drilling platforms (i.e., not by individual region).

The contribution modeling conducted for this analysis provided contribution to ozone from source regions, informed by MOG's 12km OSAT modeling and displayed in Figure 8-1, for each noted source category individually. In contrast to EPA's contribution modeling using the OSAT/Anthropogenic Precursor Culpability Analysis (APCA) technique, Alpine's OSAT technique assigns ozone formed from biogenic VOC and NOx emissions that reacts with anthropogenic NOx and VOC to the biogenic category. EPA's technique of using OSAT/APCA assigns to the anthropogenic emission total the combined ozone formed from reactions between biogenic VOC and NOx with anthropogenic NOx and VOC. Alpine's position on the selection of the OSAT technique has been documented elsewhere[11].

[11] http://midwestozonegroup.com/files/SourceApportionmentScenarioModelingResultsandComparisontothe2017CrossStateAirPollutionRuleModelingPlatform.pdf

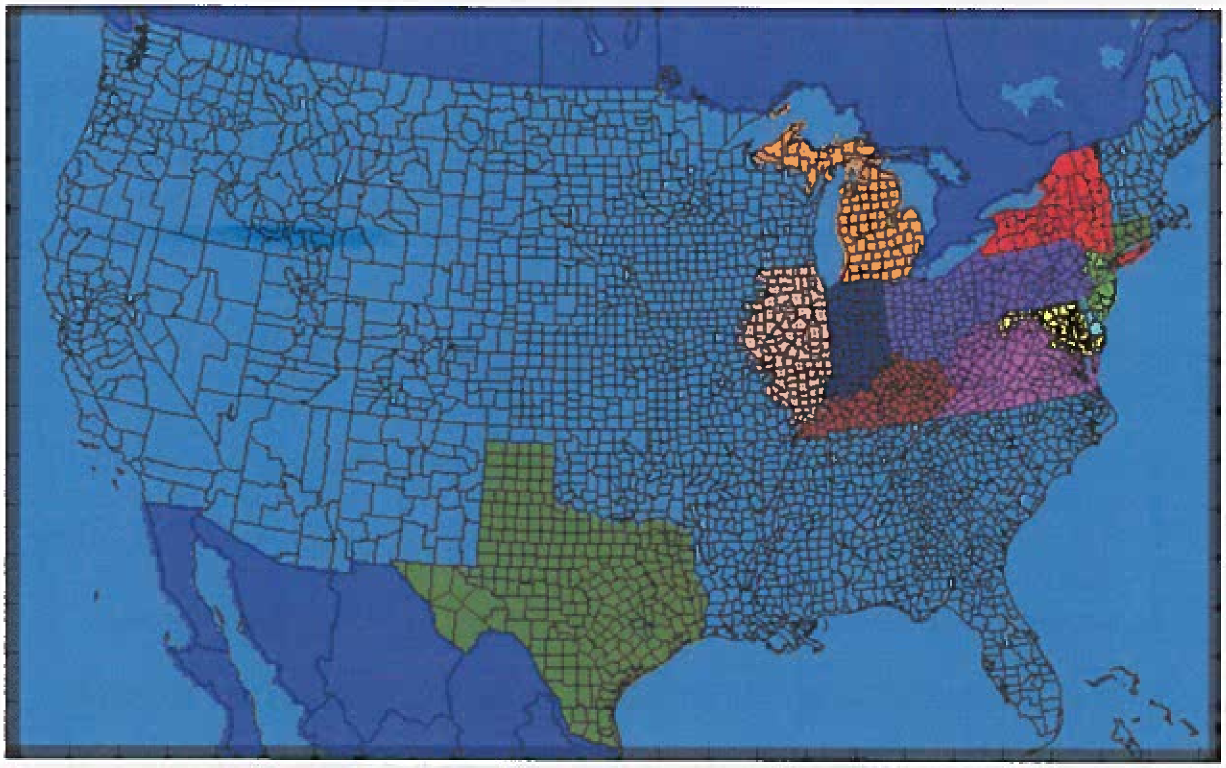

Figure 8-1. OSAT regions for Mid-Atlantic 4km source contribution modeling.

Consistent with EPA's approach, the 4km CAMx OSAT model run was performed for the period May 1 through September 30 using the projected 2023 base case emissions and 2011 meteorology for this time period. The hourly contributions from each tag were processed to calculate an 8-hour average contribution metric. Alpine used EPA's SMAT-CE tool and top ten future year modeled days (across the "3x3" neighborhood for each monitor) to develop source apportioned concentration files from which contribution metrics were calculated.

The following approach was used in preparing the SMAT-CE input files, running the SMAT-CE software, and analysing the results:

1. Ozone SMAT was run for the 2023 future case using base case 2011 and future year 2023 full model SMAT input files. This prepares the 2023 output files which were used as the basis for comparison with the "tagged" SMAT-CE output described below.
2. Alpine then created future year, tag-specific SMAT-CE input files by subtracting the 2023 hourly tags from the hourly full model concentration files. This simple arithmetic was implemented using standard IOAPI utility programs and generated regional, source category-based tagged SMAT input files. Once the hourly files were created, the same processing stream as was used in Step 1 was used create the tagged SMAT-CE input files from the hourly model concentration files.
3. SMAT-CE was then run (in batch mode) for each future year tag-specific input file generated in Step 2 using the base case 2011 SMAT-CE input file as the base year. In these runs, SMAT-CE was configured identically as in Step 1 except for using the future

year "tagged" input files. These individual runs generated SMAT-CE output files that contain the forecasted ozone data absent the tagged contribution.

4. The ozone concentration (on the 10 highest modeled days for the future year) for each tag was calculated from the SMAT-CE future year base case output file and each of the tag output files. The ozone contribution impacts of each tag will be computed by subtracting the SMAT-CE output absent the tag (created in Step 3) from the full model SMAT output file (created in Step 1).
5. The aggregate of all the individual anthropogenic "tagged" contributions were added to develop a state-total contribution concentration to compare against significant contribution thresholds (e.g., 1% of NAAQS).

This process for calculating the contribution metric uses the contribution modeling outputs in a "relative sense" to apportion the projected 2023 average design value at each monitoring location into contributions from each individual tag and is consistent with the updated methodology documented in EPA's March 2018 memorandum. It is important to note that Alpine's 4km contribution results utilize the updated approach described by EPA in basing the average future year contribution on future year modeled values instead of historically used base year modeled values.

8.1 OZONE CONTRIBUTION MODELING RESULTS

The contributions from each tagged state's anthropogenic contribution to individually identified Mid-Atlantic 4km domain nonattainment and maintenance sites are provided in Tables 8-1 and 8-2, respectively.

The EPA has historically found that the 1 percent threshold is appropriate for identifying interstate transport linkages for states collectively contributing to downwind ozone nonattainment or maintenance problems because that threshold captures a high percentage of the total pollution transport affecting downwind receptors.

Based on the approach used in CSAPR and the CSAPR Update, upwind states that contribute ozone in amounts at or above the 1 percent of the NAAQS threshold to a particular downwind nonattainment or maintenance receptor would be considered to be "linked" to that receptor in step 2 of the CSAPR framework for purposes of further analysis in step 3 to determine whether and what emissions from the upwind state contribute significantly to downwind nonattainment and interfere with maintenance of the NAAQS at the downwind receptors. For the 2008 ozone NAAQS, the value of a 1 percent threshold would be 0.75 ppb. For the 2015 ozone NAAQS the value of a 1 percent threshold would be 0.70 ppb.

Table 8-1. Significant contribution (ppb) from region-specific anthropogenic emissions to 4km determined nonattainment monitor.

			4km Modeling - 8hr Ozone Concentration (ppb)																			
Monitor	State	County	2011 DVb	2023 DVf (Avg)	2023 DVf (Max)	CT	DE	NY	NJ	MD	VA/DC	PA	WV	OH	MI	KY	IN	IL	TX	Can/Mex	BC	Other
240251001	MD	Harford	90.0	71.1	73.5	0.00	0.02	0.01	0.02	23.97	3.92	2.70	2.52	3.02	0.27	2.07	1.81	1.05	0.90	0.43	11.34	17.1

Table 8-2. Significant contribution (ppb) from region-specific anthropogenic emissions to 4km determined maintenance monitors.

			4km Modeling - 8hr Ozone Concentration (ppb)																			
Monitor	State	County	2011 DVb	2023 DVf (Avg)	2023 DVf (Max)	CT	DE	NY	NJ	MD	VA/DC	PA	WV	OH	MI	KY	IN	IL	TX	Can/Mex	BC	Other
90010017	CT	Fairfield	80.3	69.2	71.5	6.36	0.32	10.55	5.74	1.14	1.01	3.30	0.52	2.09	1.13	0.57	0.87	1.02	0.65	0.98	12.48	20.5
90013007	CT	Fairfield	84.3	69.7	73.6	5.19	0.32	9.56	3.74	1.11	1.00	3.07	0.44	2.20	1.32	0.52	0.87	1.04	0.69	1.39	12.89	24.4
90019003	CT	Fairfield	83.6	69.9	72.7	4.97	0.33	10.40	5.23	1.20	1.06	3.51	0.53	2.35	1.28	0.64	0.95	1.09	0.71	1.29	12.74	21.6
90099002	CT	New Haven	85.7	70.3	73.0	9.60	0.36	10.13	2.36	0.87	0.72	2.55	0.35	1.77	1.11	0.42	0.76	0.81	0.57	1.49	12.59	23.9
90110124	CT	New London	80.3	68.2	71.3	9.89	0.16	10.85	1.91	0.54	0.47	2.13	0.32	1.88	1.09	0.44	0.86	0.88	0.61	1.36	11.97	22.8
340150002	NJ	Gloucester	84.3	68.8	71.0	0.00	4.67	0.03	4.51	3.89	1.45	8.29	1.63	4.07	0.59	1.69	1.98	1.54	1.06	0.62	13.77	19.0
360850067	NY	Richmond	81.3	69.6	71.0	0.15	0.40	3.19	11.59	1.39	1.18	5.73	0.71	2.97	1.15	0.93	1.29	1.34	0.89	0.85	14.54	21.3
361030002	NY	Suffolk	83.3	70.7	72.1	0.95	0.49	10.10	7.84	1.57	1.43	4.32	0.65	2.34	1.20	0.64	0.93	1.15	0.79	0.90	14.60	20.8
421010024	PA	Philadelphia	83.3	68.0	71.0	0.00	0.90	0.08	2.44	1.69	0.96	14.70	1.21	4.05	0.88	1.53	2.05	1.75	1.19	0.76	15.31	18.5

9.0 SELECTED SIP REVISION APPROACHES

EPA has established a four-step framework to address the requirements of the good neighbor provision for ozone NAAQS in preparing SIP revisions;

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 emissions reductions.

EPA also notes (Tsirogotis, 2018) that in applying this framework or other approaches consistent with the CAA, various analytical approaches may be used to assess each step. EPA also notes that, in developing their own rules, states have the flexibility to follow the familiar four-step transport framework or alternative frameworks, so long as their chosen approach has adequate technical justification and is consistent with the requirements of the CAA. EPA then goes on to provide a list of potential flexibilities that states may consider during the SIP revision process.

This section identifies certain alternate approaches using the 4km data generated in this modeling analysis or other 12km data generated by EPA that states may wish to consider in the development of their GNS revisions for the 2008 or 2015 ozone NAAQS. Certain of these approaches are based on the 4km data generated in this modeling analysis. In cases in which 4 km data is not available, the alternatives presented are based on EPA's 12 km modeing data. For additional discussion of alternative approaches reflecting the types of flexibilities mentioned in EPA's March 27, 2018 memo (Tsirogotis, 2018), including an alternative approach for an upwind state to satisfy its responsibility to a downwind maintenance areas, see MOG's comments on that memo dated April 30, 2018 which are attached as Appendix B. Also attached as Appendix C is a presentation that provides specific examples on how individual elements described below could be used in combination to address an upwind state's obligation to meeting the good neighbor provisions of their SIP.

9.1 RELIANCE UPON ALTERNATIVE, EQUALLY CREDIBLE, MODELING DATA

EPA's March 27, 2018, sets forth both the agency's "3 x 3" modeling data first published in its memorandum of October 27, 2017, as well as its modified "No Water" approach. In addition to these two EPA data sets, this document provides 4km modeling results (using the "3 x 3" approach, while MOG has sponsored 12US2 modeling data consistent with EPA's "3 x 3" modeling based upon a 12km grid which has been suggested by EPA in its proposed approval of the 2008 ozone NAAQS Good Neighbor SIP for Kentucky.

Should EPA determine that each of these data sets is of "SIP quality" and meets the regulatory requirements necessary to be used by a state in demonstrating attainment with the NAAQS, a state should be permitted to select from among these data to represent conditions best representative of the current state-of-science.

As an example, we provide a comparison of the March 2018 "no water" data presented by EPA compared to the 4km data documented in this report. Looking at the list of nonattainment and maintenance monitors in the New York metro area (specifically New York and Connecticut), we can see that selection of the finer grid resolution 4km results shows a demonstrated attainment (2023 average DV < 71 ppb) of the 2015 ozone NAAQS at all monitors in these two states. It is recognized that the three monitors identified by EPA as nonattainment become reclassified as maintenance using the 4km results.

Table 9-1. Alternate modeling results comparison for New York and Connecticut monitors.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		Alpine 4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
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
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

In this instance, the selection of an equally credible modeling platform and projected design values would demonstrate modeled attainment of the NAAQS and prevent an upwind state from having to go beyond Step 1 of the four-step framework. The uncertainty involved with selecting a single modeling simulation to base such significant policy decisions, such as Good Neighbor demonstrations, should be weighed against the opportunity to select other platforms and simulations with consideration given to state methods that rely on multiple sources of data when found to be of technical merit.

9.2 NORTH AMERICAN INTERNATIONAL ANTHROPOGENIC CONTRIBUTION

EPA includes in its March 27, 2018 memorandum:

> *"EPA recognizes that a number of non-U.S. and non-anthropogenic sources contribute to downwind nonattainment and maintenance receptors."*

In source contribution modeling conducted both by Alpine and EPA, the relative impact contributions of anthropogenic emissions located within the 36km modeling domain are explicitly tracked and reported. Using these values provided in the OSAT or OSAT/APCA source contribution results, states seeking to avoid prohibited overcontrol may wish to consider removing that portion of the projected design value that is explicitly attributed to international anthropogenic contribution. At multiple monitors in the eastern U.S., this value may be enough to demonstrate attainment with the 2008 or 2015 ozone NAAQS.

As an example, see the calculations below for the Harford, MD monitor using both 12km OSAT/APCA results from the March 2018 memorandum and 4km OSAT results from this analysis.

Table 9-2. Harford, MD monitor (240151001) design values for 2011 base case and two 2023 projection year scenarios with and without Canadian and Mexican contribution.

Scenario	MDA8 DV (ppb)	2023 Can / Mex Contribution (ppb)	2023 DV (ppb) w/o Can/Mex
2011 Base Year	90.0	-	-
2023 EPA 12km APCA	70.9	0.79	70.1
2023 MOG 4km OSAT	71.1	0.43	70.6

Using this air quality monitor as an example, it can be seen that by accounting for the anthropogenic contribution of emissions from Canada and Mexico (tracked as a single tag), both scenarios demonstrate attainment with the 2015 ozone NAAQS (<71 ppb). This step would allow a state to stop at Step 1 of the four-factor process.

9.3 RELIEF FROM ADDITIONAL PERCENTAGE OF BOUNDARY CONDITIONS

The EPA, in its March 2018 memorandum, notes that in an effort to fully understand the role of background ozone levels and to appropriately account for international transport, "EPA recognizes that a number of non-U.S. and non-anthropogenic sources contribution to downwind nonattainment and maintenance receptors." Under Step 3 of the four-step process, states could take the opportunity to request relief from a portion of the source apportioned amounts from the boundary condition category.

It is recognized that the boundary condition category is not only reflective of international anthropogenic emission contribution to modeled nonattainment or maintenance monitor concentrations and is additionally comprised of international biogenic emissions, stratospheric concentrations of ozone, ozone from methane, and even emissions created within the U.S. boundaries that leave the modeling domain and are reentrained during the modeling episode. However, assuming that some percentage of these boundary conditions are from international anthropogenic sources, a state may reasonably consider accounting for these contributions using the same mechanism for relief as described in the previous section.

As an example, consider some selected monitors designated by EPA in its March 2018 memorandum as nonattainment (Table 9-3). Using OSAT/APCA contribution results for the four noted monitors, contributions from Mexico and Canada range between 0.44 and 1.24 ppb and boundary conditions have modeled contribution of between 17.53 and 24.67 ppb. Should a state request relief from the Mexican and Canadian contribution (as noted above) and request relief from a reasonable proportion of the boundary condition values (presumed to be of international anthropogenic origin), all of these monitors could also demonstrate attainment with the 70 ppb NAAQS.

Table 9-3. International Contribution to Select Nonattainment Monitors and Anticipated Average Ozone Design Values (ppb) with Reasonable Proportion of Boundary Condition Relief.

Site ID	State	County	2023 Avg DV	Mex/Can Contrib.	Boundary Contrib.	2023 DV 2% Relief	2023 DV 5% Relief	2023 DV 7% Relief	2023 DV 11% Relief
480391004	Texas	Brazoria	74.0	0.44	24.02	73.0	72.3	71.8	70.9
484392003	Texas	Tarrant	72.5	1.24	24.38	70.7	70.0	69.5	68.5
482011039	Texas	Harris	71.8	0.47	24.67	70.8	70.0	69.6	68.6
551170006	Wisconsin	Sheboygan	72.8	0.69	17.53	71.7	71.2	70.8	70.1

In this particular example, assuming a reasonable 2% of the boundary conditions as international anthropogenic contribution, two of the three Texas monitors show demonstrated attainment with the 2015 NAAQS. Assuming a 7% relief of the boundary conditions as international anthropogenic contribution, the Sheboygan, Wisconsin monitor joins the two Texas monitors in demonstrated attainment. And with an assumption that 11% of the contribution from modeled boundary conditions could be attributed to international anthropogenic contribution to the Texas monitors, all four of the selected EPA-identified nonattainment monitors would show attainment with the 70 ppb NAAQS.

Additionally, should a state like Wisconsin choose to conduct source apportionment studies on the 4km domain, their starting point for the calculation would begin with an average 2023 DV of 71.7 ppb; only 0.8 ppb from attainment. One may reasonably assume that a 4km source attribution analysis would show an approximately consistent amount of Canadian/Mexican and boundary condition contribution as the 12km results above, requiring an even lower (or no) percentage of boundary condition relief to demonstrate modeled attainment.

9.4 ALTERNATE SIGNIFICANCE THRESHOLD

Some states argue that significant contribution threshold of 1% of NAAQS (0.70 ppb for 2015 ozone NAAQS) value is arbitrary and has never been supported by any scientific argument. Concerns have been raised that this value is more stringent than current 2016 EPA Significant Impact Level (SIL) guidance of 1.0 ppb which is designed as an individual source or group of sources' contribution limit (Boylan, 2018). There is a potential for states to submit SIP revision citing SIL as acceptable for total state anthropogenic contribution threshold. In these cases, under Step 2 of the four-step process, states may wish to review their contribution to downwind receptors and request relief from the 1% threshold in lieu of using an alternate value. In the example below, we review Texas nonattainment and maintenance monitors as defined by EPA's March 2018 memo. In the Table 9-4, we have also included the OSAT/APCA contributions documented by EPA in that memo.

Table 9-4. EPA 12km OSAT/APCA contributions to Texas nonattainment and maintenance monitors. Blue + orange cells indicate states significantly contributing with 1% threshold. Orange cells indicate states significantly contributing with > 1ppb threshold.

			Ozone DV (ppb)		EPA OSAT/APCA Significant Contribution (ppb)					
Site ID	State	County	2023 Avg DV	2023 Max DV	AR	IL	LA	MS	MO	OK
480391004	Texas	Brazoria	74.0	74.9	0.90	1.00	3.80	0.63	0.88	0.90
484392003	Texas	Tarrant	72.5	74.8	0.78	0.29	1.71	0.27	0.38	1.71
482011039	Texas	Harris	71.8	73.5	0.99	0.88	4.72	0.79	0.88	0.58
482010024	Texas	Harris	70.4	72.8	0.29	0.34	3.06	0.50	0.38	0.20
481210034	Texas	Denton	69.7	72.0	0.58	0.23	1.92	0.33	0.24	1.23
482011034	Texas	Harris	70.8	71.6	0.54	0.51	3.38	0.39	0.63	0.68

As can be seen in this example, should the significant contribution threshold be raised from 1% of NAAQS (0.70 ppb) to a greater than 1.0 ppb limit, Arkansas, Illinois, Mississippi, and Missouri would all have their contribution linkages broken to all six monitors and the only state linked to the monitor with the highest design value (Brazoria) would be Louisiana, with significant contribution (3.80 ppb) greater than all other 1% linked states combined (3.68 ppb).

9.5 PROPORTIONAL CONTROL BY CONTRIBUTION ("RED LINES")

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.

Using the Harford, MD (240251001) monitor and the OSAT-derived significant contribution results from the 4km modeling from Table 8-5, we see the following calculations based on the required 0.2 ppb reduction necessary for this monitor to demonstrate attainment with the 2015 ozone NAAQS.

In the example for Harford, 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 pbb). From these assumptions, the reduction necessary for attainment is 0.2 ppb from 71.1 ppb 2023 base case average design value.

Table 9-5. 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**

Using this monitor as an example, we can see that as a result of the proportional reduction requirement associated with the relative significant contribution from each upwind state, a range of 0.04 ppb (from the Virginia/DC OSAT region) to a 0.01 ppb reduction (from Illinois and Texas) would be calculated using this method. From these results, each upwind state would then need to craft a GNS revision to generate reductions associated with this proportional amount.

Similarly, using the Brazoria, TX (480391004) monitor and the OSAT/APCA-derived significant contribution results from EPA's 12km modeling (Tsirigotis, 2018), we see the following calculations (Table 9-6) based on the required 3.1 ppb reduction necessary for this monitor to demonstrate attainment with the 2015 ozone NAAQS.

Table 9-6. Proportional contribution and reductions associated with significantly contributing upwind states to Brazoria, TX (480391004) monitor in 12km modeling domain.

	Relative Contribution		Required Reduction
Region	**Ppb**	**%**	**ppb**
LA	3.80	51%	1.57
IL	1.00	13%	0.41
AR	0.90	12%	0.37
OK	0.90	12%	0.37
MO	0.88	12%	0.36
Total	**7.48**	**100%**	**3.10**

In this example, each significantly contributing (again based on 1% NAAQS) upwind State must also (1) achieve the 0.70 ppb significant contribution or (2) the monitor must achieve attainment (70.9 pbb). From these assumptions, the reduction necessary for attainment is 3.1 ppb from 74.0 ppb 2023 base case average design value.

Using this monitor, we can see that as a result of the proportional reduction requirement associated with the relative significant contribution from each upwind state, a range of 3.80 ppb (from Louisiana) to a 0.88 ppb reduction (from Missouri) would be calculated using this method. From these results, each upwind state would then need to craft a GNS revision to generate reductions associated with this proportional amount.

9.6 ADRESSING MAINTENANCE WITH 10 YEAR EMISSION PROJECTION

As an alternative to maintenance monitors being accorded the same weight as nonattainment monitors, states may choose to indicate that no additional control would be needed to address a maintenance monitor if the upwind state can show that either the monitor is likely to remain in attainment for a period of 10 years or that the upwind state's emissions will not increase for 10 years after the attainment date. Such an approach is consistent with Section 175A of the Clean Air Act which provides:

> *(a) Plan revision*
> *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 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 (Calcagni, 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. "*

Using the Harford, MD (240251001) monitor as an example, assuming previous steps and determining that this monitor would now be considered a maintenance monitor using the EPA methods, we would look at the upwind states that were determined to contribute significantly to this receptor in the 2023 model simulation.

As seen in Table 9-7, any of the following linked states may then make the claim that as their emissions are projected to decrease over a ten year period (the following example is illustrative in nature and uses a twelve year trend based on EPA's 2023en modeling platform summaries[12]) and would demonstrate maintenance of the NAAQS by showing that their future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory.

Table 9-7. Emission trend of annual anthropogenic NOx emissions (tons) for 1% linked states to Harford, MD monitor.

	Annual Anthropogenic NOx Emissions			
State	**2011 (Tons)**	**2023 (Tons)**	**Change (Tons)**	**Change (%)**
District of Columbia	9,404	4,569	-4,834	-51%
Illinois	506,607	293,450	-213,156	-42%
Indiana	444,421	243,954	-200,467	-45%
Kentucky	327,403	171,194	-156,209	-48%
Michigan	443,936	228,242	-215,694	-49%
Ohio	546,547	252,828	-293,719	-54%
Pennsylvania	562,366	293,048	-269,318	-48%
Texas	1,277,432	869,949	-407,482	-32%
Virginia	313,848	161,677	-152,171	-48%
West Virginia	174,219	136,333	-37,886	-22%

[12] ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011en_and_2023en/2023en_cb6v2_v6_11g_state_sector_totals.xlsx

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Appendix A

4km Modeling Results for Mid-Atlantic and Lake Michigan Domains Compared To EPA 12km "No Water" Design Value Calculations from March 2018 Memorandum

Table A-1. 4km and EPA "No Water" 12km Design Value Results for Monitors Located in 4km Mid-Atlantic Modeling Domain.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
90010017	Connecticut	Fairfield	80.3	68.9	71.2	69.2	71.5	80
90011123	Connecticut	Fairfield	81.3	66.4	67.8	65.5	66.8	78
90013007	Connecticut	Fairfield	84.3	71.0	75.0	69.7	73.6	81
90019003	Connecticut	Fairfield	83.7	73.0	75.9	69.9	72.7	83
90031003	Connecticut	Hartford	73.7	60.7	61.7	61.4	62.7	74
90050005	Connecticut	Litchfield	70.3	57.2	57.8	57.0	57.5	72
90070007	Connecticut	Middlesex	79.3	64.7	66.1	63.9	65.2	79
90090027	Connecticut	New Haven	74.3	61.9	65.0	63.2	66.3	76
90099002	Connecticut	New Haven	85.7	69.9	72.6	70.3	73.0	76
90110124	Connecticut	New London	80.3	67.3	70.4	68.2	71.3	72
90131001	Connecticut	Tolland	75.3	61.4	62.8	61.4	62.7	73
100010002	Delaware	Kent	74.3	57.6	60.5	58.2	61.1	66
100031007	Delaware	New Castle	76.3	59.2	62.0	59.3	62.1	68
100031010	Delaware	New Castle	78.0	61.2	61.2	59.5	61.6	74
100031013	Delaware	New Castle	77.7	60.8	62.6	61.6	63.4	70
100051002	Delaware	Sussex	77.3	59.7	62.6	60.4	63.3	65
100051003	Delaware	Sussex	77.7	61.1	63.7	63.2	65.9	69
110010041	District Of Columbia	District of Columbia	76.0	58.7	61.7	61.8	65.0	N/A
110010043	District Of Columbia	District of Columbia	80.7	62.3	64.8	65.7	68.4	70
240030014	Maryland	Anne Arundel	83.0	63.4	66.4	65.1	68.2	N/A
240051007	Maryland	Baltimore	79.0	63.9	66.3	62.0	64.3	72
240053001	Maryland	Baltimore	80.7	65.3	67.9	64.0	66.7	72
240090011	Maryland	Calvert	79.7	63.2	65.9	63.7	66.3	69

Table A-1. 4km and EPA "No Water" 12km Design Value Results for Monitors Located in 4km Mid-Atlantic Modeling Domain.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
240130001	Maryland	Carroll	76.3	58.8	60.9	59.4	61.5	68
240150003	Maryland	Cecil	83.0	64.5	66.8	65.0	67.3	76
240170010	Maryland	Charles	79.0	61.6	64.7	63.3	66.3	70
240199991	Maryland	Dorchester	75.0	59.4	59.4	59.4	59.4	66
240210037	Maryland	Frederick	76.3	59.6	61.8	60.8	63.0	67
240251001	Maryland	Harford	90.0	70.9	73.3	71.1	73.5	73
240259001	Maryland	Harford	79.3	62.2	64.3	62.3	64.4	73
240290002	Maryland	Kent	78.7	61.2	63.7	61.1	63.7	70
240313001	Maryland	Montgomery	75.7	60.0	61.0	59.8	60.8	68
240330030	Maryland	Prince George's	79.0	60.5	62.8	61.3	63.7	69
240338003	Maryland	Prince George's	82.3	63.2	66.8	64.3	67.9	71
240339991	Maryland	Prince George's	80.0	61.0	61.0	61.4	61.4	68
245100054	Maryland	Baltimore (City)	73.7	59.4	60.4	58.9	60.0	69
250051002	Massachusetts	Bristol	74.0	61.2	61.2	61.3	61.3	N/A
250070001	Massachusetts	Dukes	77.0	64.1	66.6	65.0	67.5	N/A
250130008	Massachusetts	Hampden	73.7	59.3	59.5	60.2	60.5	68
340010006	New Jersey	Atlantic	74.3	58.6	60.0	59.5	60.8	64
340030006	New Jersey	Bergen	77.0	64.1	65.0	64.8	65.7	74
340071001	New Jersey	Camden	82.7	66.3	69.8	65.5	68.9	69
340110007	New Jersey	Cumberland	72.0	57.0	59.4	56.7	59.1	68
340130003	New Jersey	Essex	78.0	64.3	67.6	64.3	67.6	70
340150002	New Jersey	Gloucester	84.3	68.2	70.4	68.8	71.0	74
340170006	New Jersey	Hudson	77.0	64.6	65.4	63.8	66.0	72
340190001	New Jersey	Hunterdon	78.0	62.0	63.6	60.8	62.3	72
340210005	New Jersey	Mercer	78.3	63.2	65.4	61.7	63.8	72

Table A-1. 4km and EPA "No Water" 12km Design Value Results for Monitors Located in 4km Mid-Atlantic Modeling Domain.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
340219991	New Jersey	Mercer	76.0	60.4	60.4	58.6	58.6	73
340230011	New Jersey	Middlesex	81.3	65.0	68.0	64.8	67.7	74
340250005	New Jersey	Monmouth	80.0	64.1	66.5	64.7	67.1	70
340273001	New Jersey	Morris	76.3	62.4	63.8	61.6	62.9	69
340290006	New Jersey	Ocean	82.0	65.8	68.2	64.1	66.4	73
340315001	New Jersey	Passaic	73.3	61.3	62.7	61.0	62.3	70
340410007	New Jersey	Warren	66.0	54.0	54.0	51.7	51.7	64
360050133	New York	Bronx	74.0	63.3	65.0	64.7	66.4	70
360270007	New York	Dutchess	72.0	58.6	60.2	56.8	58.4	68
360610135	New York	New York	73.3	64.2	66.5	61.5	63.7	69
360715001	New York	Orange	67.0	55.3	56.9	54.9	57.0	66
360790005	New York	Putnam	70.0	58.4	59.2	56.7	57.5	68
360810124	New York	Queens	78.0	70.2	72.0	68.0	69.8	69
360850067	New York	Richmond	81.3	67.1	68.5	69.6	71.0	76
360870005	New York	Rockland	75.0	62.0	62.8	61.1	63.1	72
361030002	New York	Suffolk	83.3	74.0	75.5	70.7	72.1	72
361030004	New York	Suffolk	78.0	65.2	66.9	64.5	66.2	72
361030009	New York	Suffolk	78.7	67.6	68.7	66.8	67.9	N/A
361192004	New York	Westchester	75.3	63.8	64.4	64.4	64.9	74
420110006	Pennsylvania	Berks	71.7	56.2	58.8	55.7	58.3	66
420110011	Pennsylvania	Berks	76.3	58.9	61.0	59.9	62.0	71
420170012	Pennsylvania	Bucks	80.3	64.6	66.8	64.4	66.6	77
420290100	Pennsylvania	Chester	76.3	58.7	60.8	59.7	61.8	73
420430401	Pennsylvania	Dauphin	69.0	54.7	54.7	55.5	55.5	66
420431100	Pennsylvania	Dauphin	74.7	58.3	60.1	58.7	60.5	67

Table A-1. 4km and EPA "No Water" 12km Design Value Results for Monitors Located in 4km Mid-Atlantic Modeling Domain.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
420450002	Pennsylvania	Delaware	75.7	60.3	62.1	61.0	62.9	72
420710007	Pennsylvania	Lancaster	77.0	60.1	62.4	60.7	63.0	69
420710012	Pennsylvania	Lancaster	78.0	60.2	63.3	60.4	63.5	66
420750100	Pennsylvania	Lebanon	76.0	58.6	58.6	58.8	58.8	71
420770004	Pennsylvania	Lehigh	76.0	59.5	61.1	59.9	61.5	70
420890002	Pennsylvania	Monroe	66.7	52.9	55.6	52.5	55.1	65
420910013	Pennsylvania	Montgomery	76.3	61.0	62.4	61.3	62.6	72
420950025	Pennsylvania	Northampton	76.0	58.5	60.6	57.3	59.3	70
420958000	Pennsylvania	Northampton	69.7	54.8	55.9	54.7	55.8	69
421010004	Pennsylvania	Philadelphia	66.0	53.9	57.1	54.6	57.9	61
421010024	Pennsylvania	Philadelphia	83.3	67.3	70.3	68.0	71.0	77
421011002	Pennsylvania	Philadelphia	80.0	64.7	64.7	65.4	65.4	N/A
421330008	Pennsylvania	York	72.3	56.9	58.3	58.3	59.7	66
421330011	Pennsylvania	York	74.3	58.0	60.1	58.6	60.7	N/A
440030002	Rhode Island	Kent	73.7	60.4	60.7	59.4	59.6	69
440071010	Rhode Island	Providence	74.0	59.5	61.1	59.7	61.3	66
440090007	Rhode Island	Washington	76.3	62.6	64.0	62.8	64.2	68
510130020	Virginia	Arlington	81.7	64.9	68.3	65.9	69.4	72
510330001	Virginia	Caroline	71.7	56.0	57.6	54.9	56.7	N/A
510360002	Virginia	Charles	75.7	59.4	62.0	60.7	63.4	63
510410004	Virginia	Chesterfield	72.0	56.8	59.2	55.6	58.0	62
510590030	Virginia	Fairfax	82.3	65.1	68.1	66.2	69.2	70
510850003	Virginia	Hanover	73.7	56.9	58.6	55.1	56.8	62
510870014	Virginia	Henrico	75.0	58.8	61.2	57.8	60.2	N/A
511071005	Virginia	Loudoun	73.0	57.8	59.4	58.7	60.3	67

Table A-1. 4km and EPA "No Water" 12km Design Value Results for Monitors Located in 4km Mid-Atlantic Modeling Domain.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
511530009	Virginia	Prince William	70.0	56.2	57.8	54.8	56.4	65
511790001	Virginia	Stafford	73.0	57.1	59.4	53.7	55.9	63
515100009	Virginia	Alexandria City	80.0	63.4	65.8	64.7	67.2	N/A
516500008	Virginia	Hampton City	74.0	56.9	58.4	54.9	56.4	64
518000004	Virginia	Suffolk City	71.3	56.2	57.5	56.4	57.8	60

Table A-2. 4km and EPA "No Water" 12km Design Value Results for Monitors Located in 4km Lake Michigan Modeling Domain.								
			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
170310001	Illinois	Cook	72.0	63.2	64.9	60.8	62.5	69
170310032	Illinois	Cook	77.7	66.6	69.5	62.8	65.5	70
170310064	Illinois	Cook	71.3	61.1	64.3	61.0	64.1	N/A
170310076	Illinois	Cook	71.7	62.7	64.7	59.4	60.6	69
170311003	Illinois	Cook	69.7	62.4	64.4	60.1	62.1	69
170311601	Illinois	Cook	71.3	61.5	63.9	63.3	65.7	69
170314002	Illinois	Cook	71.7	62.3	64.3	61.5	63.5	66
170314007	Illinois	Cook	65.7	58.0	60.0	55.5	57.5	71
170314201	Illinois	Cook	75.7	66.8	68.8	58.8	60.6	71
170317002	Illinois	Cook	76.0	66.8	70.3	59.1	62.2	72
170436001	Illinois	DuPage	66.3	57.9	59.4	57.7	59.2	68
170890005	Illinois	Kane	69.7	62.8	63.9	60.5	61.7	68
170971007	Illinois	Lake	79.3	63.4	65.6	59.4	61.4	73
171110001	Illinois	McHenry	69.7	61.8	62.9	59.5	60.6	68
171971011	Illinois	Will	64.0	55.6	56.5	54.4	55.2	64
172012001	Illinois	Winnebago	67.3	57.5	58.0	57.1	57.7	68
180390007	Indiana	Elkhart	67.7	54.6	56.5	55.0	56.9	61
180890022	Indiana	Lake	66.7	58.3	60.3	54.7	56.6	67
180890030	Indiana	Lake	69.7	61.9	64.8	56.4	59.1	N/A
180892008	Indiana	Lake	68.0	60.4	60.4	56.9	58.6	65
180910005	Indiana	LaPorte	79.3	67.2	70.4	66.4	69.5	N/A
180910010	Indiana	LaPorte	69.7	58.9	60.9	57.7	59.7	63
181270024	Indiana	Porter	70.3	61.8	63.3	59.6	61.1	69
181270026	Indiana	Porter	63.0	54.4	55.3	53.1	53.9	66
181410015	Indiana	St. Joseph	69.3	56.9	59.9	56.8	59.9	68

Table A-2. 4km and EPA "No Water" 12km Design Value Results for Monitors Located in 4km Lake Michigan Modeling Domain.

			Ozone Design Value (ppb)					
				EPA "No Water" 12km Modeling		4km Modeling		
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	2014-2016 DV
181411007	Indiana	St. Joseph	64.0	52.5	52.5	52.1	52.1	N/A
260050003	Michigan	Allegan	82.7	69.0	71.7	70.3	73.1	75
260190003	Michigan	Benzie	73.0	60.6	62.3	61.0	62.7	69
260210014	Michigan	Berrien	79.7	66.9	68.8	66.6	68.5	74
260270003	Michigan	Cass	76.7	62.0	63.1	61.6	62.6	70
260810020	Michigan	Kent	73.0	59.8	61.4	60.4	62.0	69
261010922	Michigan	Manistee	72.3	60.5	61.9	59.8	61.1	68
261050007	Michigan	Mason	73.3	60.7	62.1	60.6	62.0	70
261210039	Michigan	Muskegon	79.7	65.8	67.7	66.1	68.0	75
261390005	Michigan	Ottawa	76.0	62.3	64.0	62.7	64.4	70
550290004	Wisconsin	Door	75.7	63.3	65.2	63.5	65.5	72
550590019	Wisconsin	Kenosha	81.0	64.8	67.2	59.2	61.4	77
550610002	Wisconsin	Kewaunee	75.0	64.5	67.1	64.5	67.1	69
550710007	Wisconsin	Manitowoc	78.7	67.6	68.7	68.3	69.5	72
550790010	Wisconsin	Milwaukee	69.7	60.6	62.6	61.1	63.2	64
550790026	Wisconsin	Milwaukee	74.7	66.5	69.4	66.0	68.9	68
550790085	Wisconsin	Milwaukee	80.0	71.2	73.0	67.4	70.5	71
550890008	Wisconsin	Ozaukee	76.3	67.2	70.5	64.9	68.1	71
550890009	Wisconsin	Ozaukee	74.7	63.6	65.5	63.8	65.7	73
551010017	Wisconsin	Racine	77.7	62.2	64.8	58.6	61.1	N/A
551170006	Wisconsin	Sheboygan	84.3	72.8	75.1	71.7	74.0	79
551330027	Wisconsin	Waukesha	66.7	58.1	60.1	58.2	60.3	66

Appendix B

Midwest Ozone Group Comments on EPA's March 27, 2018 Memorandum Entitled "Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards Under the Clean Air Act Section 110(a)(2)(D)(i)(I)", April 30, 2018

MIDWEST OZONE GROUP COMMENTS ON EPA'S MARCH 27, 2018 MEMORANDUM ENTITLED "INFORMATION ON THE INTERSTATE TRANSPORT STATE IMPLEMENTATION PLAN SUBMISSIONS FOR THE 2015 OZONE NATIONAL AMBIENT AIR QUALITY STANDARDS UNDER THE CLEAN AIR ACT SECTION 110(a)(2)(D)(i)(I)"[13]

April 30, 2018

Submitted by email to: Norm Possiel (possiel.norm@epa.gov) and Elizabeth Palma (palma.elizabeth@epa.gov)

On March 27, 2018, EPA issued a memorandum entitled "Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air quality Standards Under the Clean Air Act Section 110(a)(2)(D)(i)(I)". This memorandum offers much needed guidance on how a state might develop or review its State Implementation Plan (SIP) to address the interstate transport requirements of the Clean Air Act as stated in Section 110(a)(2)(D)(i)(I). The memorandum also provides a list of flexibilities in analytical approaches for the developing a good neighbor SIP for further discussion between EPA and the states. Significantly the memorandum acknowledges that it has received suggestions from not only from states, but also stakeholders identifying specific approaches that may merit further consideration.

The Midwest Ozone Group (MOG), as one of the stakeholders to have suggested flexibilities for EPA to consider in the development of Good Neighbor SIP guidance, welcomes the opportunity of this letter to acknowledge the March 27, 2018 guidance and to offer additional proposals for your consideration suggestion. In doing so we will acknowledge the Presidential memorandum dated April 12, 2018, which offers some extremely valuable direction to several issues that have a direct impact on the development of approvable Good Neighbor SIPs.

MOG is an affiliation of companies, trade organizations, and associations that draw upon their collective resources to seek solutions to the development of legally and technically sound national ambient air quality management programs.[14] MOG's primary efforts are to

13 Questions or inquiries about these comments should be directed to David M. Flannery, Kathy G. Beckett, or Edward L. Kropp, Legal Counsel, Midwest Ozone Group, Steptoe & Johnson PLLC, 707 Virginia Street East, Charleston West Virginia 25301; 304-353-8000; dave.flannery@steptoe-johnson.com and kathy.beckett@steptoe-johnson.com and skipp.kropp@steptoe-johnson.com respectively. These comments were prepared with the technical assistance of Alpine Geophysics, LLC.

14 The members of and participants in the Midwest Ozone Group include: American Coalition for Clean Coal Electricity, American Electric Power, American Forest & Paper Association, Ameren, Alcoa, Appalachian Region Independent Power Producers Association (ARIPPA), Associated Electric Cooperative, Citizens Energy Group, Council of Industrial Boiler Owners, Duke Energy, East Kentucky Power Cooperative, FirstEnergy, Indiana Energy

work with policy makers in evaluating air quality policies by encouraging the use of sound science. MOG has been actively engaged in a variety of EPA issues and initiatives related to the development and implementation of air quality policy, including the development of transport rules, NAAQS standards, petitions under 176A and 126 of the Clean Air Act, implementation guidance, and the development of Good Neighbor state implementation plans. MOG members and participants operate a variety of emission sources including more than 75,000 MW of coal-fired and coal-refuse fired electric power generation in more than ten states. They are concerned about the development of technically unsubstantiated interstate air pollution rules and the impacts on their facilities, their employees, their contractors, and the consumers of their products.

1. **EPA should specifically recognize the benefits of having multiple data sets containing modeling that may be relied upon by states in the development of Good Neighbor SIPs.**

MOG welcomes the following EPA statement about the ability of states to be able to rely upon alternative, equally credible, modeling data:

> States may consider using this national modeling to develop SIPs that address requirements of the good neighbor provision for the 2015 ozone NAAQS. When doing so, EPA recommends that states include in any such submission state-specific information to support their reliance on the 2023 modeling data. Further, states may supplement the information provided in this memorandum with any additional information that they believe is relevant to addressing the good neighbor provisions requirements. States may also choose to use other information to identify nonattainment and maintenance receptors relevant to development of their good neighbor SIPs. If this is the case, states should submit that information along with a full explanation and technical analysis.

The March 27, 2018, memorandum in Attachment B sets forth both the agency's "3 x 3" modeling data first published in its memorandum of October 27, 2017, as well as its modified "No Water" approach. In addition to these two EPA data sets, MOG has also produced modeling data similar to EPA "3 x 3" modeling based upon a 12km grid which has been suggested by EPA in its proposed approval of the 2008 ozone NAAQS Good Neighbor SIP for Kentucky.[15]

Association, Indiana Utility Group, LGE / KU, Ohio Utility Group, Olympus Power, and City Water, Light and Power (Springfield IL).

15 83 Fed. Reg. 17123 (April 18, 2018)

We welcome EPA's development of a March 27, 2018, "no water" set of predictions and urge that EPA allow states to be able to rely not only upon EPA's October 27, 2017 "3x3" data set which is currently being relied upon for the approval of Good Neighbor SIP's, but also EPA's "no water" simulation, or any other alternate modeling analysis conducted in a technically credible manner consistent with EPA's attainment demonstration guidance and that meets performance criteria utilized by the agency. This, for example, could be particularly critical to the Milwaukee and Sheboygan monitors that are predicted to be in attainment with the 2015 ozone NAAQS using the "3x3" data but not with the "no water" data simulation. Similarly, EPA should recognize that the March 27, 2018 "no water" data shows the Harford monitor to be in attainment with the 2015 ozone NAAQS even though other equally credible modeling simulations demonstrate nonattainment at this monitor. The uncertainty involved with selecting a single modeling simulation to base such significant policy decisions, such as Good Neighbor demonstrations, should be weighed against the opportunity to select other platforms and simulations with consideration given to state methods that rely on multiple sources of data when found to be of technical merit.

EPA should specifically acknowledge the merit of 4km modeling as an alternative to its "no water" methodology. MOG's 4km modeling results demonstrate that all nonattainment monitors in the East attain the 2015 ozone NAAQS with the exception of Harford MD which has a predicted design value of 71.1 ppb using that 4km modeling. 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).[16]

The guidance goes on to note that in addition to the "primary" modeling analysis, there are various other models, model applications, and tools that can be used to supplement the results of a modeled attainment test. These include the use of multiple air quality models / model input data sets (e.g., multiple meteorological data sets, alternative chemical mechanisms or emissions inventories, etc.). Multiple model configurations can be used to estimate sensitivity and uncertainty of future year design value predictions. For results to be most relevant to the way the agency recommends models be applied in attainment demonstrations, EPA notes it is preferable that such procedures focus on the sensitivity of estimated relative response factors (RRF) and resulting projected design values to the variations inputs and/or model formulations.

For day-to-day forecasts, modelers aim to choose a model with performances close to field observations. The ultimate objective is to deliver a forecast with highest performances to observational conditions. Using this logic, different model configurations could be combined in

16 http://www3.epa.gov/scram001/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

a way to take the best components of each simulation (compared to performance) for each location and time-step in an analysis. No single model configuration or simulation will be most appropriate for every location under every given condition. The use of multiple model simulations using scientifically credible approaches falls within EPA's attainment modeling guidance for weight-of-evidence (WOE) analyses supporting an attainment SIP revision.

An ensemble-like approach using multi-model predictions aims to minimize the uncertainty typically involved with single simulation reliance and done correctly, can provide less uncertain concentrations than any individual simulation. When available, States should be allowed to consider using multiple models and credible applications of these modeled results in preparing SIP attainment demonstrations and predicted future year concentrations.

2. **EPA should provide guidance to the states on need to properly account for both on-the-books and on-the-way emission reductions related to local sources in areas with problem monitors.**

MOG very much welcomes EPA's recognition of the importance of the assessment of local emissions as one of the added flexibilities being considered. Specifically, EPA offers the following description of this flexibility:

> Assess current and projected local emissions reductions ...

Because the modeling currently being used by EPA, states and stakeholders relies on inventories that do not reflect all of the current local control programs or known unit operations that will affect predicted ozone air quality, EPA should not only encourage states and stakeholder to offer updated inventories to account for on-the-books controls, but should also encourage states to take account of anticipated changes in unit retirements not already recognized by the modeling inventory being employed.

This issue is important to all states, but particularly to upwind states which must determine whether they must commit to additional emissions reductions as they prepare to submit approvable Good Neighbor State Implementation Plans to address the 2015 ozone NAAQS to EPA by the October 2018 deadline. 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 there is a continuing nonattainment area.[17]

As shown by MOG's modeling and analyses (Outlook For Future Ozone Transport Program Design at http://midwestozonegroup.com/index.html), when EPA's current emission inventory is modeled using a 4 km grid in critical portions of the East, all monitors in the East

17 *EME Homer et.al. v EPA*, 134 S. Ct. at 1608.

would achieve attainment of the 2015 ozone NAAQS by 2023 with the sole exception of the Harford Maryland monitor – which has a modeled ozone concentration of 71.1 ppb, only 0.2 ppb above the concentration that would demonstrate achievement of the 2015 ozone NAAQS. EPA's emission inventory, however, does not include a significant number of legally mandated on-the-books and on-the-way local controls that are likely to further reduce the emission of ozone precursors that could bring all monitors in the East into attainment with the 2015 ozone NAAQS. Moreover, EPA's current emission inventory does not take into consideration unit retirements, fuel switching and modifications that have been announced since that inventory was last updated.

MOG's has previously documented that downwind states have many options to reduce their own NOx and VOC contributions.[18]

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[19], the Maryland Department of the Environment identified a series of local controls that it believed would further reduce ozone concentration in the Northeast, including:

- New rules by New York on small generators;
- New Ozone Transport Commission initiatives involving idle reduction;
- After market catalysts on mobile sources;
- Electric and other zero emission vehicles;
- Maryland 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[20] that attainment in the Northeast cannot be achieved without local controls 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.
>
> ...

[18] 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/RelativeImpactofStateandSourceCategoryNOxEmissionsonDownwindMonitorsIdentifiedUsingthe2017CrossStateAirPollutionRuleModelingPlatform.pdf .

[19] 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

20 "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

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.

While Connecticut has called for beyond RACT controls on HEDD units and Maryland has cited New York's rule addressing small generators, the New York State Department of Environmental Conservation has actually conducted an air quality assessment of that rule in which it has concluded[21], that ozone concentrations could be reduced by as much as 4.8 ppb – an extremely significant improvement in ozone air quality (for perspective, 0.7 ppb represents a significant contribution relative to the 2015 ozone NAAQS) in a portion of the East that has historically had high ozone concentrations.

It is imperative that newly announced unit retirements, fuel switching and modifications as well as all emission control programs that will be or are required to be adopted and implemented prior to 2023 be considered and the resultant emissions reductions quantified for use in the good neighbor SIP modeling required by October 2018. A recent review of generating units Wisconsin has identified the following EGUs that will be shut down prior to 2023, and yet, EPA's modeling platform[22] includes their emissions and contribution to ambient ozone concentrations:

Facility	ORIS	Boiler	2016 Ozone Season NOx (tons)	2023 Ozone Season NOx (tons)	Adjusted from 2016	Reason for Adjustment
Edgewater (4050)	4050	4	402.3	201.2	Y	Coal to Gas Conversion
Pleasant Prairie	6170	1	552.2	552.2		
Pleasant Prairie	6170	2	402.8	402.8		
Pulliam	4072	7	73.8	73.8		
Pulliam	4072	8	224.0	224.0		

Failure to consider the effects of those programs and unit retirements destines any such modeling to over-predict ozone concentrations and risk the unlawful imposition of emission control requirements on sources in upwind states. Further, it is highly likely that the inclusion of these emissions reduction will result in all areas demonstrating attainment of the 2015 ozone NAAQS without the need for further additional regional or national emissions reductions programs.

[21] "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

[22] ftp://newftp.epa.gov/air/emismod/2011/v3platform/reports/2011en_and_2023en/2023en_Engineering_Analysis_Unit_File.xls

With respect to EPA's call for an assessment of projected emission reductions, it is significant that when an area is measuring nonattainment of a national ambient air quality standard (NAAQS), the Clean Air Act (CAA) requires that the effects and benefits of local controls be considered first, prior to pursuing regional or national controls. 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.

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 relevant attainment deadline, what date is as soon as practicable for EPA to require reductions following the relevant attainment deadline.[23]

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

[23] Declaration of Janet D. McCabe, at ¶81.

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).[24]

MOG strongly urges the agency to follow the court holding *North Carolina v. EPA*, 531 F.3d 896, 911-12 (D.C. Cir. 2008), and to provide the states with guidance to align implementation of Good Neighbor SIPs with the date by which states are required to demonstrate attainment with the applicable NAAQS. As the focus on attainment of the 2015 ozone NAAQS continues, there must be an official recognition that air quality will continue to improve between the 2018 due date for Good Neighbor SIPs and the 2023 attainment deadline as a result of CAA programs including Federal Measures, federally mandated state RACT rules, nonattainment infrastructure SIPs, and Good Neighbor SIPs. While the Federal measures, state RACT rules, and nonattainment infrastructure SIPs 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 MOG asserts is 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.

3. **EPA should offer more specific guidance on how to account for international emissions.**

MOG applauds both the EPA memorandum of March 27, 2018, and the President's Memorandum of April 12, 2018, for identifying international emissions as a significant matter in need of resolution. Fundamental to addressing this issue is the statement of fact that EPA includes in its March 27, 2018 memorandum:

> EPA recognizes that a number of non-U.S. and non-anthropogenic sources contribute to downwind nonattainment and maintenance receptors.

[24] 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.

Beyond mere recognition of the process established under Clean Air Act Section 179B, EPA should immediately acknowledge that known portions of a source apportionment analysis directly attributable to international emissions (such as the Canada/Mexico category) may be subtracted from the design value of a monitor to determine whether it is a problem monitor for purposes of the development of a Good Neighbor SIP. In addition, and pending more refined analysis) we urge that EPA apply a weight of evidence approach to determining some default percentage of the initial conditions and boundary condition portion of the source apportionment analysis that should be deemed to be international in nature to be subtracted from design values to identify problem monitors. Finally, with respect to 179B petitions addressed by the President's April 12, 2018 memo, EPA should provide for the parallel processing of 179B petitions and Good Neighbor SIP's that acknowledge any such petitions.

Set forth in the table below are the results of EPA's most recent source apportionment analysis[25] that for key monitors the significant contribution made by Canada/Mexico emissions (entirely international) and by Boundary Conditions (significantly international).

			MDA8 Design Value (ppb)				Contribution (ppb)	
Monitor ID	State	County	2009-2013 Avg DV	2009-2013 Max DV	2023 Avg DV	2023 Max DV	Can + Mex	IC / BC
90010017	Connecticut	Fairfield	80.3	83	68.9	71.2	1.64	16.73
90013007	Connecticut	Fairfield	84.3	89	71.0	75.0	1.35	17.17
90019003	Connecticut	Fairfield	83.7	87	73.0	75.9	1.37	17.00
90099002	Connecticut	New Haven	85.7	89	69.9	72.6	1.58	17.17
211110067	Kentucky	Jefferson	85.0	85	70.1	70.1	0.66	21.94
240251001	Maryland	Harford	90.0	93	70.9	73.3	0.79	15.28
260050003	Michigan	Allegan	82.7	86	69.0	71.7	0.54	11.85
261630019	Michigan	Wayne	78.7	81	69.0	71.0	3.13	20.06
360810124	New York	Queens	78.0	80	70.2	72.0	1.73	17.87
361030002	New York	Suffolk	83.3	85	74.0	75.5	1.85	18.94
480391004	Texas	Brazoria	88.0	89	74.0	74.9	0.44	24.02
481130075	Texas	Dallas	82.0	83	69.0	69.9	0.55	24.69
481210034	Texas	Denton	84.3	87	69.7	72.0	0.92	24.69
482010024	Texas	Harris	80.3	83	70.4	72.8	0.28	27.83
482011034	Texas	Harris	81.0	82	70.8	71.6	0.24	25.71
482011039	Texas	Harris	82.0	84	71.8	73.5	0.47	24.67
484392003	Texas	Tarrant	87.3	90	72.5	74.8	1.24	24.38
484393009	Texas	Tarrant	86.0	86	70.6	70.6	0.77	23.79
550790085	Wisconsin	Milwaukee	80.0	82	71.2	73.0	0.82	16.67
551170006	Wisconsin	Sheboygan	84.3	87	72.8	75.1	0.69	17.53

25 https://www.epa.gov/sites/production/files/2018-03/contributions_from_updated_2023_modeling__0.xlsx

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

> Notwithstanding any other provision of law, an implementation plan or plan revision required under this chapter shall be approved by the Administrator if the submitting State establishes . . .that the implementation plan of such . . . would be adequate to attain and maintain the relevant [NAAQS] . . ., but for emissions emanating from outside of the United States.

If a state is able to demonstrate attainment "but for" international transport after adopting all reasonably available control measures, CAA Section 179(B) requires that EPA approve the CAA-required state implementation plan.

Addressing international emissions is important not only to downwind states but also upwind states that are obligated to submit under CAA Section 110(a)(2)(D) Good Neighbor SIPs. As the U.S. Supreme Court in the Homer City case has ruled, 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... "EPA cannot require a State to reduce its output of pollution by more than is necessary to achieve attainment in every downwind State. . ."[26] 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." Slip op at 11 (2012). However, this "mess" seems to be related to international emissions for which upwind states have no responsibility.[27] As the Courts have stated, CAA 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 v. EPA*, 531 F 2d at 921.

With so many receptors so very close to meeting the NAAQS requirement even recognition of a portion of boundary conditions as attributable to international emissions would have a significant impact on an upwind states responsibilities in the development of approvable Good neighbor SIPs.

4. EPA should allow the use of either the APCA or OSAT source apportionment technique as an appropriate tool for conducting source apportionment analysis

MOG welcomes EPA's March 27, 2018 memorandum recognizing the proposal that OSAT be considered an appropriate technique to determine source apportionment in the context of determining significant contribution of an upwind state to a downwind monitor. Within the air quality model used by EPA in calculating future year nonattainment, there exist two alternate techniques that can be used in developing source attribution results; the Ozone

26 134 S. Ct. at 1608.
27 696 F.3d at 14.

Source Apportionment Technology (OSAT) and the Anthropogenic Precursor Culpability Assessment (APCA). While EPA certainly believes the APCA technique is appropriate for use in this application, we ask that EPA recognized that the OSAT is also a viable tool for this purpose and provides an already accepted alternative to APCA for any state that would elect to use it.

According to the CAMx model documentation, the OSAT technique provides a robust picture of which emissions sources are contributing to ozone formation because it specifically apportions ozone individually to all source categories, including the "uncontrollable" (e.g., biogenics in EPA's modeling) component. This allows for a separation of attribution for anthropogenic and biogenic contribution to a downwind monitor's modeled concentration.

Accordingly, we urge that EPA to issue guidance to allow state to use either the APCA or OSAT apportionment method when developing their Good Neighbor SIP submittals.

5. EPA's methodology for selection and management of impact on maintenance receptors should be reconsidered.

EPA's reliance on the CSAPR methodology to address "interference with maintenance" is 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 CSAPR methodology proposed for use in this NODA is not reasonable in its application, resulting in requirements beyond the CAA and therefore must be revised.

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."[28]

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

28 134 S. Ct. at 1064, Ftn 18.

The Good Neighbor Provision . . . prohibits only upwind emissions that contribute significantly to downwind nonattainment. EPA's authority is therefore limited to eliminating . . . the overage caused by the collective contribution . . ."[29] (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 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."[30] "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."[31] EPA has not justified its proposal as necessary to avoid interference with maintenance.

6. In the development of its guidance to the states, EPA should not give maintenance areas the same weight and status as to nonattainment areas.

EPA should avoid its past practice of giving the same weight to the development of controls programs for maintenance areas as nonattainment areas as it considers the guidance it will provide to the states to address the 2015 ozone NAAQS. 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.

In the CSAPR Update rule, EPA again applied the nonattainment area significance test to maintenance areas. The CSAPR Update applies the same weight to the development of control programs to address maintenance areas as it does nonattainment areas. This approach is objectionable both because maintenance areas are not subject to the same "significance" test as applies to nonattainment areas and because maintenance areas do not require the same emission reduction requirement as nonattainment areas.

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

29 Id. at 1604.
30 *EME Homer City v. EPA*, 696 F.3d 7, 22 (D.C. Cir 2012).
31 Id.

> 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.[32]

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 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.[33]

MOG urges EPA to abandon its current test for "interference" with maintenance and develop an alternative emission reduction approach that accounts for the fact that maintenance areas are already in attainment. EPA cannot reasonably justify the same level of emission reductions as might be called for with respect to nonattainment areas for maintenance areas. EPA does not address the fact that the CAA uses different terms to address

32 134 S. Ct. at 1064, Ftn 18.
33 EME Homer City v. EPA, 96 F.3d 7, 27 Ftn. 25 (D.C. Cir 2012).

maintenance and nonattainment, i.e., "significant contribution to non-attainment versus "interfere with maintenance." EPA improperly implements the terms "significant" and "interference" as being the same and in doing so offers no rationale or legal justification.

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 EPA advise the states that no additional control would be needed to address a maintenance monitor if the upwind state can show that either the monitor is likely to remain in attainment for a period of 10 years or that the upwind state's emissions will not increase for 10 years after the attainment date. 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 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.

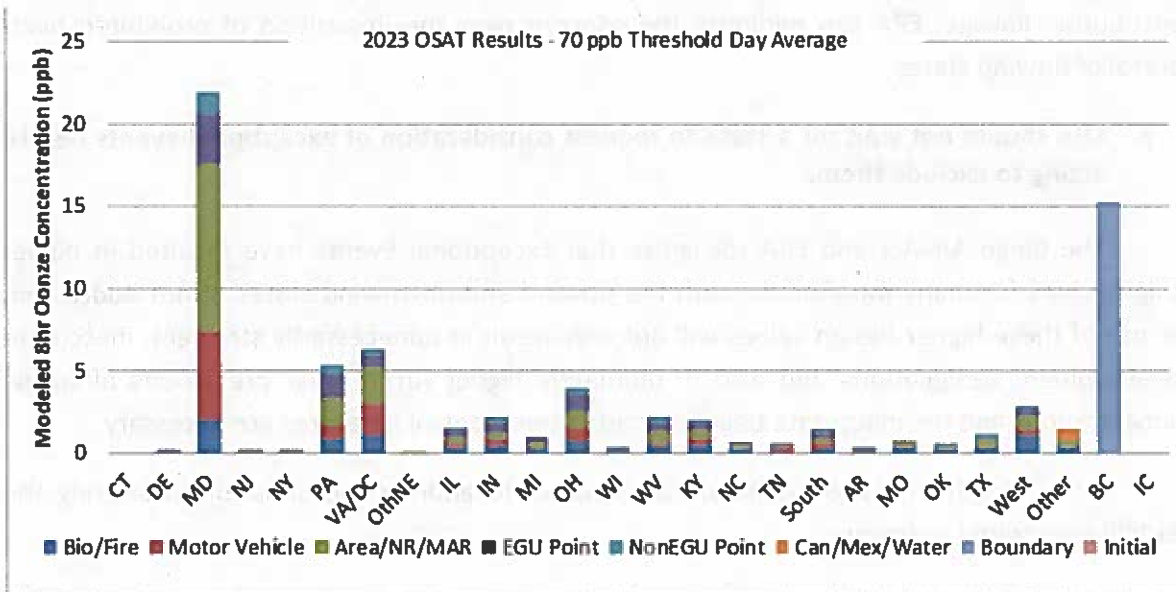
Accordingly, we urge EPA allow this less stringent and effective option for states to respond to maintenance monitors.

7. **To the extent that more than one upwind state contributes to a downwind problem monitor, EPA should allow upwind states to submit a plan that would allow that state to demonstrate either that it has already imposed cost effective controls on its sources or that it is prepared to eliminate its prorate contribution to the portion of the downwind states design value that exceeds the NAAQS.**

MOG is pleased that EPA's March 27, 2018 memorandum recognizes 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, EPA should provide guidance to states allowing them the option of prorating the reduction needed to achieve attainment over all states that contribute/interfere with that monitor. Such a process would allow an individual upwind state the option of addressing only their prorate portion of responsibility for the portion of the problem monitors ozone concentration that exceeds the NAAQS. This situation is illustrated in the situation set out below involving the Harford MD monitor which when modeling at 12km has a predicted 2023 ozone design value of 71.4 ppb (0.5 ppb above the 2015 ozone NAAQS). In the method described, Kentucky's responsibility, for example, to the Harford monitor would be 0.04 ppb versus its overall contribution to that monitor of 1.54 ppb.



Anthropogenic Contribution (ppb) from 2023 Base Case

CT	0.00	IL	1.23	TN	0.42	BC	15.15
DE	0.07	IN	1.76	South	1.17	IC	0.00
MD	19.90	MI	0.78	AR	0.20	Can/Mex	0.72
NJ	0.09	OH	3.29	MO	0.41	Bio/Fire	9.03
NY	0.13	WI	0.23	OK	0.41		
PA	4.52	WV	1.76	TX	0.80	Total	71.40
VA/DC	5.18	KY	1.54	West	1.66		
OthNE	0.01	NC	0.47	Other	0.48		

Redlines Reduction Contribution Calculation
Upwind State must achieve less than 0.70 ppb significant contribution or monitor much achieve attainment (70.9 pbb)
Reduction Necessary for Attainment = 0.50 ppb from 71.40 ppb

Relative Contribution of Significant Upwind States (ppb and %)			Proportional Reduction Requirement (ppb)		Resulting Concentration After Reduction (ppb)
VA/DC	5.18	25%	0.12		5.06
PA	4.52	22%	0.11		4.42
OH	3.29	16%	0.08		3.21
IN	1.76	8%	0.04		1.72
WV	1.76	8%	0.04		1.72
KY	1.54	7%	0.04		1.50
IL	1.23	6%	0.03		1.20
TX	0.80	4%	0.02		0.78
MI	0.78	4%	0.02		0.76
Total	20.86	100%	0.50		

By proceeding to offer these alternatives approaches for responding to any significant contribution linkage, EPA can minimize the concern over the imposition of prohibited over-control of upwind states.

8. **EPA should not wait for a state to request consideration of exceptional events before acting to exclude them.**

The Clean Air Act and EPA recognize that Exceptional Events have resulted in higher design values for many monitors in both the upwind and downwind states. If not addressed, the use of these higher design values will not only result in unnecessarily stringent, inaccurate nonattainment designations, but also in ultimately higher future year predictions of ozone concentrations and the inaccurate belief that additional control measures are necessary.

EPA's March 27, 2018 memorandum appears to address this situation in offering the flexibility described as follows:

> Consider ... whether downwind areas have considered and/or used available mechanisms for regulatory relief.

This is important because we now have state's that have successfully sought EPA approval for excluding consideration of monitoring data influenced by exceptional events and other states that have not done so.

The importance of the need to exclude data influenced by Exceptional Events is recognized by Congress in the provisions of Clean Air Act §319(b)(3)(B) which provides as follows:

> *Regulations promulgated under this section shall, at a minimum, provide that –*

(i) the occurrence of an exceptional event must be demonstrated by reliable, accurate data that is promptly produced and provided by Federal, State, or local government agencies;

(ii) a clear causal relationship must exist between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location;

(iii) there is a public process for determining whether an event is exceptional; and

(iv) there are criteria and procedures for the Governor of a State to petition the Administrator to exclude air quality monitoring data that is directly due to exceptional events from use in determinations by the Administrator with respect to exceedances or violations of the national ambient air quality standards. (Emphasis added.)

A number of states have already made requests to have the air masses caused by the Canadian wildfires that occurred in 2016 be declared Exception Events – thus allowing monitored data influenced by those events to be excluded from the calculation of the design value for the affected monitor. Among the states submitting these requests are:

Connecticut - The Connecticut demonstration related to the May 2016 event was submitted on May 23, 2017.[34] In addition to showing that Canadian wildfire caused the event, the demonstration noted that ". . . the exceedances of May 25-26th cannot be attributed to EGUs operating on high electric demand days as is more typically the case later in the ozone season." EPA concurred in that demonstration on July 31, 2017.

New Jersey - The New Jersey demonstration related to the May 2016 was submitted on May 31, 2017.[35] In addition to showing that Canadian wildfire caused the event in New Jersey, the demonstration also noted that the event had had a similar impact on many other states including Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania and New York. EPA concurred in that demonstration on October 24, 2017.

Massachusetts - The Massachusetts demonstration related to the May 2016 event was submitted on May 25, 2017.[36] EPA concurred in that demonstration on September 19, 2017.

Maryland – While the Maryland demonstration dated May 26, 2017, nominally addresses July 2016 event, the demonstration report itself includes data which assesses how the design values for Maryland's monitors are affected by both the May and July 2016 events.[37]

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34 https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-connecticut

35 https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-new-jersey

36 https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-massachusetts

37 http://www.mde.state.md.us/programs/Air/AirQualityMonitoring/Documents/MDE_JUL_21_22_2016_EE_demo.pdf

Pennsylvania – Pennsylvania has also made a demonstration related to the May 2016 event dated November 2017.[38]

Significantly, several states that have historically had problem monitors have not made similar requests even though these events clearly impact their monitors. Specifically, it appears that New York have elected not to seek any relief at all for the events, while other states have limited their requests to only the May 2016 event and not to the July 2016 event that was identified by Maryland.

It is clear from these demonstrations that the May and July 2016 events were significant and clearly meet the substantive criteria for concurrence by EPA. While the EPA has historically focused on applying Exceptional Event determinations to those monitors that exceed a NAAQS, extending these determinations to all other affected monitors is critical because doing so would assure that all designations are based on appropriate data. In addition, even for monitor whose attainment status is not changed, accounting for these Exceptional Events would lower the design value for that monitor and increase the critical nonattainment value for each monitor (the ozone concentration in the upcoming ozone season that would be high enough to push a monitor into nonattainment). Moreover, as we move to modeling a more recent base case the updated 2016 design values would be directly incorporated into that modeling platform affecting the development of Good Neighbor SIPs and any possible transport rules, state 126 petitions or other planning related to the future attainment year. Finally, appropriately updating these design values would provide a more accurate benchmark for determining if and to what extent upwind states would need to reduce ozone precursor emissions related to transport because that obligation ends when a downwind state achieves attainment of the NAAQS at all monitoring locations.

Accordingly, whether or not a state has requested EPA approval of the exclusion of exceptional events, EPA should invoke its own authority to address those events so that upwind states may have the benefit of correct data as they develop and submit their 2015 ozone NAAQS Good Neighbor SIPs

CONCLUSION

MOG very much appreciates the opportunity to offer these additional comments on flexibilities need to allow for the development of approvable good neighbor SIPs.

38 http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-117484/Ozone%20EE%20Analysis%20May%2024-26-2017.pdf

Appendix C

Presentation – Midwest Ozone Group Preview of 2015 Ozone NAAQS Good Neighbor SIPs

MIDWEST OZONE GROUP PREVIEW OF 2015 OZONE NAAQS GOOD NEIGHBOR SIPs

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May 30, 2018

A PDF version of this document can be located at:
http://www.midwestozonegroup.com/files/MOG_Preview_of_GNS_Development_final.pdf

Support for States

- Using information available from EPA and MOG, how can States develop a technical support document (TSD) for Good Neighbor SIP revisions?
- MOG is making available to the states a TSD with data supporting approvable Good Neighbor SIPs to address EPA-identified nonattainment / maintenance monitors in the eastern US

Outcome

- Approval of Good Neighbor SIP for 2008 and 2015 ozone NAAQS would obviate new transport rules, 126 petitions and the 176A petition
- Good Neighbor SIPs can be approvable with existing OTB/OTW controls for all states in the East with recognition of the following:
  - Use of the accepted modeling platforms that are appropriate to assess transport, including 12km and 4 km
  - International emissions
  - Proration of upwind state responsibility based upon ppb contribution to downwind monitor
  - Maintenance monitors to be addressed through a no emission increase demonstration
  - Significant contribution to be based on 1 ppb (not 1 %)

Ozone Modeling TSD Development

- Address the four step process for each monitor group based on issues related to each
  - Step 1 – Identify problem monitors
  - Step 2 – Determine state linkages
  - Step 3 – Determine required response
  - Step 4 – Establish enforceable measures

- Use directly or as weight of evidence to support SIP revisions

- Examples provided for four (4) sets of monitors
  - Connecticut/New York, Maryland, Wisconsin/Michigan, Texas

New York/Connecticut

Step 1 – Identify Problem Monitors

Maintenance only

				DVf (2023) Average (ppb) - Nonattainment		
Monitor	State	County	DVb (2011)	Original 12km Modeling	Updated 12km Modeling	4km Modeling
361030002	New York	Suffolk	83.3	72.5	74.0	70.7
90019003	Connecticut	Fairfield	83.7	72.7	73.0	69.9
90013007	Connecticut	Fairfield	84.3	71.2	71.0	69.7
360810124	New York	Queens	78.0	70.1	70.2	68.0
90099002	Connecticut	New Haven	85.7	71.2	69.9	70.3
90010017	Connecticut	Fairfield	80.3	69.8	68.9	69.2

				DVf (2023) Maximum (ppb) - Maintenance		
Monitor	State	County	DVb (2011)	Original 12km Modeling	Updated 12km Modeling	4km Modeling
361030002	New York	Suffolk	83.3	74.0	75.5	72.1
90019003	Connecticut	Fairfield	83.7	75.6	75.9	72.7
90013007	Connecticut	Fairfield	84.3	75.2	75.0	73.6
360810124	New York	Queens	78.0	71.9	72.0	69.8
90099002	Connecticut	New Haven	85.7	73.9	72.6	73.0
90010017	Connecticut	Fairfield	80.3	72.1	71.2	71.5

Step 2: Linkage assessment (1%)

- Using the linkage calculations from the 12km simulation, Alpine selected the states with linkage to problem receptors (based on the 1% of 70 pbb NAAQS) to define source regions in 4km OSAT simulation

Monitor	Name	PA	VA/DC	IL	IN	OH	MD	NJ	NY	WV	KY	MI	CT	DE	TX
90019003	Fairfield, CT	x	x	x	x	x	x	x	x						
361030002	Suffolk, NY	x	x	x	x	x	x	x			x	x	x		x
360850067	Richmond, NY	x	x	x	x	x	x	x		x	x	x		x	x
90013007	Fairfield, CT	x	x	x	x	x	x	x	x						
90099002	New Haven, CT	x	x	x	x	x	x	x	x						

Step 2: Linkage assessment (>1 ppb)

- Using the linkage calculations from the 12km simulation, Alpine also identified states with linkage to problem receptors > 1 ppb

Monitor	Name	PA	VA/DC	IL	IN	OH	MD	NJ	NY	DE
90019003	Fairfield, CT	x	x			x	x	x	x	
361030002	Suffolk, NY	x	x	x	x	x	x	x		
360850067	Richmond, NY	x	x	x	x	x	x	x		x
90013007	Fairfield, CT	x	x			x	x	x	x	
90099002	New Haven, CT	x	x	x		x	x	x	x	

Step 3 – Determine Required Response

- No nonattainment receptors: no response needed
- Only problem monitors: maintenance
- Alternative maintenance approaches
  - Demonstrate cost effective controls in place; or
  - 10 year projection with no emission increase

Step 3: Maintenance Alternative: 10 Year Reduction Demonstration

State	Annual Anthropogenic NOx Emissions			
	2011 (Tons)	2023 (Tons)	Change (Tons)	Change (%)
Connecticut	72,906	37,758	-35,148	-48%
Delaware	29,513	14,511	-15,002	-51%
District of Columbia	9,404	4,569	-4,834	-51%
Illinois	506,607	293,450	-213,156	-42%
Indiana	444,421	243,954	-200,467	-45%
Kentucky	327,403	171,194	-156,209	-48%
Maryland	165,550	88,383	-77,167	-47%
Michigan	443,936	228,242	-215,694	-49%
New Jersey	191,035	101,659	-89,376	-47%
New York	388,350	230,001	-158,349	-41%
Ohio	546,547	252,828	-293,719	-54%
Pennsylvania	562,366	293,048	-269,318	-48%
Texas	1,277,432	869,949	-407,482	-32%
Virginia	313,848	161,677	-152,171	-48%
West Virginia	174,219	136,333	-37,886	-22%

As reported by EPA, final CSAPR update summaries

Maryland

Step 1: Identify Problem Monitors

- Utilize SIP approvable modeling to demonstrate attainment (EPA Updated 12km)

				DVf (2023) Average (ppb) - Nonattainment		
Monitor	State	County	DVb (2011)	Original 12km Modeling	Updated 12km Modeling	4km Modeling
240251001	Maryland	Harford	90.0	71.4	70.9	71.1

				DVf (2023) Maximum (ppb) - Maintenance		
Monitor	State	County	DVb (2011)	Original 12km Modeling	Updated 12km Modeling	4km Modeling
240251001	Maryland	Harford	90.0	73.8	73.3	73.5

Step 1 : International Contribution

Harford: (only nonattainment monitor at 4km) – 71.1 ppb

- Reduction needed to achieve attainment: 0.2 ppb
- International contribution
  - Canada/Mexico: 0.43 ppb (assumed to be 100% international)
  - Boundary Conditions: no credit for any portion of the 11.34 ppb BC needed to bring monitor into attainment
    - 89% of global NO_x emissions are generated outside U.S.
- Weight of Evidence: Harford is likely to be in attainment of the 2015 ozone NAAQS "but for" international emissions

Step 1: International Emissions

- NOx Emissions influencing boundary condition are overwhelmingly (89%) from international sources:
  - China 21%
  - Int. Shipping 13%
  - USA 11%
  - India 7%
  - Russian Fed. 3%
  - Brazil 3%
  - Iran 2%
  - Indonesia 2%
  - Japan 2%
  - Mexico 2%
  - Int. Aviation 2%
  - Canada 1%
  - Saudi Arabia 1%

- Source: "European Commission, Joint Research Centre (JRC)/PBL Netherlands Environmental Assessment Agency. Emission Database for Global Atmospheric Research (EDGAR)"

Step 2: Linkage assessment (1%)

- Using the linkage calculations from the 12km simulation, Alpine selected the states with linkage to problem receptors (based on the 1% of 70 pbb NAAQS) to define source regions in 4km OSAT simulation

Monitor	Name	PA	VA/DC	IL	IN	OH	WV	KY	MI	TX
240251001	Harford, MD	x	x	x	x	x	x	x	x	x

Step 2: Linkage assessment (> 1 ppb)

- Using the linkage calculations from the 12km simulation, Alpine also identified states with linkage to problem receptors > 1 ppb

Monitor	Name	PA	VA/DC	IL	IN	OH	WV	KY
240251001	Harford, MD	x	x	x	x	x	x	x

Step 3 – Determine Required Response for Maintenance

- No nonattainment receptors (if emissions from Canada/Mexico are recognized)
- If only maintenance, allow the following alternatives
  - Show cost effective controls in place, or
  - 10 year projection with no emission increase

Step 3: Maintenance Alternative: 10 Year Reduction Demonstration

	Annual Anthropogenic NOx Emissions			
State	**2011 (Tons)**	**2023 (Tons)**	**Change (Tons)**	**Change (%)**
District of Columbia	9,404	4,569	-4,834	-51%
Illinois	506,607	293,450	-213,156	-42%
Indiana	444,421	243,954	-200,467	-45%
Kentucky	327,403	171,194	-156,209	-48%
Michigan	443,936	228,242	-215,694	-49%
Ohio	546,547	252,828	-293,719	-54%
Pennsylvania	562,366	293,048	-269,318	-48%
Texas	1,277,432	869,949	-407,482	-32%
Virginia	313,848	161,677	-152,171	-48%
West Virginia	174,219	136,333	-37,886	-22%

As reported by EPA, final CSAPR update summaries

Step 3 – Determine Required Response to Nonattainment

- If Harford is designated as nonattainment allow the following alternatives
  - Show cost effective controls in place, or
  - Proportional contribution (a.k.a., 'red lines' approach)

Step 3: "Red Lines" Allocation Alternative

- Upwind states are obligated to reduce emissions but no more than necessary to achieve attainment or eliminate linkage
- CAA does not specify how to allocate among upwind states
- EPA's CSAPR cost based allocation method was upheld by the Supreme Court in part because of the complexity of other approaches
- This situation is much simpler

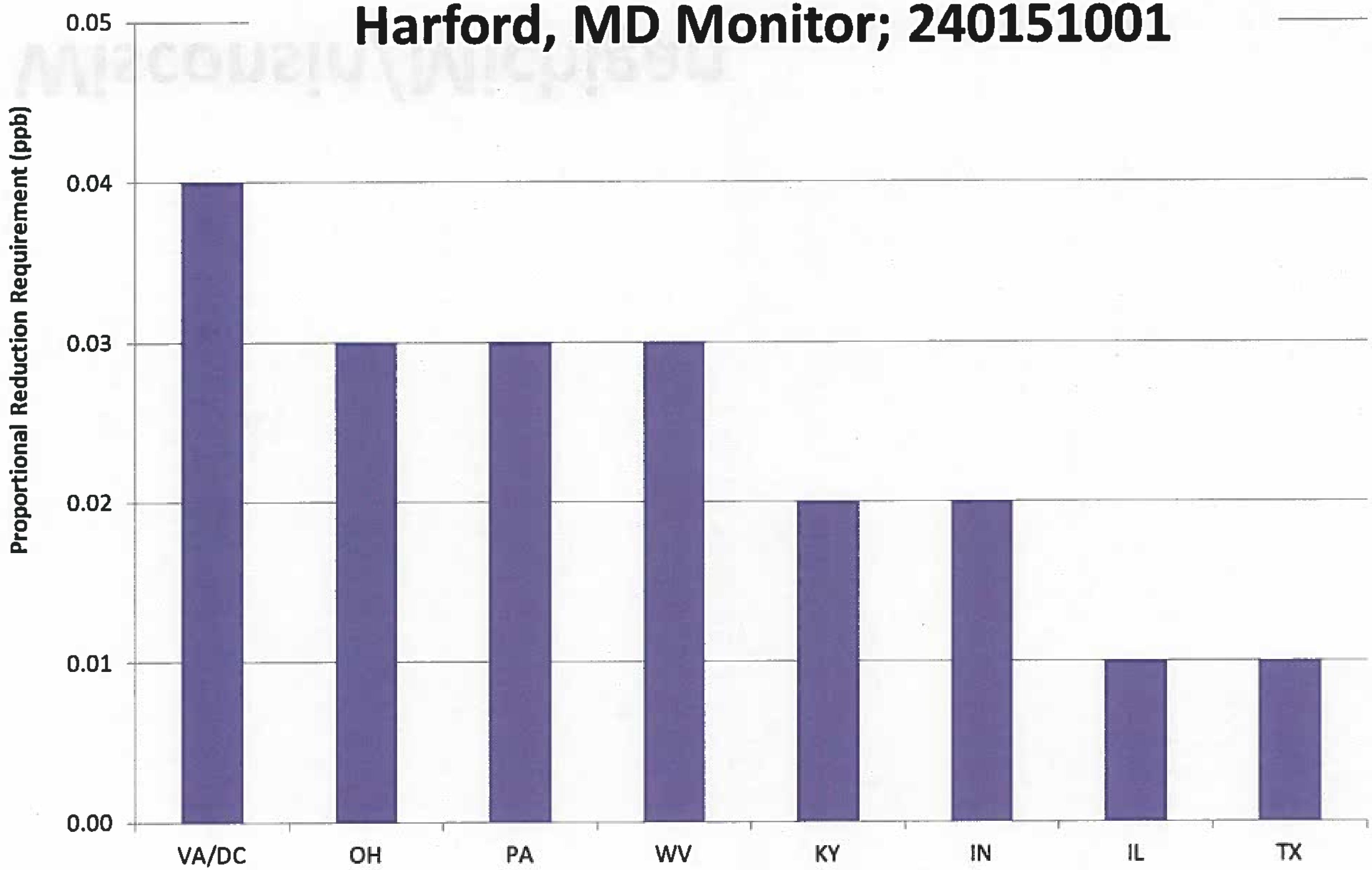
Step 3: Red Lines Alternative Harford, MD

Anthropogenic Contribution (ppb) from 2023 Base Case – 4km OSAT Modeling

Redlines Reduction Contribution Calculation – Harford, MD
Upwind State must achieve less than 0.70 ppb significant contribution or monitor must achieve attainment
Reduction Necessary for Attainment = 0.2 ppb from 71.1 ppb

	Relative Contribution of Significant Upwind States (ppb and %)		Proportional Reduction Requirement (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**

Proportional Reduction Requirements for Harford, MD Monitor; 240151001



Wisconsin/Michigan

Step 1: Identify Problem Monitors

				Original 12km Modeling		Updated 12km Modeling		4km Modeling	
Monitor	State	County	DVb (2011)	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max	DVf (2023) Ave	DVf (2023) Max
260050003	Michigan	Allegan	82.7	69.0	71.8	69.0	71.7	70.3	73.1
550790085	Wisconsin	Milwaukee	80.0	65.4	67.0	71.2	73.0	67.4	70.5
551170006	Wisconsin	Sheboygan	84.3	70.8	73.1	72.8	75.1	71.7	74.0

Step 1 (cont.): International Contribution

Sheboygan: (only nonattainment monitor at 4km) – 71.7 ppb

- Reduction needed to achieve attainment: 0.8 ppb
- International contribution (from 12km modeling)
  - Canada/Mexico: 0.69 ppb (assumed to be 100% international)
  - Boundary Conditions: 17.53 ppb (only need credit for 0.11 ppb – less than 1%- of BC (in addition to Can/Mex) to bring monitor into attainment
    - 89% of global NOx emissions are generated outside U.S.
- Weight of Evidence: Sheboygan is likely to be in attainment of the 2015 ozone NAAQS "but for" international emissions

Step 1: International Emissions

- NOx Emissions influencing boundary condition are overwhelmingly (89%) from international sources:
  - China 21%
  - Int. Shipping 13%
  - USA 11%
  - India 7%
  - Russian Fed. 3%
  - Brazil 3%
  - Iran 2%
  - Indonesia 2%
  - Japan 2%
  - Mexico 2%
  - Int. Aviation 2%
  - Canada 1%
  - Saudi Arabia 1%

- Source: "European Commission, Joint Research Centre (JRC)/PBL Netherlands Environmental Assessment Agency. Emission Database for Global Atmospheric Research (EDGAR)"

Step 1 (cont.): Problem Monitors

- Sheboygan, Wisconsin: Maintenance only (assuming international emissions are recognized)
- Allegan, Michigan: Maintenance

Step 2: Linkage assessment (1%)

Site ID	State	County	2023 Avg DV	2023 Max DV	AR	IL	IN	IA	KS	KY
551170006	Wisconsin	Sheboygan	72.8	75.1	0.51	15.73	7.11	0.45	0.46	0.81
260050003	Michigan	Allegan	69.0	71.7	1.64	19.62	7.11	0.77	0.77	0.58

Site ID	State	County	LA	MI	MO	OH	OK	TX	WI
551170006	Wisconsin	Sheboygan	0.84	2.06	1.37	1.10	0.95	1.65	9.09
260050003	Michigan	Allegan	0.70	3.32	2.61	0.19	1.31	2.39	1.95

Site ID	State	County	Can + Mex	Offshore	Fire	Initial & Boundary	Biogenic
551170006	Wisconsin	Sheboygan	0.69	0.55	0.64	17.53	7.51
260050003	Michigan	Allegan	0.54	0.36	0.93	11.85	8.91

EPA 12km APCA contribution calculations

Step 2: Linkage assessment (> 1 ppb)

Site ID	State	County	2023 Avg DV	2023 Max DV	AR	IL	IN	MI
551170006	Wisconsin	Sheboygan	72.8	75.1	0.51	15.73	7.11	2.06
260050003	Michigan	Allegan	69.0	71.7	1.64	19.62	7.11	3.32

Site ID	State	County	MO	OH	OK	TX	WI
551170006	Wisconsin	Sheboygan	1.37	1.10	0.95	1.65	9.09
260050003	Michigan	Allegan	2.61	0.19	1.31	2.39	1.95

Site ID	State	County	Can + Mex	Offshore	Fire	Initial & Boundary	Biogenic
551170006	Wisconsin	Sheboygan	0.69	0.55	0.64	17.53	7.51
260050003	Michigan	Allegan	0.54	0.36	0.93	11.85	8.91

EPA 12km APCA contribution calculations

Step 3 – Determine Required Response

- No nonattainment receptors (if international emissions are recognized)
- Only problem monitors: maintenance
- Alternative maintenance approaches
  - Show cost effective controls in place;or
  - 10 year projection with no emission increase

Step 3: Maintenance Alternative: 10 Year Reduction Demonstration

State	Annual Anthropogenic NOx Emissions			
	2011 (Tons)	2023 (Tons)	Change (Tons)	Change (%)
Illinois	506,607	293,450	-213,156	-42%
Indiana	444,421	243,954	-200,467	-45%
Kentucky	327,403	171,194	-156,209	-48%
Louisiana	535,339	373,849	-161,490	-30%
Michigan	443,936	228,242	-215,694	-49%
Missouri	376,256	192,990	-183,266	-49%
Ohio	546,547	252,828	-293,719	-54%
Oklahoma	427,278	255,341	-171,937	-40%
Texas	1,277,432	869,949	-407,482	-32%

As reported by EPA, final CSAPR update summaries

Step 3 – Determine Required Response to Nonattainment

- If Sheboygan is deemed to be nonattainment allow the following alternatives
  - Show cost effective controls in place, or
  - Proportional contribution (a.k.a., 'red lines' approach)

Step 3: “Red Lines” Allocation Alternative

- Upwind states are obligated to reduce emissions but no more than necessary to achieve attainment or eliminate linkage
- CAA does not specify how to allocate among upwind states
- EPA’s CSAPR cost based allocation method was upheld by the Supreme Court in part because of the complexity of other approaches
- This situation is much simpler

Step 3: Red Lines Alternative

Redlines Reduction Contribution Calculation - Sheboygan, WI

Upwind State must achieve less than 0.70 ppb significant contribution or monitor must achieve attainment

Reduction Necessary for Attainment = 1.90 ppb from 72.8 ppb

	Relative Contribution of Significant Upwind States (ppb and %)		Proportional Reduction Requirement (ppb)
IL	15.73	50%	0.95
IN	7.11	22%	0.43
MI	2.06	7%	0.12
TX	1.65	5%	0.10
MO	1.37	4%	0.08
OH	1.10	3%	0.07
OK	0.95	3%	0.06
LA	0.84	3%	0.05
KY	0.81	3%	0.05
Total	**31.62**	**100%**	**1.90**

EPA final CSAPR update 12km APCA contributions

Texas

Step 1: Identify Problem Monitors

Site ID	State	County	2009-13 Avg DV	2009-13 Max DV	2023 Avg DV	2023 Max DV
480391004	Texas	Brazoria	88.0	89	74.0	74.9
484392003	Texas	Tarrant	87.3	90	72.5	74.8
482011039	Texas	Harris	82.0	84	71.8	73.5
482010024	Texas	Harris	80.3	83	70.4	72.8
481210034	Texas	Denton	84.3	87	69.7	72.0
482011034	Texas	Harris	81.0	82	70.8	71.6

EPA 12km design values as published in March 27, 2018 EPA memo

Step 1 (cont.): International Contribution

Tarrant (484392003) – 72.5 ppb (12km modeling)

- Reduction needed to achieve attainment: 1.6 ppb
- International contribution
  - Canada/Mexico: 1.24 ppb (assumed to be 100% international)
  - Boundary Conditions: 24.38 ppb (only need credit for 0.36 ppb – 1.5 % of BC -in addition to Can/Mex - to bring monitor into attainment)
    - 89% of global NOx emissions are generated outside U.S.
- Weight of Evidence: This monitor is likely to be in attainment of the 2015 ozone NAAQS "but for" international emissions

Step 1 (cont.): International Contribution

Harris (482011039) – 71.8 ppb (12km modeling)

- Reduction needed to achieve attainment: 0.9 ppb
- International contribution
  - Canada/Mexico: 0.47 ppb (assumed to be 100% international)
  - Boundary Conditions: 24.67 ppb (only need credit for 0.43 ppb – 1.7 % of BC - in addition to Can/Mex - to bring monitor into attainment)
    - 89% of global NOx emissions are generated outside U.S.
- Weight of Evidence: This monitor is likely to be in attainment of the 2015 ozone NAAQS "but for" international emissions

Step 1 (cont.): International Contribution

Brazoria (480391004) – 74.0 ppb (12km modeling)

- Reduction needed to achieve attainment: 3.1 ppb
- International contribution
  - Canada/Mexico: 0.44 ppb (assumed to be 100% international)
  - Boundary Conditions: 24.02 ppb (only need credit for 2.66 ppb – 11.07% of BC - in addition to Can/Mex - to bring monitor into attainment)
    - 89% of global NOx emissions are generated outside U.S.
- Weight of Evidence: This monitor is likely to be in attainment of the 2015 ozone NAAQS "but for" international emissions

Step 1: International Emissions

- NOx Emissions influencing boundary condition are overwhelmingly (89%) from international sources:
  - China 21%
  - Int. Shipping 13%
  - USA 11%
  - India 7%
  - Russian Fed. 3%
  - Brazil 3%
  - Iran 2%
  - Indonesia 2%
  - Japan 2%
  - Mexico 2%
  - Int. Aviation 2%
  - Canada 1%
  - Saudi Arabia 1%

- Source: "European Commission, Joint Research Centre (JRC)/PBL Netherlands Environmental Assessment Agency. Emission Database for Global Atmospheric Research (EDGAR)"

Step 2: Linkage assessment (1%)

Site ID	State	County	2023 Avg DV	2023 Max DV	AR	IL	LA	MS	MO	OK
480391004	Texas	Brazoria	74.0	74.9	0.90	1.00	3.80	0.63	0.88	0.90
484392003	Texas	Tarrant	72.5	74.8	0.78	0.29	1.71	0.27	0.38	1.71
482011039	Texas	Harris	71.8	73.5	0.99	0.88	4.72	0.79	0.88	0.58
482010024	Texas	Harris	70.4	72.8	0.29	0.34	3.06	0.50	0.38	0.20
481210034	Texas	Denton	69.7	72.0	0.58	0.23	1.92	0.33	0.24	1.23
482011034	Texas	Harris	70.8	71.6	0.54	0.51	3.38	0.39	0.63	0.68

Site ID	State	County	TX	Can + Mex	Offshore	Fire	Initial & Boundary	Biogenic
480391004	Texas	Brazoria	26.00	0.44	2.31	2.05	24.02	5.60
484392003	Texas	Tarrant	27.64	1.24	1.18	1.34	24.38	6.44
482011039	Texas	Harris	22.82	0.47	4.04	2.09	24.67	4.50
482010024	Texas	Harris	25.62	0.28	4.83	0.77	27.83	2.66
481210034	Texas	Denton	26.69	0.92	1.23	0.87	24.69	6.42
482011034	Texas	Harris	25.66	0.24	3.91	1.75	25.71	3.44

EPA 12km APCA contribution calculations

1% Contribution Threshold

- Some states and stakeholders argue that 1% (0.70 ppb) is not scientifically supported and is more stringent than current 2016 EPA Significant Impact Level (SIL) guidance of 1.0 ppb
- Potential for states to submit SIP revision citing SIL as acceptable for total state anthropogenic contribution threshold
- Allow as an alternative that significance occurs if greater than 1 ppb and eliminate linkage with 5 upwind states

Step 2: Linkage assessment (> 1 ppb)

Site ID	State	County	2023 Avg DV	2023 Max DV	LA	OK	TX
480391004	Texas	Brazoria	74.0	74.9	3.80	0.90	26.00
484392003	Texas	Tarrant	72.5	74.8	1.71	1.71	27.64
482011039	Texas	Harris	71.8	73.5	4.72	0.58	22.82
482010024	Texas	Harris	70.4	72.8	3.06	0.20	25.62
481210034	Texas	Denton	69.7	72.0	1.92	1.23	26.69
482011034	Texas	Harris	70.8	71.6	3.38	0.68	25.66

Site ID	State	County	Can + Mex	Offshore	Fire	Initial & Boundary	Biogenic
480391004	Texas	Brazoria	0.44	2.31	2.05	24.02	5.60
484392003	Texas	Tarrant	1.24	1.18	1.34	24.38	6.44
482011039	Texas	Harris	0.47	4.04	2.09	24.67	4.50
482010024	Texas	Harris	0.28	4.83	0.77	27.83	2.66
481210034	Texas	Denton	0.92	1.23	0.87	24.69	6.42
482011034	Texas	Harris	0.24	3.91	1.75	25.71	3.44

EPA 12km APCA contribution calculations

Step 3 – Determine Required Response

- No nonattainment receptors (if international emissions are recognized)
- Only problem monitors: maintenance
- Alternative maintenance approaches
  - Show cost effective controls in place; or
  - 10 year projection with no emission increase

Step 3: Maintenance Alternative: 10 Year Reduction Demonstration

State	Annual Anthropogenic NOx Emissions			
	2011 (Tons)	2023 (Tons)	Change (Tons)	Change (%)
Arkansas	232,185	132,148	-100,037	-43%
Illinois	506,607	293,450	-213,156	-42%
Louisiana	535,339	373,849	-161,490	-30%
Mississippi	205,800	105,941	-99,859	-49%
Missouri	376,256	192,990	-183,266	-49%
Oklahoma	427,278	255,341	-171,937	-40%

As reported by EPA, final CSAPR update summaries

Step 3 – Determine Required Response to Nonattainment

If Tarrant, Harris and/or Brazoria are deemed to be nonattainment, allow the following alternatives

- Show cost effective controls in place, or
- Proportional contribution (a.k.a., 'red lines' approach)

Conclusion

- Approval of Good Neighbor SIP for 2008 and 2015 ozone NAAQS would obviate new transport rules and 126 petitions and the 176A petition
- Good Neighbor SIPs can be approved without new controls for all states in the East with recognition of the following:
- Step 1:
  - Alternative modeling platforms
    - Recognition of the several modeling platforms that are known to be appropriate to assess transport, including 12km and 4 km
    - MOG 4km modeling improves results in NY/CT; MD; MI/WI

Conclusion (cont.)

Step 1 (cont.):

- Recognition of international emissions
  - Allowing credit for only Can/Mex resolves MD
  - Allowing additional credit for 1% of BC resolves all monitors in East other than TX
  - Allowing additional credit for 2% of BC resolves all monitors in East other than 1 monitor in TX
  - Allowing additional credit for 12% of BC resolves all of East, including TX

Conclusion (cont.)

- Step 2:
  - Allow linkage to be based on impacts greater than 1 ppb (not 1 %) eliminates linkages with TX for the states of AR, MS, MO, OK, IL)
- Step 3:
  - Allow "maintenance" to be addressed through a no emission increase demonstration helps all upwind states
  - For nonattainment, allow states to allocate responsibility for new control. This works particularly well in MD and WI which have only 1 potential nonattainment monitor (if international is not considered). Once ppb contribution to nonattainment is determined, states can calculate the extent to which emissions would need to be reduced or cost-justified

Contact Information

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Appendix D

Public Hearing

KENTUCKY DIVISION FOR AIR QUALITY
NOTICE OF PUBLIC HEARING
TO REVISE KENTUCKY'S STATE IMPLEMENTATION PLAN

The Kentucky Energy and Environment Cabinet will conduct a public hearing on September 21, 2018, at 10:00 a.m. (EDT) in Conference Room 111 located at 300 Sower Boulevard, Frankfort, Kentucky 40601. This hearing is being held to receive comments on a proposed revision to Kentucky's 2015 Ozone Standard Infrastructure State Implementation Plan (SIP) addressing the Clean Air Act (CAA) Section 110 requirements.

This hearing is open to the public and all interested persons will be given the opportunity to present testimony. The hearing will be held, if requested, at the date, time and place given above. It is not necessary that the hearing be held or attended in order for persons to comment on the proposed submittal to EPA. To assure that all comments are accurately recorded, the Division requests that oral comments presented at the hearing also be provided in written form, if possible. To be considered part of the hearing record, written comments must be received by the close of the hearing. Written comments should be sent to the contact person. All comments must be submitted no later than September 21, 2018.

The full text of the proposed SIP revision is available for public inspection and copying during regular business hours (8:00 a.m. to 4:30 p.m.) at the following location: Division for Air Quality, 300 Sower Boulevard, Frankfort, Kentucky 40601. Any individual requiring copies may submit a request to the Division for Air Quality in writing, by telephone or by fax. Requests for copies should be directed to the contact person. In addition, an electronic version of the proposed SIP revision document and relevant attachments can be downloaded from the Division for Air Quality's website at: **http://air.ky.gov/Pages/PublicNoticesandHearings.aspx.**

The hearing facility is accessible to people with disabilities. An interpreter or other auxiliary aid or service will be provided upon request. Please direct these requests to the contact person. CONTACT PERSON: Lauren Hedge, Environmental Scientist II, Evaluation Section, Division for Air Quality, 300 Sower Boulevard, Frankfort, Kentucky 40601. Phone: (502) 782-6561; E-mail: Lauren.Hedge@ky.gov.

The Energy and Environment Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion or disability and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs and activities.

Energy and Environment Cabinet
DIVISION FOR AIR QUALITY
Public Hearing
September 21, 2018

	TESTIMONY			
Name: Stephanie Stumbo				
Affiliation/Company: Goss Samford, PLLC	Verbal	Written	None	Time limited?
Address: 2365 Harrodsburg Rd B-325			✓	
City: Lexington State: Ky Zip: 40504	Copy of SOC?			

	TESTIMONY			
Name: Brian Clark				
Affiliation/Company: KPMA	Verbal	Written	None	Time limited?
Address: 2365 Harrodsburg Rd. Suite A-325			✓	
City: Lexington State: Ky Zip: 40504	Copy of SOC?			

	TESTIMONY			
Name: Larry Taylor				
Affiliation/Company: DEP-CO	Verbal	Written	None	Time limited?
Address: 300 ~~Fair Oaks Ln~~ Sower Blvd			✓	
City: Frankfort State: KY Zip: 40601	Copy of SOC?			

	TESTIMONY			
Name: Anna Bowman				
Affiliation/Company: DAQ	Verbal	Written	None	Time limited?
Address: 300 Sower Blvd.			✓	
City: Frankfort State: KY Zip: 40601	Copy of SOC?			

	TESTIMONY			
Name:				
Affiliation/Company:	Verbal	Written	None	Time limited?
Address:				
City: State: Zip:	Copy of SOC?			

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 20, 2018

Mr. Sean Alteri, Acting Director
Kentucky Energy and Environment Cabinet
Department for Environmental Protection
300 Sower Blvd.
Frankfort, Kentucky 40601

Dear Mr. Alteri:

Thank you for your letter dated August 23, 2018, transmitting a prehearing state implementation plan (SIP) revision addressing Kentucky's obligations under the Clean Air Act's Section 110(a)(1) and (2) for the 2015 8-hour ozone National Ambient Air Quality Standard, also known as the "infrastructure" SIP. This certification of compliance with infrastructure requirements is the subject of a public hearing scheduled for September 21, 2018. We have completed our preliminary review of the prehearing package and offer comments in the enclosure.

We look forward to continuing to work with you and your staff. If you have any questions, please contact Ms. Lynorae Benjamin, Chief, Air Regulatory Management Section, at (404) 562-9040, or have your staff contact Mr. Brad Akers at (404) 562- 9089.

Sincerely,

R. Scott Davis
Chief
Air Planning and Implementation Branch

Enclosure

The U.S. Environmental Protection Agency Comments on Kentucky's Prehearing Submittal Regarding the 2015 Ozone Infrastructure State Implementation Plan (SIP)

Key Comments

Section 110(a)(2)(D)(i)(I), "Prongs 1 and 2"

1. The modeling performed by Alpine Geophysics (Alpine) in support of Kentucky's 2015 ozone interstate transport SIP determined downwind nonattainment monitors in 2023 and evaluated the significance of upwind states contributions for the 2015 ozone national ambient air quality standards (NAAQS) based on alternative flexibilities and/or analytics proposed in the EPA's March 27, 2018 Memorandum *(Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone NAAQS under the Clean Air Act Section 110(a)(2)(D)(i)(I)*. As discussed on page 50 of the SIP submission, the use of these flexibilities provide alternative results than the EPA's 2023 modeling platform in terms of downwind receptors and Kentucky's projected contribution. We would like to have further discussions on these differences and below provide examples.

    a. Page 51 - Alpine projects the Harford County, Maryland, monitor as a nonattainment receptor with an average design value of 71.1 parts per billion (ppb). In the submittal, Kentucky indicates that the EPA's modeling platform did not account for newly announced unit retirements, fuel switching and modifications. Please identify any specific emission reductions anticipated in the downwind state that Kentucky believes were not accounted for in the EPA's modeling. To the extent that Kentucky believes anticipated emission reductions would address the average design value of 71.1 ppb identified in the Alpine modeling, Kentucky should also explain how such reductions would address maintenance concerns at this same receptor, given both the EPA modeling and the Alpine modeling identified a maximum design value of 73.3 ppb and 73.5 ppb, respectively.

    b. Page 53 - Kentucky says that the EPA "...did not run separate models to assess how much the emissions from Canada and Mexico contributed to monitors within the U.S. Alpine determined that accounting for the contribution of emissions from Canada and Mexico would impact the attainment status of several monitors." The EPA believes these statements blend different aspects of accounting for contributions from Canada and Mexico. Specifically, the EPA did provide separate contribution data for emissions from in the portions of Canada and Mexico within the modeling domain, as did Alpine. However, Alpine applied these contributions to the projected 2023 design values to lower the design values by the amount of contribution from Canada and Mexico. Please provide more information to support the technical basis for this approach to calculating design values. The application of this approach does not address the maintenance concerns at this same receptor, given both the EPA modeling and the Alpine modeling identified a maximum design value of 73.3 ppb and 73.5 ppb, respectively, and would still be above the NAAQS even without inclusion of the 2023 Canada and Mexico contributions.

    c. Pages 54-55 - Kentucky suggests that the degree of reductions required of upwind states linked to maintenance receptors should be different than that required for upwind states linked to nonattainment receptors. However, Kentucky does not propose how the obligations of upwind states should differ for the former group of upwind states. As noted, the EPA's modeling links emissions from Kentucky to one maintenance receptor in Harford County, Maryland, based on the 1 ppb threshold. The Alpine modeling identifies this receptor as nonattainment, which Kentucky asserts would have an average design value below the NAAQS if certain other factors, addressed in prior comments, were considered. The EPA notes that the obligation to address maintenance of the NAAQS also applies to receptors identified as nonattainment receptors. Therefore, considering the results of either modeling platform, Kentucky should explain how it has addressed its projected interference to maintenance of the NAAQS at the Harford County receptor.

2. The analysis of Step 1 and Step 2 includes an intricate combination of the EPA's 12-kilometer (km) modeling and Alpine's 4-km modeling. The outcome of this approach appears to be that Kentucky is linked for nonattainment and maintenance (i.e. prong 1 and prong 2) to the receptor in Harford County, Maryland where the 2023 average design value for this site based on Alpine's modeling is 71.1 ppb. The approach in the SIP involves mixing and matching the contribution data from the EPA's modeling with design values from Alpine's modeling. The EPA is unclear as to how this additional information would provide a basis to conclude that Kentucky does not significantly contribute to downwind receptors. An alternative, more straightforward approach would be to rely entirely upon the EPA's projected design values and contribution data and apply the 1 ppb screening threshold established in the EPA's August 31, 2018 Memorandum to the contributions from Kentucky to downwind receptors. Specifically, the EPA's modeling projects that the Harford site will be a maintenance-only receptor with a 2023 average design value of 70.9 ppb. *See* 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. The EPA's modeling also shows that this site is the only receptor to which Kentucky contributes above 1 ppb. Thus, under this approach Kentucky would only be linked to the maintenance receptor in Harford County, Maryland.

3. The SIP refers to a number of expected electricity generating units (EGU) closures, plans for fuel-switching, and other actions that are expected to reduce future nitrogen oxide (NOx) emissions in Kentucky (page 31). As indicated in comment 1 above, in the SIP revision, please identify which of these actions were not accounted for in the EPA's 2023 modeling. Also, in support of Kentucky's analysis, please provide an estimate of the anticipated ozone season NOx emissions reductions from these actions in 2023. The EPA encourages Kentucky to include information about NOx reduction efforts, costs, and air quality impacts which may help provide the Agency with additional rationales for why further NOx reduction is not needed. In addition, Kentucky should consider including information related to steps 3 (identification of emissions reductions necessary – considering costs and air quality factors – to prevent an identified upwind state from contributing significantly to those downwind monitors) and 4 of EPA's traditional 4-step framework. This discussion should include information about EGU as well as non-EGU sources. If the Commonwealth intends to rely on the anticipated reductions related to these facilities as measures to address its contribution to downwind receptors, then the Commonwealth would need to consider providing a separate SIP revision that incorporates these emission reductions into the SIP and demonstrates how the reductions at these facilities will affect the receptors to which the Commonwealth is linked.

Section 110(a)(2)(D)(i)(I), "Prong 4"

4. To obtain full approval for prong 4, a state can either rely on a fully approved regional haze SIP or provide a demonstration in its infrastructure SIP submission that emissions within its jurisdiction do not interfere with other air agencies' plans to protect visibility. The EPA acknowledges Kentucky's ongoing work to obtain a full approval of its regional haze SIP, including a pending SIP submission that would change the Commonwealth's reliance from the Clean Air Interstate Rule to the Cross-State Air Pollution Rule for for certain regional haze requirements.

General Comments

Section 110(a)(2)(D)(i)(I), "Prongs 1 and 2"

5. Kentucky's prehearing submittal discusses use of a 1.0 ppb threshold in relation to the 2015 EPA Significant Impact Level (SIL) guidance. On April 17, 2018, the EPA released guidance on ozone and particulate matter significant impact levels (SILs) for the prevention of significant deterioration (PSD) permitting program. The EPA has not made the determination that the SIL, developed for source-specific PSD purposes, could be considered an appropriate threshold to use when assessing contribution from an entire-state. The EPA's August 31, 2018, memorandum regarding use of a 1.0 ppb threshold, stated that the amount of upwind collective contribution captured with the 1 percent and 1.0 ppb thresholds was generally comparable and that it may be reasonable and appropriate for states to use a 1 ppb contribution threshold. The EPA recommends Kentucky consider referring to this memorandum as part of its rationale for comparing its contribution to a 1 ppb threshold. *See* Memorandum from Peter Tsirigotis, Director, OAQPS to Regional Air Division Directors, re: 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, available at https://www.epa.gov/sites/production/files/2018-09/documents/contrib_thresholds_transport_sip_subm_2015_ozone_memo_08_31_18.pdf. If Kentucky believes it is appropriate to use the 1 ppb threshold in its SIP development, then the Commonwealth would only be linked to one potential maintenance receptor for the 2015 ozone NAAQS in the EPA's 2023 air quality modeling in Harford County, Maryland (which Alpine modeling identifies as a nonattainment receptor). The EPA notes that the contribution threshold alone was not intended to represent a "significant contribution" as suggested on page 51 of the SIP submission, but rather a contribution that merits more consideration to determine *if* a state impacting a downwind receptor above that threshold will significantly contribute to nonattainment or interfere with maintenance of the NAAQS.

6. On page 31 of the prehearing submission, the EPA notes that Kentucky cites to the Cross-State Air Pollution Rule (CSAPR) Update as part of its interstate transport demonstration for the 2015 ozone NAAQS. The Update trading program provides for reductions of annual and ozone season nitrogen oxides (NOx) and sulfur dioxide emissions from EGUs, and the analyses used to develop the Update rule were based on data and inputs specific to addressing downwind nonattainment and maintenance issues for the 1997 and 2008 ozone NAAQS. The EPA suggests the Commonwealth modify the discussion on page 31 to clarify that the CSAPR trading programs were developed to address states' 110(a)(2)(D)(i)(I) obligations for the 1997 and 2008 ozone NAAQS but may provide NOx emission reduction co-benefits for the 2015 ozone NAAQS.

Section 110(a)(2)(J) (Consultation)

7. The EPA recommends that Kentucky include a statement noting that 40 CFR 51.308(i)(4) requires states to maintain continuing consultation procedures with the Federal Land Managers regarding any regional haze plan (or plan revision), and includes progress reports, and that Kentucky maintains such procedures in the Commonwealth's regional haze plan and progress report.

Other Comments

Section 110(a)(2)(D)(i)(I), "Prongs 1 and 2"

8. 401 KAR 51:240 (CSAPR NOx Annual) and 401 KAR 51:250 (CSAPR NOx Ozone Season) are currently listed with other SIP-approved provisions. The EPA suggests that the Commonwealth provide a note that it provided these regulations for approval into the SIP on September 13, 2018.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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SEP 2 1 2018

Ms. Lauren Hedge
Division of Air Quality – Evaluation Section
Kentucky Department of Environmental Protection
300 Sower Boulevard
Frankfort, KY 40601

Dear Ms. Hedge:

The New York State Department of Environmental Conservation (DEC) appreciates the opportunity to comment on the Kentucky Department for Environmental Protection's (KY DEP) proposed infrastructure State Implementation Plan (SIP), specifically the interstate transport pollution section pursuant to Clean Air Act (CAA) section 110(a)(2)(D)(i)(I). Otherwise known as the Good Neighbor provision, this section requires states to include adequate measures in their SIPs prohibiting emissions that result in significant contributions to nonattainment or interference with maintenance in downwind areas, such as New York. According to U.S. EPA's 2023 projection modeling, Kentucky significantly contributes to two Connecticut monitors under the 2015 ozone National Ambient Air Quality Standards (NAAQS) that are within the shared New York-Northern New Jersey-Long Island, NY-NJ-CT nonattainment area (NYMA). DEC therefore has an established interest in KY DEP's transport determination.

DEC commends Kentucky on the reductions in ozone precursor emissions to date, but requests that KY DEP take additional measures to resolve its current significant contributions to the NYMA for the 2015 ozone NAAQS, rather than waiting to see whether its contributions are resolved years into the future. Most importantly, KY DEP should make enforceable commitments for all control measures and operational changes (e.g., unit shutdowns) discussed in this transport analysis. KY DEP relies on 2023 CAMx projection modeling conducted by EPA and Alpine Geophysics in its Good Neighbor demonstration. EPA's 2023 projection modeling is riddled with unenforceable assumptions and inaccuracies that render the results suspect; enclosed are comments submitted by DEC to EPA on the many flaws in its projection modeling associated with its "Cross-State Air Pollution Rule (CSAPR) Close-Out" proposal. Future-year market trends are difficult to predict; EPA has discussed the uncertainty in U.S. Energy Information Administration fuel-use projections, and notes that "[b]ecause of the rapid pace of these power sector changes, it is difficult for sector analysts to fully account for these changing trends in near-term and long-term sector-wide projections. This means that regulatory decisions made today could be based on information that may very well be outdated within the next several years."[1] Without enforceable emission limits being implemented at facilities as assumed in the faulty 2023 modeling, there is no guarantee that any emission reductions will actually occur. This serves to underrepresent the extent of downwind nonattainment and maintenance issues, and minimizes the extent of ozone transport from upwind states such as Kentucky. Additional monitors in the New York City metropolitan area, including in New York State, would likely be shown to be significantly impacted by Kentucky if not for the various issues in EPA's modeling. Irrespective of projected future design values and emissions contributions, Kentucky is obligated to resolve its current significant contributions to the New York City metropolitan area, which continues to record exceedances of the 2008 and 2015 ozone NAAQS.

KY DEP claims that "NOx emissions from EGUs will continue to decrease with the implementation of the CSAPR Update," along with unit retirements. Despite the CSAPR Update being fully implemented, Kentucky sources have not been optimizing their existing controls and the NYMA continues to monitor NAAQS exceedances, due in large part to pollution transport from upwind states like Kentucky.

First, KY DEP must apply enforceable limits to assure projected emission reductions take place. 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."[2] 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."[3] Without specific enforceable emissions limits and control measures, DEC submits that the SIP is incomplete and does not meet the requirements of the CAA and implementing regulations.[4]

KY DEP should institute emission limits consistent with SCR optimization at all EGUs forecasted by U.S. EPA to operate at a 0.1 lb/mmBtu emission rate in 2023, including unit 3 at the Paradise Fossil Plant.[5] While KY DEP touts the shutdown of two coal boilers at Paradise, the remaining unit had 2017 ozone season nitrogen oxide (NOx) emissions of 2,425 tons at an emission rate of 0.223 lb/mmBtu.[6] Had it operated its SCR controls to achieve the assumed rate of 0.1 lb/mmBtu, this one unit by itself would have reduced its 2017 ozone season NOx emissions by an additional 1,338 tons.

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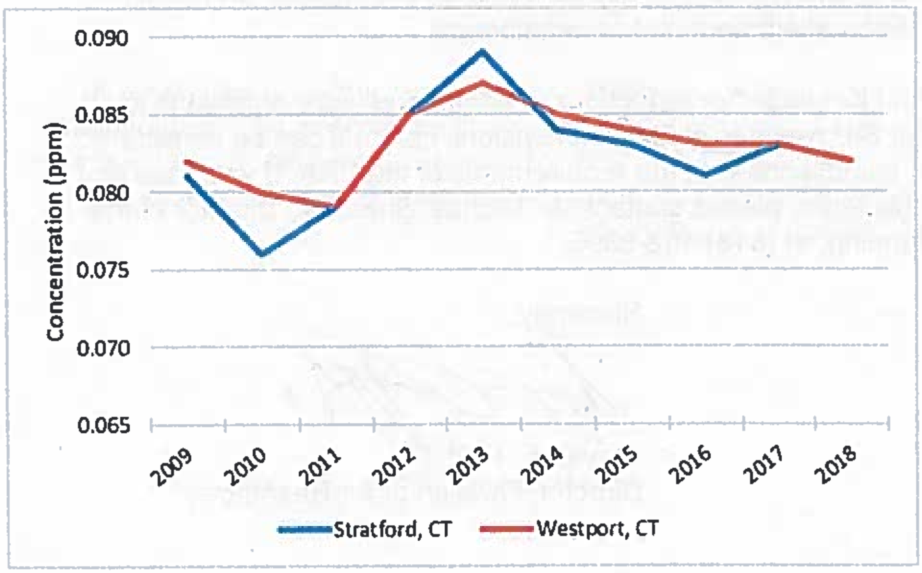
[1] "Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program," Proposed Rule. Published August 31, 2018. 83 FR 44751.
[2] 42 U.S.C. §7410(a)(2)(A)
[3] 40 CFR Part 51, App. V, §2.2(g)
[4] 42 U.S.C. §7410(a)(2) and 40 CFR 60.24
[5] "2023en_Engineering_Analysis_Unit_File.xls" workbook released with October 27, 2017 Page Memorandum
[6] U.S. EPA Air Markets Program Data

Second, KY DEP should implement emission controls on its major stationary sources based on a more stringent control threshold. New York and other downwind states, such as Connecticut, 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 EGUs and non-EGUs, at a current cost threshold of $5,500 per ton of NOx reduced; meanwhile, many upwind states – including Kentucky – 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, emissions from Kentucky's electric generating sector were 400% (16,000 tons) greater than electric generating emissions in New York, with an average emission rate over 200% higher.[7]

While it is true that ozone concentrations are declining over the long term,[8] KY DEP ignores current trends at monitors in the NYMA. Presented below are ozone design value trends for the Stratford and Westport monitors, which show some variation, but both have design values equal to or higher than in 2009 and exhibit an overall flat or increasing design value trend since 2009.[9] This trend has developed despite continual NOx and volatile organic compound reductions from New York, New Jersey, and Connecticut to fulfill their reasonable further progress obligations pursuant to 2008 ozone NAAQS requirements (with actual reductions having greatly exceeded the required three percent per year), further highlighting the need for upwind emission reductions.



[7] U.S. EPA Air Markets Program Data
[8] KY DEP's Proposed Infrastructure State Implementation Plan for the 2015 Ozone National Ambient Air Quality Standards, Table 4 – "Design Values for Kentucky-Linked Downwind Connecticut Monitors"
[9] Note that 2018 design values are preliminary and represent exceedances as of September 5

KY DEP chose to utilize the longstanding contribution threshold of 1% of the standard (i.e., 0.70 ppb for the 2015 NAAQS),[10] though it discussed the validity of using a 1 ppb threshold as an alternative. Despite EPA's August 31, 2018 memorandum analyzing the use of a 1 ppb threshold, DEC believes there is not a sound basis for the piecemeal adoption of such threshold. Rather, the continued use of the 1% threshold is required for consistency across all states and because it is directly tied to the level of the NAAQS; thus, it is a far superior fit to the reductions needed for downwind attainment. If upwind states selectively use a higher contribution threshold while downwind states face a lower, more stringent NAAQS, it will have the inequitable effect of requiring downwind states to reduce their emissions *even more* at greater cost to compensate for upwind states doing *even less* at lower costs. The contribution threshold is tied not only to the linkages established under step 2 of the CSAPR framework, but the resulting emissions budgets for upwind states under step 3. It is unreasonable and clearly inequitable for upwind states, on an ad hoc basis, to use a higher contribution screening threshold at the same time downwind states face a lower NAAQS. For example, while contributions from Kentucky are linked to the two Fairfield, CT monitors at the 1% level, the linkage would not be retained when using a 1 ppb threshold according to the Alpine modeling.[11] Using a higher contribution threshold places the burden of additional reductions at these other downwind monitors entirely on the downwind states (and potentially on other upwind states using a 1% threshold), despite the demonstrable contribution using the settled 1% approach from Kentucky at these monitors. This is clearly not an equitable or cost-effective solution to ensuring downwind states such as New York attain the 2015 ozone NAAQS as expeditiously as practicable, and could mean the difference between attainment and nonattainment.

In summary, we commend Kentucky for reductions in ozone precursor emissions to date, but believe the draft SIP requires significant revisions before it can be considered complete by EPA and in compliance with the requirements of the CAA. If you have any questions in relation to this letter, please contact Mr. Michael Sheehan, Director of the Bureau of Air Quality Planning, at (518) 402-8396.

Sincerely,

Steven E. Flint, PE
Director, Division of Air Resources

Enclosure

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[10] *See, e.g.*, Cross-State Air Pollution Rule (CSAPR), 76 FR 48208, 48236-38 (Aug. 8, 2011) (using 0.80 ppb as threshold, which is 1% of the 1997 ozone NAAQS); Cross-State Air Pollution Rule Update (CSAPR Update), 81 FR 74504, 74518 (Oct. 26, 2016) (using 0.75 ppb threshold, 1% of the 2008 ozone NAAQS; "much of the ozone nonattainment problem being addressed by this rule is still the result of the collective impacts of relatively small contributions from many upwind states.").

[11] KY DEP's Proposed Infrastructure State Implementation Plan for the 2015 Ozone National Ambient Air Quality Standards, Table 9 – "Kentucky Significant Contribution using 1.0 ppb Significant Threshold"

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AUG 3 1 2018

Mr. Andrew Wheeler
Acting Administrator
U.S. Environmental Protection Agency
Mail Code: 1101A
1200 Pennsylvania Avenue NW
Washington, DC 20460

Re: "Determination Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard," Fed. Reg. Vol. 83, No. 132, Pages 31915-31939, July 10, 2018
Docket ID No. EPA-HQ-OAR-2018-0225

Dear Acting Administrator Wheeler:

The New York State Department of Environmental Conservation (DEC) strongly disagrees with EPA's proposed determination that the Cross-State Air Pollution Rule (CSAPR) Update fully addresses interstate pollution transport that impairs New York's ability to meet the 2008 ozone National Ambient Air Quality Standards (NAAQS) (the Proposed Rule). For too long, New Yorkers have been subject to increased asthma and other respiratory illness and even premature mortality due in large part to the transport of air pollution from out-of-state coal-fired power plants. On behalf of the people of New York, I insist that EPA take action now to reduce the upwind pollution that plagues New York, not kick the can down the road until 2023.

For all the reasons explained more fully in the attachment to this letter, EPA's analysis that the New York City metropolitan area will meet the 2008 ozone NAAQS by 2023 is both incredible and irrelevant: incredible because it is based on unreasonable assumptions and ignores EPA's own actions to allow increased pollution; irrelevant because the Clean Air Act requires lower ozone now, not in 2023. Earlier this year, on July 2, 2018, New York experienced ozone levels in the lower Hudson Valley that were the highest seen in the past decade – levels that are "very unhealthy" for the general public, according to EPA's own rating system. EPA's claim that ozone levels will improve significantly by 2023 ignores its regulatory proposals this month designed to increase the consumption of coal and petroleum and allow increased emissions from coal-fired power plants and motor vehicles. In fact, it admits in the Regulatory Impact Analysis for the rollback of the Clean Power Plan that its proposal will increase ozone levels, causing up to 230 additional deaths from elevated ozone levels (and many more from particulate matter).[1] In addition, EPA's conclusion relies on its unsupported

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[1] "Regulatory Impact Analysis for the Proposed Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program." EPA OAQPS, August 2018. Table 4-6, page 4-33.

assumption that upwind power plants will voluntarily run emissions controls, contrary to the documented record that plants do not run their controls unless they are legally required to do so.

Furthermore, EPA's 2023 target for achieving the 2008 ozone standard is an arbitrary target without any basis in the Clean Air Act, seemingly designed to excuse upwind power plants from taking action now to reduce their ongoing contribution to pollution in New York and other locations. EPA does not even bother identifying a legal basis for the 2023 target. In fact, New York was most recently required to achieve compliance with the ozone NAAQS in July 2018, a requirement that is not being met largely due to the 75-95% of New York's ozone that originates out-of-state.[2] EPA is now obligated to reclassify the New York-Northern New Jersey-Long Island, NY-NJ-CT nonattainment area (hereafter NYMA) to serious nonattainment, which would extend the attainment deadline to July 2021 – with compliance based on ozone levels in 2018-2020, well before the 2023 target date assumed by EPA. Absent additional emission reductions in upwind states, it is extremely unlikely that the NYMA will attain the 2008 ozone NAAQS by that 2021 deadline given the attainment margin of 0.1 parts per billion (ppb) in 2023 that EPA predicts under this proposal.[3] Simply put, EPA's 2023 target date is an arbitrary construct that allows upwind coal-fired power plants to continue polluting without using even the most rudimentary pollution controls.

The additional delay in attaining the 2008 ozone NAAQS in the NYMA will further compromise the health of millions of New York residents. Ozone pollution causes a range of respiratory symptoms and aggravates existing conditions such as asthma and lung disease, and likely causes increased mortality and cardiovascular effects. EPA determined in 2015 that the 2008 NAAQS, at a level of 75 ppb, was no longer considered "requisite to protect public health with an adequate margin of safety, as required by the CAA..."[4] New York's ongoing struggle to attain an outdated health standard intensifies the need for relief from upwind states.

New York and the other NYMA states have already implemented more control measures than most, if not all, of the states in the eastern United States, and many of these controls have been implemented at a much higher cost than the estimated costs for available controls in the upwind states. For example, in New York, the most recently available cost data estimates that the marginal cost of additional NOx reductions is

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[2] "updated_2023_modeling_dvs_collective_contributions.xls" workbook released with "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)" Memorandum from Peter Tsirigotis, Director, EPA OAQPS, to Regional Air Division Directors. March 27, 2018.

[3] "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)." Memorandum from Steven D. Page, Director, EPA OAQPS, to Regional Air Division Directors. October 27, 2017.

[4] "National Ambient Air Quality Standards for Ozone," Final Rule. Published October 26, 2016; effective December 28, 2015. 80 FR 65294.

more than \$5,000 per ton of NOx removed.[5] In contrast, the marginal cost of additional controls EPA has used to determine cost-effectiveness in the CSAPR Update was \$800 per ton of NOx removed estimated to optimize existing and operating selective catalytic reduction (SCR) units and \$1,400 per ton of NOx removed estimated to turn on idled existing SCR units. The inequity of control requirements between upwind and downwind states will continue to grow with this proposed action as New York, which will have no more coal-fired power by 2020, is forced to impose additional in-state controls on other sources and consumer products to offset the burden of transported pollution from upwind coal-fired plants.

Finally, EPA should stop subjecting New York and other downwind states to a regulatory form of three card monte, under which it has rejected the requests of New York and other downwind states for action under other provisions of the Clean Air Act based on the availability of the remedy under Section 110(a)(2)(D) that is the basis of CSAPR. In the past year, EPA has denied requests for action under Section 176A (to add States to the Ozone Transport Region) and Section 126 petitions, claiming that its admittedly incomplete CSAPR remedy will fully address interstate air pollution. But now, rather than strengthening CSAPR to provide the complete remedy needed, EPA claims its work is done – because the air will somewhat mysteriously become clean enough on its own by 2023.

Respectfully, EPA should avoid such delusional thinking, grounded in inaccurate assumptions and an arbitrary target date, and do the job required by the Clean Air Act – require upwind states to adhere to their good neighbor obligations and reduce the pollution they allow unabated from coal-fired power plants. EPA should impose more stringent and enforceable control measures that will ensure attainment of the 2008 ozone NAAQS in the NYMA as expeditiously as possible, but no later than the serious nonattainment area compliance deadline of July 20, 2021.

Thank you for your attention and consideration of these views.

Sincerely,

Basil Seggos
Commissioner

Attachment

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[5] New York State DEC, *DAR-20 Economic and Technical Analysis for Reasonably Available Control Technology (RACT)* (Aug. 8, 2013), *available at* https://www.dec.ny.gov/chemical/91851.html

Detailed comments on EPA's methodology

EPA's Proposed Rule is based on a critically flawed modeling analysis that purports to show that there will be no remaining nonattainment or maintenance receptors in the eastern United States in 2023. The inaccuracies in EPA's projection modeling include the following:

Unenforceable Control Assumptions

In Step 1 of its analysis, EPA presumes that certain emission reductions will occur, and thus air quality will improve in the future to such a degree that no area in the eastern United States will endure ozone nonattainment or maintenance issues. Many of these claims of emission reductions are dubious and are unlikely to occur without enforceable provisions. EPA's approach is contrary to the fundamental principle behind the statutory obligation that State Implementation Plans (SIPs) must "include enforceable emission limitations" and "contain adequate provisions prohibiting...any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national ambient air quality standard."[1] By declaring future air quality as attaining the National Ambient Air Quality Standards (NAAQS) without requiring the very measures by which that prediction was made, EPA subverts the text and meaning of Clean Air Act (CAA) section 110(a)(2).

EPA's modeling assumed, with no basis in federally enforceable permit limits, that certain electric generating units (EGUs) would operate existing selective catalytic reduction (SCR) units, or install new state-of-the-art nitrogen oxide (NOx) controls, in 2023. Furthermore, EPA assumes –relying solely on historically unreliable Department of Energy predictions[2] – additional emission reductions in its analysis. In reality, actual emissions data from EPA's Air Markets Program show that, of the 72 Cross-State Air Pollution Rule (CSAPR) region EGUs for which EPA assumed optimized SCR operation (i.e., an emission rate of 0.1 lb/mmBtu),[3] over half – 37 units – operated with a NOx emission rate greater than 0.1 lb/mmBtu in the 2017 ozone season, which was the first implementation year for the CSAPR Update (see enclosure).[4] In some cases, actual emissions of individual units were more than 1,000 tons higher than if they had operated according to EPA's 0.1 lb/mmBtu control assumption – for example, unit 1 at the W.H. Zimmer Generating Station in Ohio emitted 1,432 tons more than if it emitted at the 0.1 lb/mmBtu level, and unit 3 at the Paradise Fossil Plant in Kentucky emitted an additional 1,338 tons.

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[1] Clean Air Act sections 110(a)(2)(A) and 110(a)(2)(i)(I), respectively

[2] U.S. Energy Information Administration's "Annual Energy Outlook Retrospective Review," Table 1 – "AEO Reference Case Projection Results." Available at https://www.eia.gov/outlooks/aeo/retrospective/

[3] "2023en_Engineering_Analysis_Unit_File.xls" workbook released with October 27, 2017 Page Memorandum

[4] Figures ignore two units that had no 2016 or 2017 emissions; five units with 2017 heat input less than 1,000,000 mmBtu, which suggests inconsistent operation not conducive to SCR control; and one unit with no apparent match in the Air Markets Program Data.

EPA claims in its Proposed Rule that it does not need to include enforceable commitments in its projections, stating "...not all of the factors influencing the EPA's modeling projections are or can be enforceable limitations on emissions or ozone concentrations. However, the EPA believes that consideration of these factors contributes to a reasonable estimate of anticipated future ozone concentrations." Enforceability of control measures is a consistent requirement throughout the CAA, whether it be for redesignation to attainment[5] or an attainment SIP.[6] Notably, EPA denied New York's 2008 ozone NAAQS good neighbor SIP, in part, because "the submission did not demonstrate that the emission rates at which [EGUs] in the state operated were the result of enforceable emission limits or other mandatory programs such that the emission rate would not increase."[7] EPA appears to have changed its approach regarding the requirement for enforceable measures without reasonable explanation.

In this case, where over half the units are documented to exceed EPA's assumed rate, the erroneous nature of EPA's rate assumption could not be more clear. Moreover, there will be no more of an incentive for facility owners to operate their SCR controls in 2023 than in 2017. Ozone season NOx emissions in 2017 were 23,000 tons below the cap, and as of the date of these comments, 2018 emissions are on pace to be 51,000 tons below the cap. Given the overabundance of NOx allowances, EGUs can be expected to continue to operate without optimized SCR controls.

The CSAPR program, which allows for banking of allowances, purchasing of allowances to cover excess emissions, and long-term emissions averaging, can be effective at reducing regional emissions when considering a longer timeframe, but does not assure controls will be operated on hot, hazy, and humid summer days when the need for controls is greatest. Despite implementation of the CSAPR Update, the fourth-highest eight-hour ozone concentrations in the NYMA in 2017 and 2018 have continued to exceed the 2008 ozone NAAQS.[8]

Ozone season NOx allowances were valued at only $270 per ton as of August 10, 2018,[9] which is considerably lower than the cost estimates in the now two-year-old CSAPR Update, which EPA reaffirms in its Proposed Rule without any updated analysis: $800 per ton estimated to optimize existing and operating SCR units and

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[5] Section 107(d)(3)(E)(iii)

[6] Section 172(c)(6)

[7] "Partial Approval and Partial Disapproval of Air Quality Implementation Plans; New York; Interstate Transport Infrastructure SIP Requirements for the 2008 Ozone NAAQS," Final Rule. Published August 26,2016. 81 FR 58850. Emission rates in the New York analysis were based on actual emissions that were projected forward reasonably assuming no change in operation. EPA's 2023 modeling, in contrast, is projecting lower future emissions rates and assuming changes in operations without any requirement to do so, many of which have not actually occurred.

[8] New York State DEC, *High Ozone Values During 2018, available at* http://www.dec.ny.gov/chemical/38377.html

[9] Argus Air Daily, Issue 18-154, August 10, 2018

$1,400 per ton estimated to turn on idled existing SCR units.[10] Allowance prices never exceeded the $800 per ton threshold during the 2017 ozone season or the 2018 ozone season to date. Absent permanent and enforceable emission limits, it is unreasonable to assume that units will operate already-installed controls, rather than just purchasing cheaper allowances.

Uncertainty in Model Performance

Under the 4-step approach, EPA attempts to determine future air quality through the use of projection inventories and predictive air quality modeling. While this is valid in attempting to compare the potential efficacy of proposed control strategies and other emission reduction scenarios, EPA uses the model results to predict actual air quality in future years. In this way, EPA overly relies on a single analysis using the Comprehensive Air Quality Model with Extensions (CAMx) to determine future air quality. EPA completely ignores, however, a similar, equally valid regulatory model it has developed for the same purpose, the Community Multiscale Air Quality Modeling System (CMAQ),[11] which shows far different results. EPA has not explained or justified its choice of the CAMx model over the CMAQ model.

DEC modeling using the CMAQ platform showed major differences in projected ozone levels when compared to the CAMx model that was used by EPA to support the proposal. Projected design values using CMAQ were up to 9.2 ppb higher – more than 10 percent of the standard – for northeastern region monitors when using the MARAMA 2023 (gamma2) emissions inventory. The greatest differences were at coastal receptors, such as the Susan Wagner (NY) and Westport (CT) monitors – the latter being the current design value monitor for the NYMA nonattainment area. DEC's modeling results are enclosed.

To verify the accuracy of CMAQ modeling at these receptors, DEC projected 2017 design values from a 2011 baseline at the Westport (83 ppb) and Susan Wagner (78 ppb) monitors. The results compare favorably to the actual measured 2017 design values of 83 ppb and 76 ppb, respectively. This lends further credibility to the CMAQ modeling results for 2023 and warrants further analysis by EPA prior to finalization of this proposal.

In a separate action, EPA faulted New York for "not provid[ing] any information to explain why the [Ozone Transport Commission (OTC)] CMAQ modeling results for the Westport, Connecticut and Susan Wagner, New York monitoring sites are dissimilar to

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[10] "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."

[11] "CMAQ provides detailed information about the concentrations of air pollutants in a given area for any specified emissions or climate scenario. Since 1998, when the first version was released, CMAQ has been used to evaluate potential air quality policy management decisions. The model provides reliable information for decision makers about the estimated impacts of different air quality policies." EPA's *CMAQ Fact Sheet, June 2017, available at* https://www.epa.gov/cmaq/cmaq-fact-sheet

other near-by sites or why the CMAQ modeling provides a more representative ozone projection for these two sites compared to the EPA and OTC CAMx based modeling results."[12] This frankly is EPA's responsibility and not New York's. CMAQ was developed, validated, and approved for SIP use by EPA, and as a community air quality model it has been through an intensive performance evaluation. OTC and New York have followed EPA modeling guidance in conducting its projections and CAMx comparison. Before EPA can conclude in the Proposed Rule that ozone design values in 2023 attain by only the narrowest of margins – 0.1 ppb – it must conduct its own analysis of the emission response difference between CMAQ and CAMx since both models were developed by EPA and run by New York consistent with EPA guidance. Because the greatest differences in model performance were witnessed at coastal-area monitors, EPA should also review its methodology for the land/water interface in calculating future design values – for example, whether the water grid cells should be included in the calculation, ignored, or averaged. Given the model disparities, it is crucial to project ozone concentrations at these monitors accurately.

<u>Use of 2023 as a Projection Year</u>

In selecting 2023 as the future year for which new controls could reasonably be expected to be installed, EPA ignores what can be done for the next attainment date for the NYMA (i.e., July 20, 2021). Moreover, since whether or not a state has attained is determined by looking at the three years prior to the deadline, EPA cannot ignore those years in determining whether an upwind state "will contribute" to downwind nonattainment or interfere with maintenance. By failing to assess air quality within an appropriate timeframe, EPA functionally sets an artificial attainment date for the NYMA so that upwind areas are not burdened by controls. This unduly burdens the NYMA because if the area does not attain the standard – as is expected – EPA will be required to reclassify the area to severe nonattainment which brings additional programmatic and emission reductions requirements to the nonattainment area.

EPA argues in its Proposed Rule that future-year projections are appropriate for resolving good neighbor obligations based on its interpretation of the phrase "will contribute" in CAA section 110(a)(2)(D)(i).[13] This interpretation is inconsistent with the plain meaning of section 110 and arbitrary and capricious, particularly in light of EPA's past practice. EPA ignores CAA section 110(a)(2)(d)(i)'s use of the word "emitting," which includes protection against current emissions from upwind sources that are significantly contributing to a downwind areas inability to attain a NAAQS. By ignoring the plain language of the CAA and the fact that once emissions from an upwind area

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[12] "Air Plan Approval; Kentucky; 2008 Ozone NAAQS Interstate Transport SIP Requirements," Final Rule. Published July 17, 2018, effective August 16, 2018. 83 FR 33753.

[13] CAA section 110(a)(2)(D)(i)(I) reads (emphasis added): "Each implementation plan submitted by a State under this Act shall be adopted by the State after reasonable notice and public hearing. Each such plan shall contain adequate provisions prohibiting, consistent with the provisions of this title, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which <u>will contribute</u> significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard.

transport into a downwind nonattainment area in high enough amounts[14] that upwind source is significantly contributing to nonattainment in that downwind area, EPA is denying downwind states a vital tool in their battle against upwind pollution transport. Additionally, CAA section 126(b) is directly linked to section 110(a)(2)(D)(i); it provides that a state "may petition the Administrator for a finding that any major source or group of stationary sources *emits or would emit* any air pollutant in violation of the prohibition of section 110(a)(2)(D)(i)" (emphasis added). Here, EPA is focusing solely on future air quality, ignoring the current situation. The above clauses confirm that *current* air pollution transport cannot be ignored. Indeed, EPA denied New York's 2008 ozone good neighbor SIP, in part, because "the submission used a projection year (2020) to model downwind air quality that is two years beyond the July 11, 2018 [sic] moderate area attainment date for the 2008 ozone NAAQS."[15]

Further, while EPA has emphasized the selection and modeling of 2023 based on a reasonable expectation of the timing needed for installation of new controls, it has consistently failed to state that the optimization it has assumed to support the proposal's conclusions can be addressed through the present application of federally enforceable permit conditions. These enforceable conditions would ensure that the optimization occurs in the time frame needed to address the significant contribution from upwind sources to downwind nonattainment well in advance of the July 20, 2021 attainment deadline for serious areas. This proactive approach for enforceable commitments by the 2021 attainment deadline is necessary to determine what emission reductions are possible, rather than waiting until 2023 to see whether such assumptions have been realized. EPA in the past has shown a greater urgency to have controls in place; for example, with the CSAPR Update, it examined controls available for 2017 implementation in time to assist with moderate nonattainment areas' 2018 attainment deadline.

<u>Rule Reconsiderations, Rollbacks and Petition Denials</u>

EPA's projection modeling did not account for rule changes that EPA is currently considering that could occur by 2023. For example, the Trump administration's plan to roll back clean car standards and EPA's proposal to eliminate the cap on glider trucks, which have the potential to emit 20 to 40 times the NOx of new trucks, will lead to more ozone pollution.[16,17] Likewise, the proposed rollback of the Clean Power Plan (CPP) will result in increased NOx emissions from coal-fired plants that will operate more than would be expected under the CPP.

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[14] EPA has identified that CSAPR uses a screening threshold of 1 percent of the NAAQS to identify contributing upwind states. "Determination Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard," 83 FR 31923.

[15] "Partial Approval and Partial Disapproval of Air Quality Implementation Plans; New York; Interstate Transport Infrastructure SIP Requirements for the 2008 Ozone NAQS," Final Rule. Published August 26, 2016, effective September 26, 2016. 81 FR 58850.

[16] "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks," Notice of Proposed Rulemaking. Published August 24, 2018. 83 FR 42986-43500.

[17] "Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits," Proposed Rule. Published November 16, 2017. 82 FR 53442.

EPA has also followed circular logic when acting on petitions submitted by states seeking relief from ongoing ozone pollution transport from upwind states. In denying a CAA section 176A petition brought by nine ozone transport region states, EPA stated that an expansion of the OTR "would not be the most efficient or effective way to address the remaining interstate transport issues for the 2008 ozone NAAQS in states currently included in the OTR."[18] EPA went on to tout the flexibilities provided by the good neighbor provision and CAA section 126(b), noting that the latter would "provide[] states with an additional opportunity to bring to the EPA's attention specific instances where a source or a group of sources in a specific state may be emitting in excess of what the good neighbor provision would allow."[19] Yet EPA in recent months has denied a CAA section 126(b) petition brought by Connecticut, and has proposed denial of petitions brought by Delaware and Maryland.[20, 21]

Enclosures

[18] "Response to December 9, 2013, Clean Air Act Section 176A Petition from Connecticut, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island and Vermont," Notice of final action on petition. Published and effective November 3, 2017. 82 FR 51250.
[19] *Ibid*, 82 FR 51242.
[20] "Response to June 1, 2016 Clean Air Act Section 126(b) Petition from Connecticut," Notice of final action on petition. Published and effective April 13, 2018. 83 FR 16064.
[21] "Response to Clean Air Act Section 126(b) Petitions from Delaware and Maryland," Notice of proposed action on petitions. Published June 8, 2018. 83 FR 26666.

Facility	State	ORIS	Boiler	CAMD ID	Unit Type	2017 NOx (tons)	2017 Heat Input (mmEtu)	2017 NOx Rate (lb/mmBtu)	2016 Heat Input (mmBtu)	2016 Gross Generation (mWh)	2016 Capacity Factor	2016 NOx (tons)	2023 NOx (tons)	Reason for Adjustment
Greenidge Generation LLC	NY	2527	6	1759	Tangentially-fired	128.0	1,432,134	0.179						Optimize SCR to 0.10 lb/mmBtu
Massena Energy Facility	NY	54592	001	3783	Combined cycle	3.9	15,930	0.490	31,503	2,070	1%	3	2	Optimize SCR to 0.10 lb/mmBtu
Somerset Operating Company (Kintigh)	NY	6082	1	2761	Dry bottom wall-fired boiler	85.9	1,007,915	0.171	5,561,371	581,267	24%	505	278	Optimize SCR to 0.10 lb/mmBtu
AMP-Ohio Gas Turbines Galion	OH	55263	CT1	4363	Combustion turbine	1.5	19,581	0.150	30,199	2,212	2%	2	2	Optimize SCR to 0.10 lb/mmBtu
AMP-Ohio Gas Turbines Napoleon	OH	55264	CT1	4365	Combustion turbine	3.7	49,690	0.149	33,289	2,101	2%	2	2	Optimize SCR to 0.10 lb/mmBtu
Gen J M Gavin	OH	8102	1	3461	Cell burner boiler	1,806.2	34,470,988	0.105	34,012,071	3,416,578	78%	1,912	1,701	Optimize SCR to 0.10 lb/mmBtu
Kyger Creek	OH	2876	1	1971	Wet bottom wall-fired boiler	173.7	5,749,706	0.060	5,858,620	578,434	61%	531	293	Optimize SCR to 0.10 lb/mmBtu
Kyger Creek	OH	2876	2	1972	Wet bottom wall-fired boiler	156.0	5,239,657	0.060	5,352,170	528,705	55%	508	268	Optimize SCR to 0.10 lb/mmBtu
Kyger Creek	OH	2876	3	1973	Wet bottom wall-fired boiler	171.4	5,403,639	0.063	5,770,456	575,183	60%	562	289	Optimize SCR to 0.10 lb/mmBtu
Kyger Creek	OH	2876	4	1974	Wet bottom wall-fired boiler	174.9	5,458,624	0.064	5,322,115	532,642	55%	476	266	Optimize SCR to 0.10 lb/mmBtu
Kyger Creek	OH	2876	5	1975	Wet bottom wall-fired boiler	166.8	5,193,417	0.064	5,663,706	563,474	59%	530	283	Optimize SCR to 0.10 lb/mmBtu
Miami Fort Power Station	OH	2832	7	1895	Cell burner boiler	753.3	13,190,753	0.114	15,487,535	1,623,286	78%	796	774	Optimize SCR to 0.10 lb/mmBtu
Miami Fort Power Station	OH	2832	8	1896	Dry bottom wall-fired boiler	951.9	12,020,331	0.158	13,026,033	1,552,677	71%	1,116	651	Optimize SCR to 0.10 lb/mmBtu
W H Sammis	OH	2866	6	1961	Dry bottom wall-fired boiler	623.4	12,207,537	0.102	13,727,099	1,547,935	51%	716	686	Optimize SCR to 0.10 lb/mmBtu
W H Zimmer Generating Station	OH	6019	1	2683	Dry bottom wall-fired boiler	2,971.9	30,827,253	0.193	32,508,515	3,762,307	66%	3,240	1,625	Optimize SCR to 0.10 lb/mmBtu
Bruce Mansfield	PA	6094	1	2770	Dry bottom wall-fired boiler	439.8	13,541,413	0.065	14,331,148	1,583,080	44%	968	717	Optimize SCR to 0.10 lb/mmBtu
Bruce Mansfield	PA	6094	2	2771	Dry bottom wall-fired boiler	491.4	12,677,401	0.078	20,457,910	2,349,576	62%	1,626	1,023	Optimize SCR to 0.10 lb/mmBtu
Bruce Mansfield	PA	6094	3	2772	Dry bottom wall-fired boiler	450.7	10,916,224	0.083	21,689,747	2,425,036	68%	2,009	1,084	Optimize SCR to 0.10 lb/mmBtu
Cheswick	PA	8226	1	3475	Tangentially-fired	532.7	6,834,411	0.156	10,586,120	1,045,079	46%	2,086	529	Optimize SCR to 0.10 lb/mmBtu
Conemaugh	PA	3118	1	2065	Tangentially-fired	805.4	22,358,935	0.072	20,538,696	2,104,248	61%	1,822	1,027	Optimize SCR to 0.10 lb/mmBtu
Homer City	PA	3122	1	2072	Dry bottom wall-fired boiler	963.8	10,981,718	0.176	11,612,798	1,171,548	47%	1,438	581	Optimize SCR to 0.10 lb/mmBtu
Homer City	PA	3122	2	2073	Dry bottom wall-fired boiler	443.8	4,954,466	0.179	7,870,946	824,348	32%	1,410	394	Optimize SCR to 0.10 lb/mmBtu
Homer City	PA	3122	3	2074	Dry bottom wall-fired boiler	332.8	5,799,026	0.115	13,004,787	1,320,226	49%	1,854	650	Optimize SCR to 0.10 lb/mmBtu
Keystone	PA	3136	1	2089	Tangentially-fired	1,057.2	24,847,854	0.085	24,209,336	2,471,246	74%	1,859	1,210	Optimize SCR to 0.10 lb/mmBtu
Keystone	PA	3136	2	2090	Tangentially-fired	947.1	27,247,115	0.070	21,909,119	2,290,089	67%	1,749	1,095	Optimize SCR to 0.10 lb/mmBtu
Montour, LLC	PA	3149	1	2124	Tangentially-fired	462.8	6,412,016	0.144	11,961,099	1,324,219	44%	2,316	598	Optimize SCR to 0.10 lb/mmBtu
Montour, LLC	PA	3149	2	2125	Tangentially-fired	497.9	6,528,253	0.153	11,259,648	1,293,343	42%	2,129	563	Optimize SCR to 0.10 lb/mmBtu
W A Parish	TX	3470	CTSC	90816	Combustion turbine	No unit match in CAMD			128,751	9,449	3%	6	6	Optimize SCR to 0.10 lb/mmBtu
Harrison Power Station	WV	3944	1	2553	Dry bottom wall-fired boiler	1,038.3	19,870,526	0.105	22,602,245	2,366,899	81%	1,235	1,130	Optimize SCR to 0.10 lb/mmBtu
Harrison Power Station	WV	3944	2	2554	Dry bottom wall-fired boiler	911.7	21,039,930	0.087	16,669,936	1,787,310	61%	2,004	833	Optimize SCR to 0.10 lb/mmBtu
Harrison Power Station	WV	3944	3	2555	Dry bottom wall-fired boiler	593.1	16,440,316	0.072	21,974,924	2,285,081	78%	2,033	1,099	Optimize SCR to 0.10 lb/mmBtu
John E Amos	WV	3935	3	2540	Cell burner boiler	1,581.8	28,058,104	0.113	23,502,465	2,438,995	54%	1,268	1,175	Optimize SCR to 0.10 lb/mmBtu
Pleasants Power Station	WV	6004	1	2673	Dry bottom wall-fired boiler	369.4	8,843,864	0.084	15,535,826	1,769,486	53%	1,442	777	Optimize SCR to 0.10 lb/mmBtu
Pleasants Power Station	WV	6004	2	2674	Dry bottom wall-fired boiler	1,201.8	18,246,221	0.132	14,784,129	1,657,827	46%	1,203	739	Optimize SCR to 0.10 lb/mmBtu
Combined Locks Energy Center, LLC	WI	55558	B06	4988	Combined cycle	4.1	735,764	0.011						Optimize SCR to 0.10 lb/mmBtu

Facility	State	ORIS	Boiler	CAMD ID	Unit Type	2017 NOx (tons)	2017 Heat Input (mmBtu)	2017 NOx Rate (lb/mmBtu)	2016 Heat Input (mmBtu)	2016 Gross Generation (mWh)	2016 Capacity Factor	2016 NOx (tons)	2023 NOx (tons)	Reason for Adjustment
Charles R Lowman	AL	56	2	54	Dry bottom wall-fired boiler	330.5	2,831,834	0.233	3,625,097	341,864	32%	592	181	Optimize SCR to 0.10 lb/mmBtu
Charles R Lowman	AL	56	3	55	Dry bottom wall-fired boiler	672.6	7,126,321	0.189	6,577,958	552,955	60%	1,096	329	Optimize SCR to 0.10 lb/mmBtu
Gorgas	AL	8	10	13	Tangentially-fired	1,411.1	18,792,707	0.150	19,572,975	1,990,583	31%	1,543	979	Optimize SCR to 0.10 lb/mmBtu
Dallman	IL	963	31	645	Cyclone boiler	63.1	1,293,979	0.098	1,970,345	182,924	61%	105	99	Optimize SCR to 0.10 lb/mmBtu
Dallman	IL	963	32	646	Cyclone boiler	51.4	1,046,686	0.098	1,368,998	127,370	42%	72	68	Optimize SCR to 0.10 lb/mmBtu
A B Brown Generating Station	IN	6137	1	2797	Dry bottom wall-fired boiler	268.6	6,384,877	0.084	1,807,146	178,914	14%	151	90	Optimize SCR to 0.10 lb/mmBtu
A B Brown Generating Station	IN	6137	2	2798	Dry bottom wall-fired boiler	312.8	5,424,699	0.115	7,293,856	711,512	44%	452	365	Optimize SCR to 0.10 lb/mmBtu
Alcoa Allowance Management Inc	IN	6705	4	2905	Cell burner boiler	327.6	8,161,099	0.080	9,835,484	897,069	60%	1,452	492	Optimize SCR to 0.10 lb/mmBtu
Cayuga	IN	1001	1	706	Tangentially-fired	624.9	14,794,651	0.084	10,363,170	976,786	47%	1,690	518	Optimize SCR to 0.10 lb/mmBtu
Cayuga	IN	1001	2	707	Tangentially-fired	498.2	11,057,752	0.090	15,407,920	1,631,173	72%	2,320	770	Optimize SCR to 0.10 lb/mmBtu
Clifty Creek	IN	983	1	658	Wet bottom wall-fired boiler	178.5	4,837,170	0.074	5,000,634	492,403	49%	653	250	Optimize SCR to 0.10 lb/mmBtu
Clifty Creek	IN	983	2	659	Wet bottom wall-fired boiler	172.7	4,715,705	0.073	5,009,274	492,801	49%	669	250	Optimize SCR to 0.10 lb/mmBtu
Clifty Creek	IN	983	3	660	Wet bottom wall-fired boiler	149.1	4,116,727	0.072	5,398,978	532,096	53%	678	270	Optimize SCR to 0.10 lb/mmBtu
Clifty Creek	IN	983	4	661	Wet bottom wall-fired boiler	239.5	4,684,860	0.102	4,947,507	499,943	48%	1,005	247	Optimize SCR to 0.10 lb/mmBtu
Clifty Creek	IN	983	5	662	Wet bottom wall-fired boiler	226.8	4,762,480	0.095	3,907,767	394,560	38%	770	195	Optimize SCR to 0.10 lb/mmBtu
F B Culley Generating Station	IN	1012	2	727	Dry bottom wall-fired boiler	98.4	1,257,361	0.157	1,538,899	124,969	15%	256	77	Optimize SCR to 0.10 lb/mmBtu
F B Culley Generating Station	IN	1012	3	728	Dry bottom wall-fired boiler	522.7	9,457,854	0.111	4,185,938	371,945	30%	262	209	Optimize SCR to 0.10 lb/mmBtu
Gibson	IN	6113	1	2782	Dry bottom wall-fired boiler	582.3	14,727,447	0.079	11,733,169	1,331,132	49%	907	587	Optimize SCR to 0.10 lb/mmBtu
Gibson	IN	6113	2	2783	Dry bottom wall-fired boiler	349.5	13,177,121	0.053	13,855,518	1,478,671	55%	1,031	693	Optimize SCR to 0.10 lb/mmBtu
Gibson	IN	6113	3	2784	Dry bottom wall-fired boiler	534.5	12,927,938	0.083	16,170,258	1,671,182	60%	1,399	809	Optimize SCR to 0.10 lb/mmBtu
Gibson	IN	6113	4	2785	Dry bottom wall-fired boiler	674.0	17,003,248	0.079	13,024,583	1,366,687	50%	748	651	Optimize SCR to 0.10 lb/mmBtu
Gibson	IN	6113	5	2786	Dry bottom wall-fired boiler	1,097.1	15,009,371	0.146	12,494,537	1,380,171	51%	1,056	625	Optimize SCR to 0.10 lb/mmBtu
IPL - Petersburg Generating Station	IN	994	2	693	Tangentially-fired	470.5	11,206,674	0.084	12,633,662	1,219,213	83%	935	632	Optimize SCR to 0.10 lb/mmBtu
IPL - Petersburg Generating Station	IN	994	3	694	Tangentially-fired	526.6	13,691,470	0.077	16,057,203	1,476,986	79%	1,527	803	Optimize SCR to 0.10 lb/mmBtu
E W Brown	KY	1355	3	878	Tangentially-fired	219.8	5,985,872	0.073	8,123,757	751,399	44%	616	406	Optimize SCR to 0.10 lb/mmBtu
East Bend	KY	6018	2	2682	Dry bottom wall-fired boiler	981.6	18,351,963	0.107	19,601,319	1,872,619	68%	1,163	980	Optimize SCR to 0.10 lb/mmBtu
Ghent	KY	1356	3	886	Dry bottom wall-fired boiler	917.7	11,466,784	0.160	12,110,380	1,390,969	57%	1,004	606	Optimize SCR to 0.10 lb/mmBtu
Ghent	KY	1356	4	887	Dry bottom wall-fired boiler	353.3	14,157,722	0.050	14,109,599	1,515,538	70%	798	705	Optimize SCR to 0.10 lb/mmBtu
HMP&L Station 2	KY	1382	H1	929	Dry bottom wall-fired boiler	174.7	2,148,588	0.163	2,696,002	283,894	37%	284	135	Optimize SCR to 0.10 lb/mmBtu
HMP&L Station 2	KY	1382	H2	930	Dry bottom wall-fired boiler	375.8	4,386,578	0.171	4,984,770	473,181	68%	366	249	Optimize SCR to 0.10 lb/mmBtu
John S. Cooper	KY	1384	2	933	Dry bottom wall-fired boiler	98.5	2,093,482	0.094	2,396,111	244,608	27%	129	120	Optimize SCR to 0.10 lb/mmBtu
Paradise	KY	1378	3	915	Cyclone boiler	2,425.2	21,750,305	0.223	20,552,854	2,001,152	38%	1,933	1,028	Optimize SCR to 0.10 lb/mmBtu
Chalk Point	MD	1571	1	1050	Dry bottom wall-fired boiler	128.0	2,330,944	0.110	4,936,193	511,067	37%	332	247	Optimize SCR to 0.10 lb/mmBtu
Asbury	MO	2076	1	1311	Cyclone boiler	353.4	7,133,970	0.099	6,766,129	595,088	72%	514	338	Optimize SCR to 0.10 lb/mmBtu
New Madrid Power Plant	MO	2167	1	1357	Cyclone boiler	874.6	16,229,093	0.108	8,257,589	898,937	33%	3,000	413	Optimize SCR to 0.10 lb/mmBtu
New Madrid Power Plant	MO	2167	2	1358	Cyclone boiler	787.9	15,093,626	0.104	16,685,524	1,902,393	65%	3,832	834	Optimize SCR to 0.10 lb/mmBtu
Thomas Hill Energy Center	MO	2168	MB1	1359	Cyclone boiler	349.3	5,971,757	0.117	4,037,461	343,226	49%	911	202	Optimize SCR to 0.10 lb/mmBtu
Thomas Hill Energy Center	MO	2168	MB2	1360	Cyclone boiler	464.9	8,617,723	0.108	8,506,595	813,371	65%	2,022	425	Optimize SCR to 0.10 lb/mmBtu
Thomas Hill Energy Center	MO	2168	MB3	1361	Dry bottom wall-fired boiler	1,002.7	20,110,101	0.100	18,845,916	2,020,355	63%	2,225	942	Optimize SCR to 0.10 lb/mmBtu
Carneys Point	NJ	10566	1001	3554	Dry bottom wall-fired boiler	111.1	1,978,408	0.112	2,356,489		41%	143	118	Optimize SCR to 0.10 lb/mmBtu
Carneys Point	NJ	10566	1002	3555	Dry bottom wall-fired boiler	133.4	2,368,026	0.113	2,780,239		48%	150	139	Optimize SCR to 0.10 lb/mmBtu
Logan Generating Plant	NJ	10043	1001	3524	Dry bottom wall-fired boiler	182.9	3,260,603	0.112	3,259,764		38%	175	163	Optimize SCR to 0.10 lb/mmBtu
West Station	NJ	6776	002001	2909	Combustion turbine	0.6	2,613	0.443	2,962	168	0%	1	0	Optimize SCR to 0.10 lb/mmBtu
AG - Energy	NY	10803	1	3598	Combined cycle	-								Optimize SCR to 0.10 lb/mmBtu
AG - Energy	NY	10803	2	3599	Combined cycle	-								Optimize SCR to 0.10 lb/mmBtu

Process to compare CAMx and CMAQ models using consistent projection emission inventory:

Began with EPA 2023 projection modeling utilizing 'en'projection inventory and CAMx, released in Oct 2017 (column L)

Used CAMx to model MARAMA gamma2 projection inventory (column K) to show relative consistency with column L

Used CMAQ to model MARAMA gamma2 projection inventory (column J)

Summarized the difference between CMAQ and CAMx models using MARAMA gamma2 projection inventory (column M)

State	AQS Code	POC	Latitude	Longitude	Site	DVC 2011	DVF 2017 3x3 cells MARAMA beta2 emis OTC CMAQ5.0 2 setup	DVF 2020 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CAMx 6.40 setup	DVF 2023 3x3 cells from EPA 2011en/2023en emis	DVF 2023 Difference - CMAQ v CAMx
CT	09-001-0017	1	41.003613	-73.584999	Greenwich Point Park-Greenwich	80.3	77	76.2	72.3	69.5	69.8	+2.8
CT	09-001-1123	1	41.399166	-73.443100	Western Conn State Univ-Danbury	81.3	74	71.1	68.0	66.3	66.4	+1.7
CT	09-001-3007	1	41.152500	-73.103104	Lighthouse-Stratford	84.3	77	76.8	73.7	70.6	71.2	+3.1
CT	09-001-9003	1	41.118332	-73.336700	Sherwood Island State Park-Westport	83.7	83	83.4	81.1	71.9	72.7	+9.2
CT	09-003-1003	1	41.784721	-72.631699	McAuliffe Park-East Hartford	73.7	66	61.9	58.6	58.4	60.7	+0.2
CT	09-005-0005	1	41.821342	-73.297302	Mohawk Mt-Cornwall	70.3	62	59.8	57.0	55.9	57.2	+1.1
CT	09-007-0007	1	41.552223	-72.629997	Central Valley Hospital-Middletown	79.3	70	66.9	63.5	63.1	64.7	+0.4
CT	09-009-0027	1	41.301399	-72.902901	Criscuolo Park-New Haven	74.3	67	67.8	65.1	61.5	62.3	+3.6
CT	09-009-9002	1	41.260834	-72.550003	Hammonasset State Park-Madison	85.7	77	73.9	69.7	69.9	71.2	-0.2
CT	09-011-0124	1	41.353619	-72.078796	Fort Griswold Park-Groton	80.3	73	70.3	66.2	65.2	66.4	+1.0
CT	09-013-1001	1	41.976391	-72.388100	Shenipsit State Forest-Stafford	75.3	67	63.2	59.9	59.9	61.4	0.0
DE	10-001-0002	1	38.984749	-75.555199	PROPERTY OF KILLENS POND STATE PARK; BEH	74.3	66	63.8	60.8	57.6	58.3	+3.2
DE	10-003-1007	1	39.551109	-75.730797		76.3	67	64.1	61.0	58.3	59.2	+2.7
DE	10-003-1010	1	39.817223	-75.563904	OPEN FIELD	78.0	67	66.9	63.9	60.9	61.2	+3.0
DE	10-003-1013	1	39.773888	-75.496399	BELLEVUE STATE PARK, FIELD IN SE PORTION	77.7	67	65.9	62.8	60.3	60.8	+2.5
DE	10-003-2004	1	39.739445	-75.558098	CORNER OF MLK BLVD AND JUSTISON ST, NO T	75.0	65	63.6	60.7	58.2		+2.5
DE	10-005-1002	1	38.644478	-75.612701	Seaford Shipley State Service Center	77.3	67	64.9	61.6	59.6	59.7	+2.0
DE	10-005-1003	1	38.779198	-75.162697	SPM SITE, NEAR UD ACID RAIN/MERCURY COLL	77.7	69	66.4	62.7	61.1	62.4	+1.6
DC	11-001-0041	1	38.897221	-76.952797	RIVER TERRACE	76.0	65	62.4	58.6	58.2	58.7	+0.4
DC	11-001-0043	1	38.921848	-77.013199	MCMILLAN PAMS	80.7	69	66.2	62.2	61.8	62.3	+0.4
ME	23-001-0014	2	43.974621	-70.124603	DURHAM FIRE STATION	61.0	54	51.9	49.3	48.9	49.4	+0.4
ME	23-003-1100	1	46.696430	-68.032997	MICMAC HEALTH DEPARTMENT	51.3	-8	-8.0	-8.0	-8.0		
ME	23-005-2003	1	43.561043	-70.207298	CETL - Cape Elizabeth Two Lights (State	69.3	62	60.3	57.2	56.1	56.2	+1.1
ME	23-009-0102	1	44.351696	-68.226997	TOP OF CADILLAC MTN (FENCED ENCLOSURE)	71.7	65	62.8	60.4	59.8	61.3	+0.6
ME	23-009-0103	1	44.377048	-68.260902	MCFARLAND HILL Air Pollutant Research Si	66.3	60	57.3	54.8	54.2	55.0	+0.6
ME	23-011-2005	1	44.230621	-69.785004	Gardiner, Pray Street School (GPSS)	62.7	55	52.2	49.5	49.9	50.5	-0.4
ME	23-013-0004	2	43.917953	-69.260597	Marshall Point Lighthouse	67.7	60	57.6	55.0	54.3	54.7	+0.7
ME	23-017-3001	1	44.250923	-70.860603		54.3	49	-8.0	-8.0	44.0	43.7	
ME	23-019-4008	1	44.735977	-68.670799	WLBZ TV Transmitter Building - Summit of	57.7	-8	-8.0	-8.0	-8.0	46.6	
ME	23-023-0006	1	44.005001	-69.827797	BOWDOINHAM, MERRYMEETING BAY, BROWN'S PT	61.0	54	51.6	49.2	48.4	48.7	+0.8
ME	23-029-0019	1	44.531906	-67.595901	Harbor Masters Office; Jonesport Public	58.3	53	52.2	50.5	49.7		+0.8
ME	23-029-0032	1	44.963634	-67.060699		53.0	49	-8.0	-8.0	-8.0		
ME	23-031-0038	1	43.656765	-70.629097	WBFD - West Buxton (Hollis) Fire Departm	60.3	54	51.0	48.5	47.8	48.2	+0.7
ME	23-031-0040	1	43.588890	-70.877296	SBP - Shapleigh Ball Park	64.3	57	54.2	51.5	51.2	51.5	+0.3
ME	23-031-2002	1	43.343166	-70.471001	KPW - Kennebunkport Parson'd Way	73.7	65	62.2	58.7	59.2	60.1	-0.5
MD	24-003-0014	1	38.902500	-76.653099	Davidsonville	83.0	71	68.8	64.7	63.5	63.4	+1.2
MD	24-005-1007	1	39.462025	-76.631302	Padonia	79.0	69	68.2	65.0	64.2	63.9	+0.8
MD	24-005-3001	1	39.310833	-76.474403	Essex	80.7	74	68.9	65.0	64.6	64.9	+0.4
MD	24-009-0011	1	38.536720	-76.617203	Calvert	79.7	73	68.9	66.2	63.1	64.2	+3.1
MD	24-013-0001	1	39.444168	-77.041702	South Carroll	76.3	67	64.1	61.3	59.0	58.8	+2.3
MD	24-015-0003	1	39.701111	-75.860001	Fair Hill Natural Resource Management Ar	83.0	73	69.9	66.3	64.0	64.5	+2.3
MD	24-017-0010	1	38.504166	-76.811897	Southern Maryland	79.0	69	65.8	62.8	61.2	61.6	+1.6
MD	24-019-9991	1	38.445000	-76.111397	Blackwater NWR	75.0	67	64.7	62.0	60.0	60.7	+2.0
MD	24-021-0037	1	39.422760	-77.375198	Frederick Airport	76.3	67	64.2	61.6	59.4	59.6	+2.2
MD	24-023-0002	1	39.705952	-79.012001	Piney Run	72.0	60	58.4	57.6	56.7	55.1	+0.9
MD	24-025-1001	1	39.410000	-76.296700	Edgewood	90.0	81	77.6	74.1	71.8	71.4	+2.3
MD	24-025-9001	1	39.563332	-76.203903	Aldino	79.3	70	67.1	63.7	62.0	61.8	+1.7

State	AQS Code	POC	Latitude	Longitude	Site	DVC 2011	DVF 2017 3x3 cells MARAMA beta2 emis OTC CMAQ5.0 2 setup	DVF 2020 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CAMx 6.40 setup	DVF 2023 3x3 cells from EPA 2011en/2023en emis	DVF 2023 Difference - CMAQ v CAMx
MD	24-029-0002	1	39.305199	-75.797203	Millington	78.7	68	66.8	63.7	60.9	61.2	+2.8
MD	24-031-3001	1	39.114445	-77.106903	Rockville	75.7	65	63.2	59.6	59.3	60.0	+0.3
MD	24-033-0030	1	39.055279	-76.878304	HU-Beltsville	79.0	68	65.0	61.0	60.7	60.5	+0.3
MD	24-033-8003	1	38.811939	-76.744202	PG Equestrian Center	82.3	70	67.6	63.7	63.1	63.2	+0.6
MD	24-033-9991	1	39.028400	-76.817101	Beltsville	80.0	69	66.3	62.4	61.4	61.0	+1.0
MD	24-043-0009	1	39.565582	-77.721603	Hagerstown	72.7	63	60.8	58.3	56.7	56.0	+1.6
MD	24-510-0054	1	39.328892	-76.552498	Furley	73.7	68	62.9	59.4	60.2	59.9	-0.8
MA	25-001-0002	1	41.975803	-70.023598	TRURO NATIONAL SEASHORE	73.0	66	62.7	59.1	58.5	59.6	+0.6
MA	25-003-4002	1	42.636681	-73.167397	MT GREYLOCK SUMMIT	69.0	62	60.1	58.0	56.3	56.1	+1.7
MA	25-005-1002	1	41.633278	-70.879204	LEROY WOOD SCHOOL	74.0	66	63.3	59.9	60.3	61.6	-0.4
MA	25-007-0001	1	41.330467	-70.785202	1 HERRING CREEK RD, AQUINNAH (WAMPANOAG	77.0	71	67.5	64.5	63.8	64.1	+0.7
MA	25-009-2006	1	42.474644	-70.970802	LYNN WATER TREATMENT PLANT	71.0	65	54.9	49.7	56.8	57.5	-7.1
MA	25-009-4005	1	42.814411	-70.817802	NEWBURYPORT HARBOR ST PARKING LOT	70.0	63	59.7	56.5	56.7	57.2	-0.2
MA	25-009-5005	1	42.770836	-71.102303	CONSENTINO SCHOOL.	69.3	61	58.9	56.1	56.1	56.2	0.0
MA	25-013-0008	1	42.194382	-72.555099	WESTOVER AFB	73.7	65	61.3	58.1	58.2	59.3	-0.1
MA	25-015-0103	1	42.400578	-72.523102	AMHERST	64.7	57	53.7	50.9	51.4	51.9	-0.5
MA	25-015-4002	1	42.298492	-72.334099	QUABBIN RES	71.3	62	59.7	56.6	56.0	57.0	+0.6
MA	25-017-0009	1	42.626678	-71.362099	USEPA REGION 1 LAB	67.3	59	56.8	54.0	53.7	54.0	+0.3
MA	25-017-1102	1	42.413574	-71.482803	inactive military resv 680 hudson rd sud	67.0	59	56.3	53.6	52.9	53.4	+0.7
MA	25-021-3003	1	42.211773	-71.113998	BLUE HILL OBSERVATORY	72.3	63	60.3	55.9	58.8	59.6	-2.9
MA	25-025-0041	1	42.317371	-70.968399	BOSTON LONG ISLAND	68.3	59	57.2	53.2	55.3	56.4	-2.1
MA	25-025-0042	1	42.329498	-71.082603	DUDLEY SQUARE ROXBURY	60.7	53	48.6	44.3	49.4	49.6	-5.1
MA	25-027-0015	1	42.274319	-71.875504	WORCESTER AIRPORT	68.3	60	57.6	54.8	54.1	54.6	+0.7
MA	25-027-0024	1	42.099697	-71.619400	UXBRIDGE	69.0	60	57.9	55.0	54.2	54.9	+0.8
NH	33-001-2004	1	43.566113	-71.496399	FIELD OFFICE ON THE GROUNDS OF THE FORME	62.3	55	52.9	50.0	50.3	50.4	-0.3
NH	33-005-0007	1	42.930473	-72.272400	WATER STREET	62.3	55	52.6	50.2	49.4	49.7	+0.8
NH	33-007-4001	1	44.270168	-71.303802		69.3	64	62.7	60.7	56.7	57.1	+4.0
NH	33-007-4002	1	44.308167	-71.217697	CAMP DODGE, GREENS GRANT	59.7	55	54.0	52.3	49.0	49.3	+3.3
NH	33-009-0010	1	43.629612	-72.309601	LEBANON AIRPORT ROAD	59.7	53	52.1	50.0	48.4	48.1	+1.6
NH	33-011-1011	1	42.718662	-71.522400	GILSON ROAD	66.3	58	56.0	53.2	52.9	53.6	+0.3
NH	33-011-5001	1	42.861752	-71.878403	MILLER STATE PARK	69.0	61	58.5	55.8	54.9	55.5	+0.9
NH	33-013-1007	1	43.218498	-71.514503	HAZEN DRIVE	64.7	57	54.2	51.5	51.2	51.6	+0.3
NH	33-015-0014	1	43.075333	-70.748001	PORTSMOUTH - PEIRCE ISLAND	66.0	59	55.9	52.5	53.2	53.6	-0.7
NH	33-015-0016	1	43.045277	-70.713799	SEACOAST SCIENCE CENTER	66.3	59	56.1	52.7	53.4	53.8	-0.7
NH	33-015-0018	1	42.862537	-71.380203	MOOSEHILL SCHOOL	68.0	60	57.2	54.4	54.3	55.1	+0.1
NJ	34-001-0006	1	39.464870	-74.448700	Brigantine	74.3	66	61.9	58.0	58.5	58.5	-0.5
NJ	34-003-0006	1	40.870438	-73.991997	Leonia	77.0	68	66.5	63.3	62.0	64.1	+1.3
NJ	34-007-1001	1	39.684250	-74.861504	Ancora State Hospital	82.7	72	70.3	66.9	66.3	66.3	+0.6
NJ	34-011-0007	1	39.422272	-75.025200	Millville	72.0	64	61.6	58.8	57.0	57.0	+1.8
NJ	34-013-0003	1	40.720989	-74.192902	Newark - Firehouse	78.0	69	67.3	64.0	62.5	64.3	+1.5
NJ	34-015-0002	1	39.800339	-75.212097	Clarksboro	84.3	74	72.4	69.1	67.5	68.2	+1.6
NJ	34-017-0006	1	40.670250	-74.126099	Bayonne	77.0	69	69.6	67.0	63.0	65.4	+4.0
NJ	34-019-0001	1	40.515263	-74.806702	Flemington	78.0	68	65.8	62.3	60.5	62.0	+1.8
NJ	34-021-0005	1	40.283092	-74.742599	Rider University	78.3	68	66.1	62.7	62.5	63.2	+0.2
NJ	34-021-9991	1	40.312500	-74.872902	Wash. Crossing	76.0	66	63.8	60.4	59.6	60.4	+0.8
NJ	34-023-0011	1	40.462181	-74.429398	Rutgers University	81.3	71	68.6	65.0	63.6	65.0	+1.4
NJ	34-025-0005	1	40.277645	-74.005096	Monmouth University	80.0	71	69.4	66.0	64.2	65.4	+1.8
NJ	34-027-3001	1	40.787628	-74.676300	Chester	76.3	67	64.7	61.5	59.2	62.4	+2.3

State	AQS Code	POC	Latitude	Longitude	Site	DVC 2011	DVF 2017 3x3 cells MARAMA beta2 emis OTC CMAQ5.0.2 setup	DVF 2020 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CAMx 6.40 setup	DVF 2023 3x3 cells from EPA 2011en/2023en emis	DVF 2023 Difference - CMAQ v CAMx
NJ	34-029-0006	1	40.064831	-74.444099	Colliers Mills	82.0	72	69.4	65.8	64.3	65.8	+1.5
NJ	34-031-5001	1	41.058617	-74.255501	Ramapo	73.3	65	63.6	60.7	60.5	61.3	+0.2
NJ	34-041-0007	1	40.924580	-75.067802	Columbia WMA	66.0	57	55.5	52.6	51.0	54.0	+1.6
NY	36-001-0012	1	42.680752	-73.757301	LOUDONVILLE	68.0	61	58.5	56.1	55.7	55.4	+0.4
NY	36-005-0133	1	40.867901	-73.878098	PFIZER LAB SITE	74.0	71	68.0	64.5	67.9	68.0	-3.4
NY	36-013-0006	1	42.499630	-79.318802	DUNKIRK	73.3	66	64.4	61.1	59.1	59.6	+2.0
NY	36-013-0011	1	42.290710	-79.589600	WESTFIELD	74.0	66	65.0	61.7	59.8	60.2	+1.9
NY	36-015-0003	1	42.110958	-76.802200	ELMIRA	66.5	61	59.4	57.5	55.1	54.9	+2.4
NY	36-027-0007	1	41.785549	-73.741402	MILLBROOK	72.0	64	60.7	58.0	57.4	58.6	+0.6
NY	36-029-0002	1	42.993279	-78.771500	AMHERST	71.3	65	64.3	61.7	58.5	58.3	+3.2
NY	36-031-0002	3	44.366081	-73.903099	WHITEFACE SUMMIT	70.3	64	61.9	59.6	57.5	57.5	+2.1
NY	36-031-0003	1	44.393082	-73.858902	WHITEFACE BASE	67.3	61	59.2	57.1	55.0	55.1	+2.1
NY	36-033-7003	1	44.980576	-74.695000	Y001	45.0	-8	-8.0	-8.0	37.3		
NY	36-041-0005	1	43.449570	-74.516296	PISECO LAKE	66.0	59	57.7	55.6	53.7	53.7	+1.9
NY	36-043-0005	1	43.685780	-74.985397	NICKS LAKE	62.0	-8	54.7	52.8	50.8	50.5	+2.0
NY	36-045-0002	1	44.087471	-75.973198	PERCH RIVER	71.7	65	60.5	57.0	59.2	59.0	-2.2
NY	36-053-0006	1	42.730461	-75.784401	CAMP GEORGETOWN	67.0	61	59.3	57.2	54.9	55.0	+2.3
NY	36-061-0135	1	40.819759	-73.948303	CCNY	73.3	70	67.7	64.7	66.4	65.3	-1.7
NY	36-063-1006	1	43.223862	-78.478897	MIDDLEPORT	72.3	67	66.3	64.1	60.5	60.5	+3.6
NY	36-065-0004	2	43.302681	-75.719803	CAMDEN	61.5	56	54.3	52.4	50.4	50.5	+2.0
NY	36-067-1015	1	43.052349	-76.059196	EAST SYRACUSE	69.3	63	61.4	59.4	57.7	57.8	+1.7
NY	36-071-5001	1	41.523750	-74.215302	VALLEY CENTRAL HIGH SCHOOL	67.0	60	57.5	55.1	53.8	55.3	+1.3
NY	36-075-0003	1	43.284279	-76.463203	FULTON	68.0	61	58.5	55.4	55.5	55.7	-0.1
NY	36-079-0005	1	41.455891	-73.709801	MT NINHAM	70.0	63	60.5	57.7	56.8	58.4	+0.9
NY	36-081-0124	1	40.736141	-73.821503	QUEENS COLLEGE 2	78.0	74	72.0	68.8	69.4	70.1	-0.6
NY	36-083-0004	1	42.781891	-73.463600	GRAFTON STATE PARK	67.0	60	57.9	55.5	54.7	54.4	+0.8
NY	36-085-0067	1	40.596642	-74.125298	SUSAN WAGNER HS	81.3	78	79.5	76.9	71.1	71.9	+5.8
NY	36-087-0005	1	41.182079	-74.028198	Rockland County	75.0	67	65.5	62.4	61.5	62.0	+0.9
NY	36-091-0004	1	43.012089	-73.648903	STILLWATER	67.0	59	57.8	55.3	54.6	54.3	+0.7
NY	36-101-0003	1	42.091419	-77.209801	PINNACLE STATE PARK	65.3	60	58.5	56.6	54.3	54.4	+2.3
NY	36-103-0002	1	40.745289	-73.419197	BABYLON	83.3	77	75.2	71.4	72.0	72.5	-0.6
NY	36-103-0004	1	40.960781	-72.712402	RIVERHEAD	78.0	71	68.5	65.5	65.6	66.3	-0.1
NY	36-103-0009	1	40.827991	-73.057503	HOLTSVILLE	78.7	73	72.9	70.4	67.7	68.5	+2.7
NY	36-111-1005	1	42.144032	-74.494301	BELLEAYRE MOUNTAIN	69.0	63	60.6	58.3	56.2	57.4	+2.1
NY	36-117-3001	1	43.230862	-77.171402	WILLIAMSON	65.0	59	56.9	54.4	53.6	53.4	+0.8
NY	36-119-2004	1	41.051922	-73.763702	WHITE PLAINS	75.3	73	72.7	69.5	68.1	68.1	+1.4
PA	42-003-0008	1	40.465420	-79.960800	Lawrenceville	76.3	70	67.2	65.0	63.9	65.5	+1.1
PA	42-003-0010	1	40.445576	-80.016197	LAT/LON IS APPROXIMATE LOCATION OF SCIEN	73.7	68	64.9	62.8	61.7	63.3	+1.1
PA	42-003-0067	1	40.375645	-80.169899	South Fayette	75.7	69	66.3	64.2	61.4	63.0	+2.8
PA	42-003-1008	1	40.617489	-79.727661	Harrison	80.7	73	70.6	68.2	66.4	67.1	+1.8
PA	42-005-0001	1	40.814182	-79.564697	LAT/LON IS CENTER OF TRAILER	74.3	67	63.0	60.7	60.4	60.6	+0.3
PA	42-007-0002	1	40.562519	-80.503899		70.7	65	62.9	60.8	58.1	59.5	+2.7
PA	42-007-0005	1	40.684723	-80.359703	DRIVEWAY TO BAKEY RESIDENCE	74.7	69	66.6	64.7	62.3	63.0	+2.4
PA	42-007-0014	1	40.747795	-80.316399		72.3	66	64.0	61.9	60.7	61.0	+1.2
PA	42-011-0006	1	40.514080	-75.789703	Kutztown	71.7	62	60.0	57.2	56.1	56.2	+1.1
PA	42-011-0011	1	40.383350	-75.968597	Reading Airport	76.3	65	62.6	59.6	58.8	58.9	+0.8
PA	42-013-0801	1	40.535278	-78.370796		72.7	65	63.4	61.1	59.5	60.3	+1.6

State	AQS Code	POC	Latitude	Longitude	Site	DVC 2011	DVF 2017 3x3 cells MARAMA beta2 emis OTC CMAQ5.0 2 setup	DVF 2020 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CAMx 6.40 setup	DVF 2023 3x3 cells from EPA 2011en/2023en emis	DVF 2023 Difference - CMAQ v CAMx
PA	42-017-0012	1	40.107224	-74.882202	A420170012LAT/LONG POINT IS OF SAMPLING	80.3	70	68.1	64.6	63.8	64.6	+0.8
PA	42-021-0011	1	40.309723	-78.915001		70.3	63	60.3	58.4	57.5	58.0	+0.9
PA	42-027-0100	1	40.811390	-77.876999	LAT/LON=POINT SW CORNER OF TRAILER	71.0	64	62.2	60.1	58.8	59.1	+1.3
PA	42-027-9991	1	40.720798	-77.931900	Penn State	72.0	64	62.8	60.8	59.1	59.8	+1.7
PA	42-029-0100	1	39.834461	-75.768204	CHESTER COUNTY TRANSPORT SITE INTO PHILA	76.3	66	62.7	59.7	58.7	58.7	+1.0
PA	42-033-4000	1	41.117500	-78.526199	MOSHANNON STATE FOREST	72.3	65	63.7	61.4	60.2	60.3	+1.2
PA	42-043-0401	1	40.246990	-76.847000	A420430401LAT/LON POINT IS AT CORNER OF	69.0	60	58.5	56.3	54.4	54.7	+1.9
PA	42-043-1100	1	40.272221	-76.681396	A420431100LAT/LON POINT IS AT CORNER OF	74.7	64	61.7	59.0	57.9	58.3	+1.1
PA	42-045-0002	1	39.835556	-75.372498	A420450002LAT/LON POINT IS OF CORNER OF	75.7	66	64.7	61.7	59.5	60.3	+2.2
PA	42-049-0003	1	42.141750	-80.038597		74.0	66	65.0	61.0	58.9	59.1	+2.1
PA	42-055-0001	1	39.961109	-77.475601	HIGH ELEVATION OZONE SITE	67.0	59	56.8	54.8	53.2	53.2	+1.6
PA	42-059-0002	1	39.809330	-80.265701	75 KM SSW OF PITTSBURGH RURAL SITE ON A	69.0	61	59.2	57.6	55.7	56.5	+1.9
PA	42-063-0004	1	40.563332	-78.919998		75.7	67	65.6	63.1	61.9	62.7	+1.2
PA	42-069-0101	1	41.479115	-75.578201	A420690101LAT/LON POINT IS AT CORNER OF	71.0	62	60.0	57.4	55.9	55.8	+1.5
PA	42-069-2006	1	41.442780	-75.623100	A420692006LAT/LON POINT IS AT CORNER OF	68.7	60	58.0	55.6	54.1	54.0	+1.5
PA	42-071-0007	1	40.046665	-76.283302	A420710007LAT/LON POINT AT CORNER OF TRA	77.0	65	63.1	60.8	59.5	60.1	+1.3
PA	42-071-0012	1	40.043835	-76.112396	Lancaster DW	78.0	66	63.8	61.1	59.9	60.2	+1.2
PA	42-073-0015	1	40.995850	-80.346397		71.0	64	61.4	58.4	57.2	58.0	+1.2
PA	42-075-0100	1	40.337330	-76.383400	Lebanon	76.0	65	62.5	59.7	58.7	58.6	+1.0
PA	42-077-0004	1	40.611942	-75.432503	A420770004LAT/LONG POINT IS OF SAMPLING	76.0	66	63.7	60.4	59.5	59.5	+0.9
PA	42-079-1100	1	41.209167	-76.003304	A420791100LAT/LON POINT IS AT CORNER OF	65.0	56	53.0	50.8	49.8	49.9	+1.0
PA	42-079-1101	1	41.265556	-75.846397	A420791101LAT/LON POINT IS AT CORNER OF	64.3	56	53.7	51.4	49.9	49.9	+1.5
PA	42-081-0100	1	41.250801	-76.923798	MONTOURSVILLE	67.0	60	56.7	54.3	53.7	53.9	+0.6
PA	42-085-0100	1	41.215015	-80.484802		76.3	68	65.1	60.5	58.9	60.0	+1.6
PA	42-089-0002	1	41.083061	-75.323303	SWIFTWATER	66.7	58	56.2	53.5	51.5	52.9	+2.0
PA	42-091-0013	1	40.112221	-75.309196	A420910013LAT/LON POINT IS OF CORNER OF	76.3	66	65.3	62.2	59.7	61.0	+2.5
PA	42-095-0025	1	40.628056	-75.341110	LAT/LON POINT IS CENTER OF TRAILER	74.3	66	62.3	59.1	58.0	58.5	+1.1
PA	42-095-8000	1	40.692223	-75.237198	COMBINED EASTON SITE (420950100) AND EAS	69.7	61	58.4	55.3	54.5	54.8	+0.8
PA	42-099-0301	1	40.456944	-77.165604	A420990301LAT/LON POINT IS AT CORNER OF	68.3	60	58.2	56.1	54.6	54.8	+1.5
PA	42-101-0004	1	40.008888	-75.097801	Air Management Services Laboratory (AMS	66.0	58	56.6	53.9	53.2	53.9	+0.7
PA	42-101-0024	1	40.076401	-75.011497	North East Airport (NEA)	83.3	73	70.8	67.2	67.1	67.3	+0.1
PA	42-101-1002	1	40.035984	-75.002403	BAXTER (BAX)	80.0	70	68.0	64.5	64.5	64.7	0.0
PA	42-111-9991	1	39.987801	-79.251503	Laurel Hill	65.0	55	54.3	53.0	51.8	50.8	+1.2
PA	42-117-4000	1	41.644722	-76.939201	PENN STATE OZONE MONITORING SITE	69.7	64	61.6	59.2	57.9	57.3	+1.3
PA	42-125-0005	1	40.146667	-79.902199		70.0	63	60.1	58.4	57.5	57.6	+0.9
PA	42-125-0200	1	40.170555	-80.261398		70.7	63	60.5	58.7	57.7	57.6	+1.0
PA	42-125-5001	1	40.445278	-80.420799		70.3	64	61.3	59.4	57.5	57.9	+1.9
PA	42-129-0006	1	40.428078	-79.692802		71.7	65	62.2	60.0	59.5	60.1	+0.5
PA	42-129-0008	1	40.304695	-79.505699	LAT/LON POINT IS TRAILER	71.0	63	61.1	58.9	58.1	58.0	+0.8
PA	42-133-0008	1	39.965279	-76.699402	A421330008LAT/LON POINT AT CORNER OF TRA	72.3	62	59.3	57.0	55.7	56.9	+1.3
PA	42-133-0011	1	39.860970	-76.462097	York DW	74.3	63	61.3	58.8	57.5	58.0	+1.3
RI	44-003-0002	1	41.615238	-71.720001	AJ	73.7	66	63.7	60.5	59.6	60.4	+0.9
RI	44-007-1010	1	41.841572	-71.360802	FRANCIS SCHOOL East Providence	74.0	66	63.0	59.4	59.3	60.1	+0.1
RI	44-009-0007	1	41.495110	-71.423698	US-EPA Laboratory	76.3	69	66.2	62.8	62.6	63.6	+0.2
VT	50-003-0004	1	42.887589	-73.249802	Morse Airport - State of Vermont Propert	63.7	57	54.8	52.5	51.7	51.3	+0.8
VT	50-007-0007	1	44.528389	-72.868797	PROCTOR MAPLE RESEARCH CTR	61.0	55	53.7	51.8	49.9	49.6	+1.9
VA	51-013-0020	1	38.857700	-77.059196	Aurora Hills Visitors Center	81.7	71	68.7	64.7	64.8	64.9	-0.1

State	AQS Code	POC	Latitude	Longitude	Site	DVC 2011	DVF 2017 3x3 cells MARAMA beta2 emis OTC CMAQ5.0.2 setup	DVF 2020 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CMAQ5.2.1 setup	DVF 2023 3x3 cells MARAMA gamma2 emis OTC CAMx 6.40 setup	DVF 2023 3x3 cells from EPA 2011en/2023en emis	DVF 2023 Difference - CMAQ v CAMx
VA	51-059-0030	1	38.773350	-77.104698	Lee District Park	82.3	72	69.9	66.1	64.9	65.1	+1.2
VA	51-107-1005	1	39.024731	-77.489304	Broad Run High School, Ashburn	73.0	64	61.4	58.4	57.4	57.8	+1.0
VA	51-153-0009	1	38.852871	-77.634598	James S. Long Park	70.0	62	59.8	57.5	55.6	56.2	+1.9
VA	51-510-0009	1	38.810402	-77.044403	Alexandria Health Dept.	80.0	69	67.0	63.3	62.7	63.4	+0.6
VA	51-003-0001	1	38.076569	-78.503998	Albemarle High School	66.7	59	56.4	54.1	52.5	52.9	+1.6
VA	51-033-0001	1	38.200871	-77.377403	USGS Geomagnetic Center, Corbin	71.7	62	59.9	56.7	55.4	56.0	+1.3
VA	51-036-0002	1	37.344379	-77.259300	Shirley Plantation	75.7	66	61.2	59.7	58.2	59.4	+1.5
VA	51-041-0004	1	37.357479	-77.593597	VDOT Chesterfield Residency Shop	72.0	64	60.6	58.7	56.4	56.8	+2.3
VA	51-061-0002	1	38.473671	-77.767700	Chester Phelps Wildlife Management Area,	62.7	55	54.0	51.7	48.8	49.5	+2.9
VA	51-069-0010	1	39.281021	-78.081596	Rest	66.7	58	55.5	53.4	51.8	51.4	+1.6
VA	51-071-9991	1	37.329700	-80.557800	Horton Station	63.0	56	55.6	54.5	51.8	47.1	+2.7
VA	51-085-0003	1	37.606129	-77.218803	Turner Property, Old Church	73.7	65	60.0	57.7	56.5	56.9	+1.2
VA	51-087-0014	1	37.556519	-77.400299	MathScience Innovation Center	75.0	67	61.3	59.5	59.0	58.8	+0.5
VA	51-113-0003	1	38.521984	-78.435799	Shenandoah National Park, Big Meadows	70.7	64	62.0	60.2	57.3	57.0	+2.9
VA	51-139-0004	1	38.663731	-78.504402	Luray Caverns Airport	66.3	60	58.2	56.3	53.6	53.2	+2.7
VA	51-147-9991	1	37.165501	-78.306900	Prince Edward	62.0	56	52.8	51.4	49.3	50.3	+2.1
VA	51-161-1004	1	37.283421	-79.884499	East Vinton Elementary School	67.3	60	58.8	56.8	54.3	53.4	+2.5
VA	51-163-0003	1	37.626678	-79.512604	Natural Bridge Ranger Station	62.3	56	55.6	54.2	51.4	50.2	+2.8
VA	51-165-0003	1	38.477531	-78.819504	ROCKINGHAM CO. VDOT	66.0	60	57.8	56.0	53.4	53.7	+2.6
VA	51-179-0001	1	38.481232	-77.370399	Widewater Elementary School	73.0	62	59.1	55.0	54.8	55.4	+0.2
VA	51-197-0002	1	36.891171	-81.254204	Rural Retreat Sewage Treatment Plant	64.3	58	56.5	54.6	52.5	51.9	+2.1
VA	51-650-0008	1	37.103733	-76.387001	NASA Langley Research Center	74.0	66	65.3	62.2	58.2	58.2	+4.0
VA	51-800-0004	1	36.901180	-76.438103	Tidewater Community College	71.3	66	63.8	60.9	58.6	58.7	+2.3
VA	51-800-0005	1	36.665249	-76.730797	VA Tech Agricultural Research Station, H	69.7	61	58.6	56.4	55.2	54.7	+1.2

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September 21, 2018

Sean O. Alteri, Director
Kentucky Division for Air Quality
300 Sower Boulevard
Frankfort, Kentucky 40601

RE: Proposed Infrastructure State Implementation Plan Related to the 2015 Ozone NAAQS.

Dear Director Alteri:

The Midwest Ozone Group (MOG) is pleased to have the opportunity to comment in support of the Good Neighbor SIP portion of Kentucky's proposed Infrastructure State Implementation Plan related to the 2015 ozone NAAQS.

MOG is an affiliation of companies, trade organizations, and associations that draws upon its collective resources to seek solutions to the development of legally and technically sound air quality programs.[1] MOG's primary efforts are to work with policy makers in evaluating air quality policies by encouraging the use of sound science. MOG has been actively engaged in a variety of issues and initiatives related to the development and implementation of air quality policy, including the development of transport rules, NAAQS standards, nonattainment designations, petitions under Sections 176A and 126 of the Clean Air Act, NAAQS implementation guidance, the development of Good Neighbor state implementation plans (SIPs) and related regional haze and climate change issues. MOG members and participants operate a variety of emission sources including more than 75,000 MW of coal-fired and coal-refuse fired electric power generation in more than ten states. MOG Members and Participants also own and operate several fossil-fired generating units in the Commonwealth of Kentucky. They are concerned about the development of technically or legally unsubstantiated interstate air pollution actions and the impacts of those actions on their facilities, their employees, their contractors, and the consumers of their products.

While the attached comments will identify several factors that support the Cabinet's proposal, we will highlight only a few in this letter.

[1] The members of and participants in the Midwest Ozone Group include: American Coalition for Clean Coal Electricity, American Electric Power, American Forest & Paper Association, American Wood Council, Ameren, Alcoa, Appalachian Region Independent Power Producers Association (ARIPPA), ArcelorMittal, Associated Electric Cooperative, Citizens Energy Group, Council of Industrial Boiler Owners, Duke Energy, East Kentucky Power Cooperative, FirstEnergy, Indiana Energy Association, Indiana Utility Group, LGE / KU, National Lime Association, Ohio Utility Group, Olympus Power, and City Water, Light and Power (Springfield IL).

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).**

MOG supports the conclusion reached by the Cabinet "that the emissions reductions resulting from on-the-books and on-the-way emissions reductions are adequate to prohibit emissions within Kentucky from significantly contributing to nonattainment, or interfering with the maintenance, of downwind states with respect to the 2015 ozone NAAQS; therefore, meeting the requirements of CAA section 110(a)(2)(D)(i)(I) "prongs 1and 2." MOG not only supports the Cabinet's conclusion but also points out in these comments that such a conclusion is very conservative. MOG offers 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).

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, the Cabinet has relied on modeling work performed by Alpine Geophysics on behalf of MOG. This modeling was undertaken to address the concerns about whether modeling with a 12 km grid is sufficiently refined to address the land/water interface issues, Alpine Geophysics undertook to run EPA's modeling platform at a finer 4km grid. When this state-of-the-art modeling is used to assess air quality downwind of Kentucky at the appropriate attainment date, the only remaining nonattainment monitor linked to Kentucky is a single monitor at Harford Maryland which is predicted by Alpine Geophysics to have an average DV in 2023 of only 71.1 ppb (0.2 ppb above 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 2015 ozone NAAQS), LADCO's "no water" data shows this monitor to have an average design value of 70.5 ppb (attainment with the 2025 ozone NAAQS) and EPA's predicted average design value for the same monitor is 70.9 ppb (also attainment with the 2015 ozone NAAQS). Accordingly, all monitors in the Northeast are at or near attainment of the 2015 ozone NAAQS in 2023, making it unnecessary to further consider the potential for controls in upwind states.

3. **Mobile sources have the most significant impact on ozone concentrations at the problem monitors identified in this proposal.**

Given the dominant role of mobile sources in impacting on ozone air quality, MOG agrees with the Cabinet that additional local mobile source controls in downwind states are necessary before requiring additional emission reductions from upwind states such as Kentucky. 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.

4. **The 1% significant contribution test is inappropriate and should not be applied.**

On August 31, 2018, EPA issued significant new guidance on this matter in which it analyzed 1 ppb and 2 ppb alternatives to the 1% significance level that it has historically used. 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 the case of Kentucky, EPA's modeling data below show that at the historical 1% threshold, Kentucky would be linked to 4 non-attainment monitors and one maintenance monitor. However, applying the 1 ppb threshold to this data would eliminate any linkage to non-attainment monitor reduce to 1 the linkage to any maintenance monitor. Moving to the 2 ppb threshold would completely eliminate all linkage to any non-attainment or maintenance monitor.

Conclusion

As is stated in detail in the attached comments, the Midwest Ozone Group supports the Cabinet's draft Good Neighbor SIP as a conservative justification for the conclusion that no additional emissions reductions beyond existing and planned controls are necessary to mitigate any contribution Kentucky may have to any downwind monitors to comply with CAA section 110(a)(2)(D)(i)(I).

Very truly yours,

David M. Flannery
Legal Counsel
Midwest Ozone Group

cc: Ms. Lauren Hedge
Division for Air Quality
Kentucky Energy and Environmental Cabinet
300 Sower Boulevard
Frankfort, KY 40601

COMMENTS OF THE MIDWEST OZONE GROUP REGARDING THE KENTUCKY ENERGY AND ENVIRONMENTAL CABINET'S PROPOSED REVISION TO KENTUCKY'S 2015 OZONE STANDARD INFRASTRUCTURE STATE IMPLEMENTATION PLAN ADRESSING CLEAN AIR ACT 110 REQUIREMENTS

SEPTEMBER 21, 2018

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COMMENTS OF THE MIDWEST OZONE GROUP REGARDING THE KENTUCKY ENERGY AND ENVIRONMENTAL CABINET'S PROPOSED REVISION TO KENTUCKY'S 2015 OZONE STANDARD INFRASTRUCTURE STATE IMPLEMENTATION PLAN ADRESSING CLEAN AIR ACT 110 REQUIREMENTS

The Midwest Ozone Group (MOG) is pleased to have the opportunity to comment[1] on the proposed Infrastructure State Implementation Plan (SIP) by the Kentucky Energy and Environmental Cabinet ("Cabinet") related to the 2015 ozone National Ambient Air Quality Standard (NAAQS). While the full proposal relates to the requirements of Section 110(a)(2) of the federal Clean Air Act (CAA), these comments will be limited to the interstate transport provisions. MOG strongly supports the Cabinet's proposed plan as fully satisfying the requirements CAA section 110(a)(2)(D)(i)(I) regarding the interstate transport for the 2015 ozone NAAQS. .

MOG is an affiliation of companies, trade organizations, and associations that draws upon its collective resources to seek solutions to the development of legally and technically sound air quality programs.[2] MOG's primary efforts are to work with policy makers in evaluating air quality policies by encouraging the use of sound science. MOG has been actively engaged in a variety of issues and initiatives related to the development and implementation of air quality policy, including the development of transport rules, NAAQS standards, nonattainment designations, petitions under Sections 176A and 126 of the Clean Air Act, NAAQS implementation guidance, the development of Good Neighbor state implementation plans (SIPs) and related regional haze and climate change issues. MOG members and participants operate a variety of emission sources including more than 75,000 MW of coal-fired and coal-refuse fired electric power generation in more than ten states. MOG Members and Participants also own and operate several fossil-fired generating units in the Commonwealth of Kentucky. They are concerned about the development of technically or legally unsubstantiated interstate air pollution actions and the impacts of those actions on their facilities, their employees, their contractors, and the consumers of their products.

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[1] Comments or questions about this document should be directed to David M. Flannery, Kathy G. Beckett, or Edward L. Kropp, Legal Counsel, Midwest Ozone Group, Steptoe & Johnson PLLC, 707 Virginia Street East, Charleston West Virginia 25301; 304-353-8000; dave.flannery@steptoe-johnson.com and kathy.beckett@steptoe-johnson.com and skipp.kropp@steptoe-johnson.com respectively. These comments were prepared with the technical assistance of Alpine Geophysics, LLC.

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

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[3], 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;

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 the Cabinet's proposal is its reliance on the 12km modeling work performed by both EPA and the 4km modeling work performed by Alpine Geophysics on behalf of the MOG. The Cabinet notes that use of the Alpine Geophysics 4km modeling "is appropriate for areas where there are land-water interfaces". With respect to the Alpine Geophysics modeling, the Cabinet goes on to note:

> *This model provides a better analysis of the downwind monitors; however, it does not account for all of the factors contributing to these monitors.*

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

- the use of an alternative significance threshold
- downward emission trends in Kentucky;
- the need to account for local onroad emissions in the northeast before requiring

[3] *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.

- additional reductions from Kentucky; and
- the need to consider international emissions.

The ultimate conclusion by the Cabinet as stated on page 55 of its proposal is as follows:

> *The Cabinet concludes that the emissions reductions resulting from on-the-books and on-the-way emissions reductions are adequate to prohibit emissions within Kentucky from significantly contributing to nonattainment, or interfering with the maintenance, of downwind states with respect to the 2015 ozone NAAQS; therefore, meeting the requirements of CAA section 110(a)(2)(D)(i)(I) "prongs 1nad 2.*

MOG not only supports the Cabinet'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).

2. Independent State-of-the-Art Modeling by Alpine Geophysics on behalf of MOG shows that four monitors identified by EPA as nonattainment are actually predicted to be in attainment in 2023.

Beyond the modeling work performed by EPA, the Cabinet 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[4] containing these results of this modeling is set forth as an attachment to the proposal being advanced by the Cabinet.

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 <u>land-water interfaces</u> in or near the nonattainment area(s).[5] Emphasis added.*

Accordingly, when state-of-the-art modeling is used to assess air quality downwind of Kentucky at the appropriate attainment date, all monitors are in attainment except for a single

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

monitor at Harford Maryland with a MOG predicted average DV in 2023 of only 71.1 ppb (0.2 ppb above 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 2015 ozone NAAQS), LADCO's "no water" data show this monitor to have an average design value of 70.5 ppb (attainment with the 2015 ozone NAAQS) and EPA's predicted average design value for the same monitor is 70.9 ppb (also attainment with the 2015 ozone NAAQS). It is clear from these various modeling results that the Harford monitor is at or near attainment.

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 modeling[6], a value of 70.5 ppb was obtained putting it into attainment with the 2015 ozone NAAQS. As will be discussed elsewhere in these comments, Kentucky is not linked to the Sheboygan monitor at an alternative significance threshold of 1 ppb or higher.

Even though there are modeling platforms that predict both Sheboygan and Harford to be in attainment with the 2015 ozone NAAQS, the Cabinet conducted thoughtful and careful analysis of those monitors and others as part of its conservative demonstration that the Kentucky 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.

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 the Cabinet on the reduction on NOx emissions that have occurred in Kentucky 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 dramaticaly reduced in recent years. These NOx emission reductions will continueas 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[7] 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

[6] https://protect-us.mimecast.com/s/o6GECG690VcJq2gwcK5t5z?domain=ladco.org.
[7] 83 Fed. Reg. 7716 (February 22, 2018).

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.

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

	Annual Anthropogenic NOx Emissions (Tons)			Emissions Delta (2017-2011)		Emissions Delta (2023-2011)	
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 NOx Emissions (Tons)			Emissions Delta (2017-2011)		Emissions Delta (2023-2011)	
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 for this 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 (Tons)			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 anthopogenic 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 deceasing for many years and will continue to decrease through at least 2023 as the result of nothing more than on-the-books controls.

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

NO_X and VOC Reduction Programs

OTC Model Control Measures	Regional Reductions (tons per year)	Regional Reductions (tons per day)
Aftermarket Catalysts	14,983 (NO_X) 3,390 (VOC)	41 (NO_X) 9 (VOC)
On-Road Idling	19,716 (NO_X) 4,067 (VOC)	54 (NO_X) 11 (VOC)
Nonroad Idling	16,892 (NO_X) 2,460 (VOC)	46 (NO_X) 7 (VOC)
Heavy Duty I & M	9,326 (NO_X)	25 (NO_X)
Enhanced SMARTWAY	2.5%	
Ultra Low NOX Burners	3,669 (NO_X)	10 (NO_X)
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[9], 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.

[8] http://midwestozonegroup.com/files/MOG_May_7_Final_050515.pptx

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

The Cabinet's proposal correctly notes on page 52 that 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 the Cabinet's conclusion that on-the-books control programs are all that is needed to address the 2015 ozone NAAQS.

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

The Cabinet very properly has undertaken a review of monitors in each of Connecticut, the NY-NJ-CT Nonattainment Area, Maryland and Wisconsin and has noted the nonattainment designation status of each of those areas as well as their distance from Kentucky. This analysis also notes the significant impact of mobile sources including the very large amount of vehicle miles traveled. From this analysis it is apparent that Kentucky emissions have little impact on these areas. It is also apparent that significant remaining responsibility rests with the downwind nonattainment areas to address their own local sources.

When an area is measuring nonattainment of a NAAQS, as is the case with the areas linked to Kentucky, 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. [10]

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

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

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.

Given the significance of the need for local controls to address concern about any possible residual nonattainment area, MOG urges that this factor be considered as an additional factor supporting the conclusion that no further emission requirements are necessary to satisfy the requirements of CAA section 110(a)(2)(D)(i)(I).

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 [11] 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

[11] So in original. Probably should be "this".

(2) the submitting State establishes to the satisfaction of the Administrator that <u>the implementation plan of such State would be adequate</u> 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, <u>but for emissions emanating from outside of the United States</u>.

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. . ." <u>EPA v. EME Homer City Generation</u>, 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."[12] 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 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.

[12] *EME Homer City Generation, L.P. v EPA*, 696 F3.3d 7, 13 (D.C. Cir. 2012).

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.[13] 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.[14]

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.[15]

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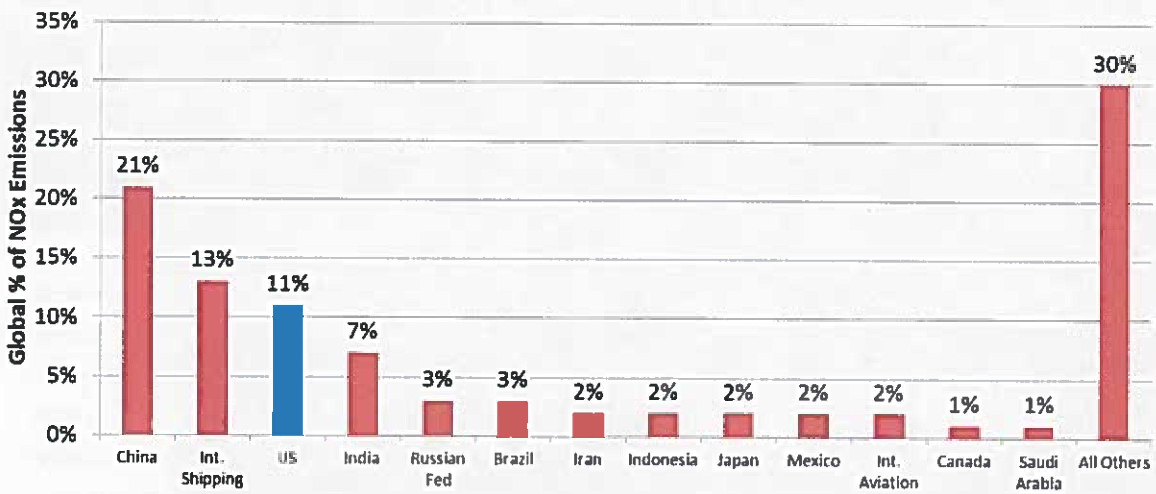
[13] EPA-HQ-OAR-2016-0751-0009.
[14] Atmos. Chem. Phys., 17, 2943–2970(2017).
[15] European Commission, Joint Research Centre (JRC)/PBL Netherlands Environmental Assessment Agency. Emission Database for Global Atmospheric Research (EDGAR), https://protect-us.mimecast.com/s/N-G6CERPwVI3vMWjhNVQlp?domain=edgar.jrc.ec.europa.eu

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 urges that the Cabinet not only recognize (as it does on page 53 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, but also that but for international emissions there would be no downwind problems areas at all and therefore no need to for additional action to be undertaken to satisfy the requirements of CAA section 110(a)(2)(D)(i)(I).

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

As the Cabinet 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[16]. 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.

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

Eastern State Mobile Source NOx Emissions (Annual Tons).

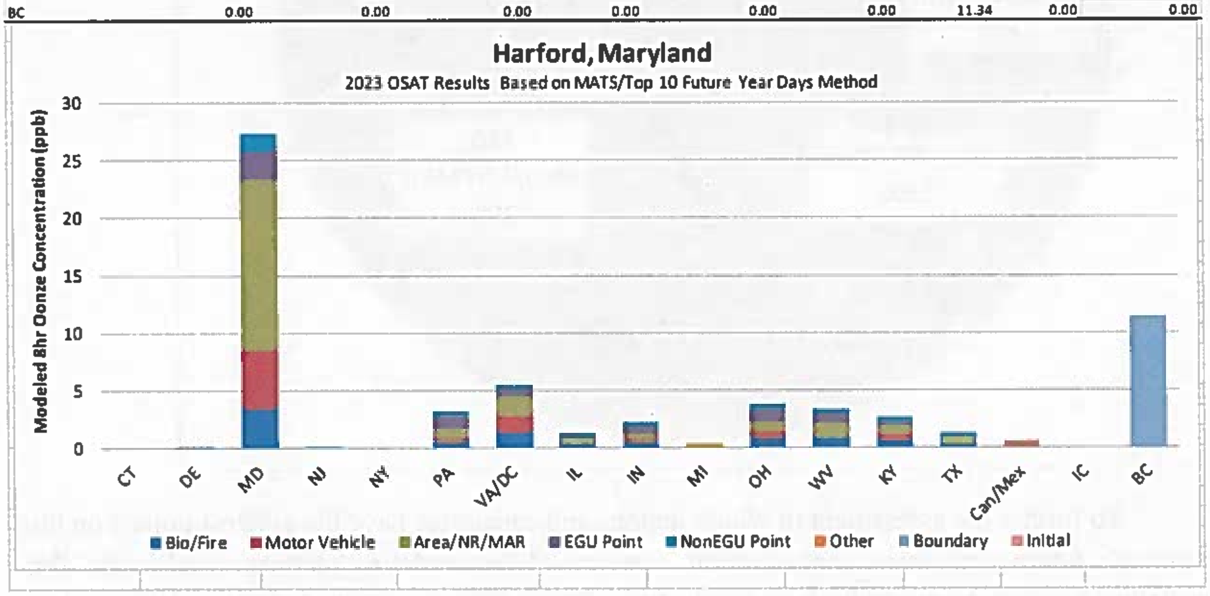
	Annual Anthropogenic NOx Emissions (Tons)			Annual Mobile Source NOx Emissions (Tons)			Mobile Sources as % of All Annual Emissions (%)		
State	2011	2017	2023	2011	2017	2023	2011	2017	2023
Alabama	359,797	220,260	184,429	175,473	88,094	54,104	49%	40%	29%
Arkansas	232,185	168,909	132,148	113,228	68,949	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[17], 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

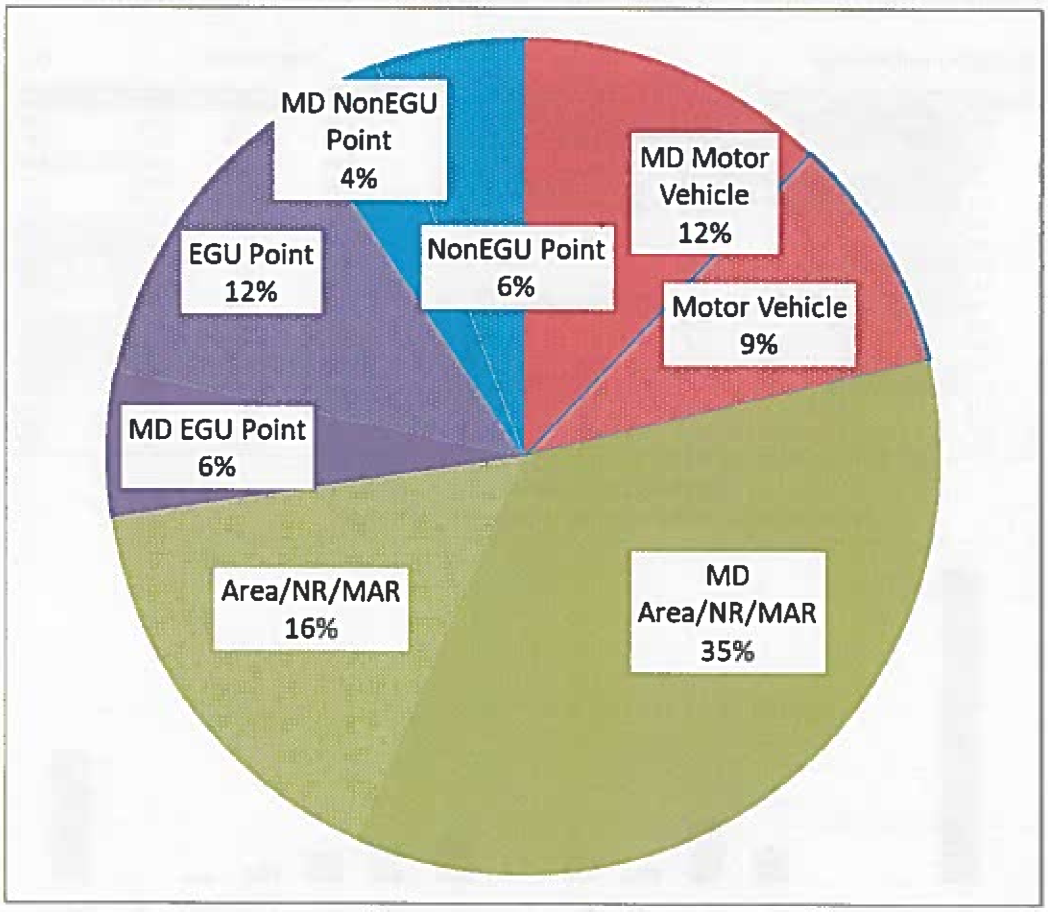


When focusing only on the anthropogenic contribution from the significant contributing states (1% of NAAQS or greater than or equal to 0.70 ppb), area/nonroad/MAR categories demonstrate more than half (51%; 35% from Maryland) of the total significant contribution from these states. As is shown in the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

[17] "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.

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[18], relational "impact factors" were developed using these data.

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

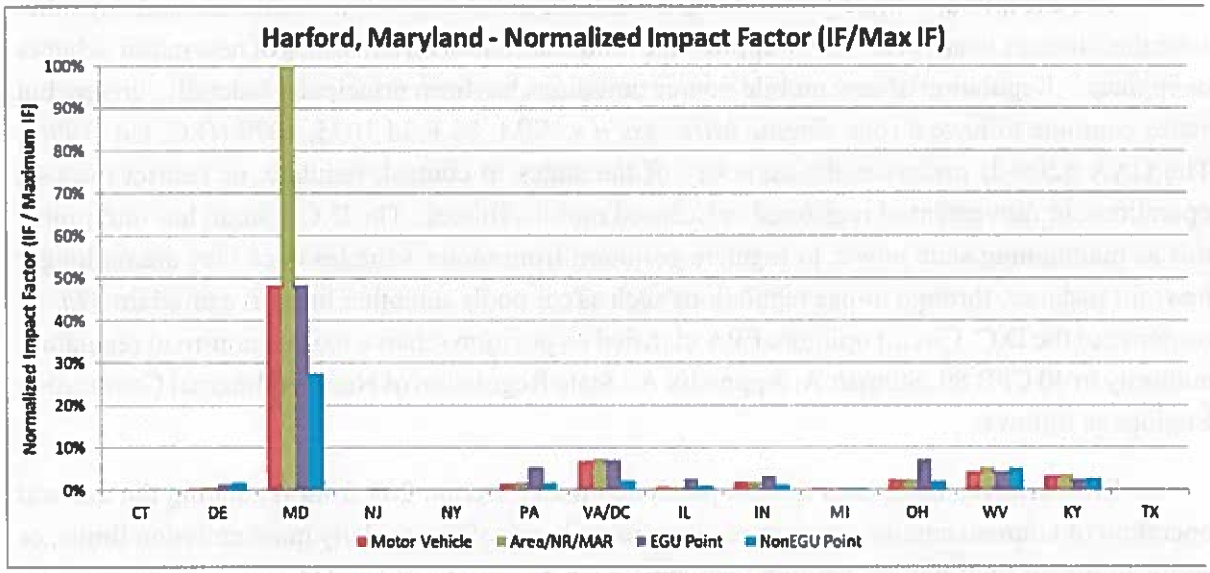
Impact Factor (ppb/ton) = OSAT Contribution (ppb) / Emissions (tons)

[18] ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011en_and_2023en/

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[19] 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 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

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

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 Cabinet 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 Kentucky. 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.

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 Cabinet 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".[20] Indeed, 2023 aligns with the last full ozone season before the attainment year for Moderate ozone nonattainment areas.

9. The Cabinet is correct in calling for the application of an alternative significance threshold.

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.[21] 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.[22]

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.[23] 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.

[20] *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.

[21] *Id* at p. A-2.

[22] Georgia EPD Comments on EPA's March 27, 2018 Interstate Transport Memo, J.W. Boylan, Air Protection Branch, George 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.

[23] *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.

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 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	71.0	36.91	33.63	27.38	91%	74%
90019003	Connecticut	Fairfield	83.7	73.0	38.55	36.93	32.28	96%	84%
361030002	New York	Suffolk	83.3	74.0	22.31	18.74	15.74	84%	71%
480391004	Texas	Brazoria	88.0	74.0	7.48	4.80	3.80	64%	51%
484392003	Texas	Tarrant	87.3	72.5	4.20	3.42	0.00	81%	0%
550790085	Wisconsin	Milwaukee	80.0	71.2	28.45	23.61	22.39	83%	79%
551170006	Wisconsin	Sheboygan	84.3	72.8	31.62	29.02	24.90	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	95%	78%
240251001	Maryland	Harford	71.0	19.9	17.51	14.56	88%	73%
361030002	New York	Suffolk	71.6	20.85	17.42	14.6	84%	70%
480391004	Texas	Brazoria	74.1	7.45	4.65	3.62	62%	49%
484392003	Texas	Tarrant	72.6	4.99	3.4	0	68%	0%
482011039	Texas	Harris	71.7	8.14	5.64	4.5	69%	55%

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

MOG Identified Nonattainment Site ID	State	County	Ozone Concentration (ppb) 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	97%	81%
90013007	Connecticut	Fairfield	84.3	69.7	23.91	23.04	18.57	96%	78%
90019003	Connecticut	Fairfield	83.6	69.9	27.78	26.12	21.49	94%	77%
90110124	Connecticut	New London	80.3	68.2	19.60	17.86	12.98	91%	66%
90099002	Connecticut	New Haven	85.7	70.3	21.08	17.92	15.04	85%	71%
240251001	Maryland	Harford	90.0	71.1	17.99	17.09	14.23	95%	79%
340150002	New Jersey	Gloucester	84.3	68.8	30.27	30.27	20.92	100%	69%
360850067	New York	Richmond	81.3	69.6	29.17	26.64	20.29	91%	70%
361030002	New York	Suffolk	83.3	70.7	22.52	19.85	14.50	88%	64%
421010024	Pennsylvania	Philadelphia	83.3	68.0	18.65	15.91	8.54	85%	46%

In the case of Kentucky, EPA's modeling data below show that at the 1% threshold, Kentucky would be linked to 4 non-attainment monitors and one maintenance monitor. Applying the 1 ppb threshold to this data would eliminate any linkage to non-attainment monitor reduce to 1 the linkage to any maintenance monitor. Moving to the 2 ppb threshold would completely eliminate all linkage to any non-attainment or maintenance monitor.

EPA Identified Nonattainment Site ID	State	County	Ozone (ppb) 2009-2013 Avg DV (ppb)	2023 Avg DV (ppb)	Significant Contribution (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	14.12	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	18.11	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	Milwaukee	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	15.73	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

EPA Identified Maintenance Site ID	State	County	2009-2013 Max DV (ppb)	2023 Max DV (ppb)	Significant Contribution (ppb) AR	CT	IL	IN	IA	KS	KY	LA	MD	MI	MS	MO	NJ	NY	OH	OK	PA	TX	VA	WV	WI
90010017	Connecticut	Fairfield	83.0	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	89.0	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	93.0	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	86.0	71.7	1.64	0	19.62	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	81.0	71.0	0.27	0	2.37	2.51	0.44	0.44	0.65	0.22	0.02	20.39	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	80.0	72.0	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	87.0	72.0	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	83.0	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	82.0	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	84.0	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 the Cabinet to carefully evaluate these additional flexibilities as further support for the conclusion that Kentucky has already satisfied the requirements of CAA section 110(a)(2)(D)(i)(I).

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."[24]

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> . . ."[25] (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 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."[26] "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."[27]

The Texas Commission on Environmental Quality (TCEQ) introduced in its 2015 Ozone NAAQS Transport SIP Revision 28 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

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[24] 134 S. Ct. at 1064, Ftn 18.
[25] *Id.* at 1604.
[26] *EME Homer City v. EPA*, 696 F.3d 7, 22 (D.C. Cir 2012).
[27] *Id.*

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.

We urge that the Cabinet 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 Kentucky is needed to address the requirements of CAA section 110(a)(2)(D)(i)(I).

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 Cabinet'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

[28] https://www.tceq.texas.gov/airquality/airmod/data/gn

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.[29]

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 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.[30]

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

[29] 134 S. Ct. at 1064, Ftn 18.

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

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 Cabinet 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 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 Kentucky 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 Cabinet apply an alternate methodology to assess maintenance monitors that is different than any method it would apply to assess nonattainment monitors. Any impacts which Kentucky 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 Kentucky sources as is well-demonstrated by these comments and the Cabinet's proposed GNS.

12. An additional element of conservatism in the Cabinet's proposal is recognition of Kentucky'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 Cabinet, 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 Kentucky's contribution to the Harford Maryland monitor to be 2.07 ppb, the result of the proportional reduction requirement associated with the relative significant contribution from each upwind state, Kentucky's required reduction would be lowered to only 0.02 ppb – a level that conservatively addressed by the various factors cited by the Cabinet 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 Kentucky 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 Kentucky sources as is well-demonstrated by these comments and the proposed GNS.

Conclusion.

Accordingly, the Midwest Ozone Group supports the Cabinet's proposed Good Neighbor SIP as a conservative justification for the conclusion that no additional emissions reductions beyond existing and planned controls are necessary to mitigate any contribution Kentucky may have to any downwind monitors to comply with CAA section 110(a)(2)(D)(i)(I).

PPL companies

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September 21, 2018

Ms. Lauren Hedge
Environmental Scientist II
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Evaluation Section
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Comments on Proposed Kentucky Infrastructure State Implementation Plan for the 2015 Ozone National Ambient Air Quality Standard

Dear Ms. Hedge:

LG&E and KU Energy LLC is pleased to have the opportunity to comment in support of the Proposed Kentucky Infrastructure State Implementation Plan (SIP) for the 2015 Ozone National Ambient Air Quality Standard. LG&E and KU Energy supports the conclusion of the proposed SIP that no additional emission reductions beyond existing and planned controls are necessary to mitigate any contribution Kentucky may have on downwind monitors to comply with CAA section 110(a)(2). Additionally, LG&E and KU Energy concur with the comments submitted on September 21, 2018 by the Midwest Ozone Group in support of the proposed SIP revision.

LG&E and KU Energy has identified one area of the proposed SIP that needs correction as listed here:

Proposed Infrastructure SIP for the 2015 Ozone NAAQS

1. Page 31, Emission Totals after CSAPR Implementation, second paragraph: This section makes reference that the "Louisville Gas & Electric Company's (LG&E) Cane Run Station converted Unit 7 to natural gas…" Revisions should be made to correctly state "Louisville Gas & Electric Company's (LG&E) Cane Run Station constructed and began operating a natural gas combined cycle unit (CR7) in 2015 and retired all remaining coal-fired units the same year".

If you have any questions, please feel free to contact me.

Respectfully,

Jason Wilkerson

Jason Wilkerson
Sr. Environmental Engineer
LG&E and KU Energy

SIERRA CLUB

September 21, 2018

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Re: Proposed Revision to Kentucky's 2015 Ozone Standard Infrastructure State Implementation Plan (SIP) Addressing the Clean Air Act (CAA) Section 110 Requirements Submitted by the Kentucky Energy and Environment Cabinet to the U.S. Environmental Protection Agency (EPA) on August 23, 2018

Dear Ms. Hedge:

Sierra Club submits the following comments in response to the Kentucky Energy and Environment Cabinet's ("Cabinet") recently proposed revision to Kentucky's 2015 Ozone Standard Infrastructure State Implementation Plan ("SIP") addressing the Clean Air Act ("CAA") Section 110 requirements (hereinafter "August 2018 SIP Proposal"). Sierra Club is a national environmental nonprofit organization with over 6,000 members in Kentucky and tens of thousands of members living in downwind states adversely impacted by Kentucky emissions of ozone precursors. For reasons identified below, the August 2018 SIP Proposal is unsupported in the record, unreasonable, and contrary to plain statutory mandate, and therefore may not lawfully be finalized in its present form.

The Cabinet submitted a letter dated August 23, 2018, to the U.S. Environmental Protection Agency ("EPA") purporting to certify that Kentucky's existing SIP contains CAA Section 110 provisions adequately address the requirements necessary to implement the 2015 ozone National Ambient Air Quality Standards ("NAAQS"). The Cabinet requested that EPA approve the accompanying submission as satisfying Kentucky's obligations under CAA Section 110(a)(2) for purposes of implementing the 2015 ozone NAAQS. *See* 42 U.S.C. § 7410(a)(2). The submission asserts its consistency with 2013 EPA guidance on infrastructure SIP elements under Section 110(a). To that end, the Cabinet reasons that that that "existing . . . provisions" in Kentucky's EPA-approved *2008* ozone NAAQS infrastructure SIP suffice to "address the requirements for purposes of implementing the 2015 ozone NAAQS."[1] The Cabinet then suggests that EPA should deem Kentucky's 2015 ozone NAAQS obligations satisfied on the basis of state laws on the books, yet without incorporating and adopting those laws into Kentucky's 2015 infrastructure SIP.[2]

The Cabinet's decision essentially to rely on existing state laws in conjunction with EPA's 2008 approval, for purposes of satisfying the 2015 ozone NAAQS, is arbitrary and capricious, and unsupported by evidence, and fails to satisfy the plain statutory requirement that Kentucky's SIP ensure that the Commonwealth does not contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to the 2015 ozone NAAQS. 42 U.S.C. § 7420(a)(2)(D)(i)(I).

First, the Cabinet's reliance on prior EPA approval, in regards to the 2008 ozone NAAQS, is unsupportable and unreasonable in light of the fact that EPA's own, most recent guidance and modeling, issued in March 2018, projects that Kentucky will contribute more than 1% of the NAAQS at 5 nonattainment or maintenance monitors (namely, two in Fairfield County, CT; one in Harford County, MD; one in Sheboygan County, WI, and one in Milwaukee County, WI). For specific reference, see the attached EPA Memorandum, *Information on the Interstate 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), Attachments B & C (submitted herewith as Appendix A hereto), along with the attached Excel spreadsheet featuring EPA's most updated modeling, with highlighting added (for convenience and clarity) of projected nonattainment monitors in orange and projected maintenance monitors in yellow (submitted herewith as Appendix B hereto). In other words, EPA's own, most recent determinations show that Kentucky's previously approved SIP is stale and does not show compliance with the 2015 ozone NAAQS; Kentucky's attempt simply to point to existing state-law provisions fails to address the Commonwealth's significant contributions to nonattainment and maintenance that EPA projects will persist in 2023.[3] On that critical point, EPA's prior

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[1] Proposed Kentucky I-SIP Package (Aug. 23, 2018) at 1.

[2] *Id.*

[3] Sierra Club continues to underscore and protest, as it has in prior comments to the Cabinet as well as EPA, the unreasonableness of EPA's modeling being based on 2023, which is beyond relevant attainment dates for marginal areas (which at least the Maryland and Wisconsin counties are) for the 2015 standard. Using an earlier year, as is proper, would only exacerbate the flaws discussed herein; but, as explained above, the August 2018 SIP Proposal is untenable even with EPA's 2023 modeling basis.

conclusion that Kentucky is not contributing significantly to nonattainment or maintenance under the *2008* ozone NAAQS is outdated and simply irrelevant to the instant query.[4] Thus, because EPA's modeling shows that Kentucky is in fact contributing significantly to nonattainment and maintenance at five monitors in three states under the 2015 standard, Kentucky obviously may not claim that it has no further obligations under the 2015 ozone NAAQS.

Unconvincingly, the August 2018 SIP Proposal acknowledges, but unfoundedly dismisses or dodges, the aforementioned EPA modeling and determinations that are fatal to its claims of adequacy at present.[5] For instance, the Cabinet's apparent argument that other sources also contribute significantly to failing air quality at downwind monitors is legally irrelevant; it simply does not obviate the need for Kentucky to address *its own* significant contribution.[6] Also, the submission's observations about meteorological data and HYSPLIT back trajectories are unpersuasive because EPA's CAMx modeling *already* incorporates meteorological inputs and links downwind air quality at specific locations with upwind emissions originating in Kentucky.[7] Likewise, the Alpine modeling submitted by the Midwest Ozone Group is unpersuasive: Among other fatal deficiencies, it utilized an inappropriate and arbitrary significance threshold (1 ppb rather than 1% of the NAAQS); and in any event, even if one were to accept the Alpine modeling, four of the five nonattainment or maintenance monitors linked to Kentucky still recorded maximum design values above the 2015 ozone NAAQS, and for all five monitors Kentucky's contribution exceeded 1 percent of the NAAQS.[8]

In addition, the Cabinet's assertion that existing provisions of state law will "address the requirements," vis-à-vis Kentucky's legal obligations to satisfy the 2015 ozone NAAQS, is unreasonably vague and non-committal; more detailed explanation and explicit guarantees, based on binding legal obligations, are required. The Cabinet points to existing local, state and federal regulations and other legal obligations in attempt to satisfy its obligations under Section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.[9] However, the submission fails to recognize, importantly, that EPA was unsatisfied this very year by those very laws and regulations when conducting its 2018 modeling, which found that Kentucky *does* contribute significantly to both nonattainment and maintenance monitors in downwind states. Given that EPA already took into

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[4] Sierra Club previously explained, in comments provided to the Cabinet on March 30, 2018, how the proposed Kentucky SIP revision to address the requirements of Section 110(a)(2)(D)(i)(I) of the Clean Air Act vis-à-vis the *2008* ozone NAAQS was deeply flawed. *See also supra* n.3. However, even accepting *arguendo* the validity of EPA's conclusions vis-à-vis the 2008 NAAQS, those conclusions are inapposite to satisfying Kentucky's obligations under the 2015 NAAQS, as discussed above.

[5] *See, e.g.*, Proposed Kentucky I-SIP Package at 32-55.

[6] *See id.* at 32-49.

[7] *See, e.g.*, *id.* at 37, 42, 49.

[8] *See id.* at 51.

[9] *Id.* at 19-28.

account the suite of control measures identified in the August 2018 SIP Proposal, and yet still found that Kentucky emissions were significantly interfering with downwind attainment and maintenance of the 2015 ozone NAAQS, Kentucky's submittal is inadequate and unlawful.

In conclusion, the August 2018 SIP Proposal concerning Kentucky's 2015 ozone NAAQS obligations is unsupported, unreasoned, and contrary to the CAA. The Cabinet therefore may not lawfully finalize it, but rather must revise the SIP to include obligations that will satisfy Section 110(a)(2)(D)(i)(I).

Thank you for your consideration. Please feel free to contact us if you have any questions or would otherwise like to discuss these or related issues.

Respectfully submitted,

/s/ Aaron Messing

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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MAR 27 2018

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: 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)

FROM: Peter Tsirigotis
Director

TO: Regional Air Division Directors, Regions 1–10

The purpose of this memorandum is to provide information to states and the Environmental Protection Agency Regional offices as they develop or review state implementation plans (SIPs) that address section 110(a)(2)(D)(i)(I) of Clean Air Act (CAA), also called the "good neighbor" provision, as it pertains to the 2015 ozone National Ambient Air Quality Standards (NAAQS). Specifically, this memorandum includes EPA's air quality modeling data for ozone for the year 2023, including newly available contribution modeling results, and a discussion of elements previously used to address interstate transport. In addition, the memorandum is accompanied by Attachment A, which provides a preliminary list of potential flexibilities in analytical approaches for developing a good neighbor SIP that may warrant further discussion between EPA and states.

The information in this memorandum provides an update to the contribution modeling analyses provided in EPA's January 2017 Notice of Data Availability (NODA) of ozone transport modeling data for the 2015 ozone NAAQS and builds upon information provided in the October 2017 interstate transport memorandum.[1] The October 2017 memorandum provided projected ozone design values for 2023 based on EPA's updated nationwide ozone modeling with the primary goal of assisting states in completing good neighbor transport actions for the 2008 ozone NAAQS.

[1] *See* 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), 82 FR 1733 (January 6, 2017). This memorandum also supplements the information provided in the memorandum, *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)*. Memorandum from Stephen D. Page, Director, U.S. EPA Office of Air Quality Planning and Standards, to Regional Air Division Directors, Regions 1–10. October 27, 2017. Available at *https://www.epa.gov/sites/production/files/2017-10/documents/final_2008_o3_naaqs_transport_memo_10-27-17b.pdf*. (The October 27, 2017, memorandum includes links to all supporting documentation, including modeling and emissions technical support documents.)

EPA's goal in providing this information is to assist states' efforts to develop good neighbor SIPs for the 2015 ozone NAAQS to address their interstate transport obligations. While the information in this memorandum and the associated air quality analysis data could be used to inform the development of these SIPs, the information is not a final determination regarding states' obligations under the good neighbor provision. Any such determination would be made through notice-and-comment rulemaking.

The Good Neighbor Provision

Under CAA sections 110(a)(l) and 110(a)(2), each state is required to submit a SIP that provides for the implementation, maintenance and enforcement of each primary and secondary NAAQS. Section 110(a)(1) requires each state to make this new SIP submission within 3 years after promulgation of a new or revised NAAQS. This type of SIP submission is commonly referred to as an "infrastructure SIP." Section 110(a)(2) identifies specific elements that each plan submission must meet. Conceptually, an infrastructure SIP provides assurance that a state's SIP contains the necessary structural requirements to implement the new or revised NAAQS, whether by demonstrating that the state's SIP already contains or sufficiently addresses the necessary provisions, or by making a substantive SIP revision to update the plan provisions to meet the new standards.

In particular, CAA section 110(a)(2)(D)(i)(I) requires each state to submit to EPA new or revised SIPs that "contain adequate provisions ... prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will ... contribute significantly to nonattainment in, or interfere with maintenance by, any other state with respect to any such national primary or secondary ambient air quality standard." EPA often refers to section 110(a)(2)(D)(i)(I) as the good neighbor provision and to SIP revisions addressing this requirement as good neighbor SIPs.

On October 1, 2015, EPA promulgated a revision to the ozone NAAQS, lowering the level of both the primary and secondary standards to 70 parts per billion (ppb).[2] Pursuant to CAA section 110(a), good neighbor SIPs are, therefore, due by October 1, 2018. As noted earlier, EPA intends that the information conveyed through this memorandum should assist states in their efforts to develop good neighbor SIPs for the 2015 ozone NAAQS to address their interstate transport obligations.

Framework to Address the Good Neighbor Provision

Through the development and implementation of several previous rulemakings, including most recently the Cross-State Air Pollution Rule (CSAPR) Update,[3] 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

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[2] National Ambient Air Quality Standards for Ozone Final Rule, 80 FR 65292 (October 26, 2015).

[3] *See* Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone (also known as the NO_X SIP Call), 63 FR 57356 (October 27, 1998); Clean Air Interstate Rule (CAIR) Final Rule, 70 FR 25162 (May 12, 2005); CSAPR Final Rule, 76 FR 48208 (August 8, 2011); CSAPR Update for the 2008 Ozone NAAQS (CSAPR Update) Final Rule, 81 FR 74504 (October 26, 2016).

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 emissions reductions. EPA notes that, in applying this framework or other approaches consistent with the CAA, various analytical approaches may be used to assess each step. EPA has undertaken several previous regional rulemakings applying this framework, and its analytical approaches have varied over time due to continued evolution of relevant tools and information, as well as their specific application.

This memo presents information regarding EPA's latest analysis for purposes of assisting states in developing SIPs for the 2015 ozone NAAQS, and, in doing so, generally follows approaches that EPA has taken in its regional rulemaking actions addressing prior ozone NAAQS. EPA also notes that, in developing their own rules, states have flexibility to follow the familiar four-step transport framework (using EPA's analytical approach or somewhat different analytical approaches within these steps) or alternative frameworks, so long as their chosen approach has adequate technical justification and is consistent with the requirements of the CAA. In various discussions, states and other stakeholders have suggested specific approaches that may warrant further consideration, and have indicated that they may be exploring other approaches as well. Over the next few months, EPA will be working with states to evaluate potential additional flexibilities for states to consider as they develop their good neighbor SIPs for the 2015 ozone NAAQS. Such potential flexibilities could apply to modeling conducted by states or to states' use of EPA's updated modeling presented here. Attachment A provides a preliminary list of potential flexibilities that may warrant further discussion. EPA looks forward to discussing these and other potential flexibilities with states over the next few months, which will help inform states' development of their good neighbor SIP submittals, as well as EPA's development of further information on good neighbor SIPs.

Air Quality Modeling Projection of 2023 Ozone Design Values

As noted previously and as described in more detail in both the 2017 NODA and the October 2017 memorandum, EPA uses modeling to identify potential downwind air quality problems. A first step in the modeling process is selecting a future analytic year that considers both the relevant attainment dates of downwind nonattainment areas impacted by interstate transport[4] and the timeframes that may be required for implementing further emissions reductions as expeditiously as practicable.[5] For the 2015 ozone NAAQS, EPA selected 2023 as the analytic year in our modeling analyses primarily because it aligns with the anticipated attainment year for Moderate ozone nonattainment areas.[6]

[4] *North Carolina v. EPA*, 531 F.3d 896, 911–12 (D.C. Cir. 2008) (holding that compliance timeframes for necessary emission reductions must consider downwind attainment deadlines).

[5] *See* October 2017 memorandum, pp. 4-6 (discussion of timing of controls).

[6] On November 16, 2017 (82 FR 54232), EPA established initial air quality designations for most areas in the United States. On December 22, 2017 (83 FR 651), EPA responded to state and tribal recommendations by indicating the anticipated area designations for the remaining portions of the U.S. In addition, EPA proposed the maximum attainment dates for nonattainment areas in each classification, which for Moderate ozone nonattainment is 6 years (81 FR 81276, November 17, 2016). Based on the expected timing for final designations, 6 years from the likely effective date for designations would be summer 2024. Therefore, the 2023 ozone season would be the last full ozone season before the 2024 attainment date.

As noted in the aforementioned October 2017 memorandum, EPA then used the Comprehensive Air Quality Model with Extensions (CAMx v6.40)[7] to model emissions in 2011 and 2023, based on updates provided to EPA from states and other stakeholders.[8] 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 monitoring sites nationwide. In projecting these future year design values, EPA applied its own modeling guidance,[9] which recommends using model predictions from the "3 x 3" array of grid cells surrounding the location of the monitoring site.[10] In light of comments on the January 2017 NODA and other analyses, EPA also projected 2023 design values based on a modified version of the "3 x 3" approach for those monitoring sites located in coastal areas. Briefly, in this alternative approach, EPA incorporated the flexibility of eliminating from the design value calculations those modeling data in grid cells that are dominated by water (*i.e.*, more than 50 percent of the area in the grid cell is water) and that do not contain a monitoring site (*i.e.*, if a grid cell is more than 50 percent water but contains an air quality monitor, that cell would remain in the calculation).[11] For each individual monitoring site, the base period 2009-2013 average and maximum design values, 2023 projected average and maximum design values based on both the "3 x 3" approach and the alternative approach affecting coastal sites, and 2014-2016 measured design values are provided in an attachment to the October 27 memorandum. The same information is available in Excel format at *https://www.epa.gov/airmarkets/october-2017-memo-and-information-interstate-transport-sips-2008-ozone-naaqs*.

In the CSAPR Update rulemaking process, EPA considered a combination of monitoring data and modeling projections to identify receptor sites that are projected to have problems attaining or maintaining the NAAQS.[12] Specifically, EPA identified nonattainment receptors as those monitoring sites with current measured values exceeding the NAAQS that also have projected (*i.e.*, in 2023) average design values exceeding the NAAQS. EPA identified maintenance receptors as those monitoring sites with maximum design values exceeding the NAAQS. This included sites with current measured values below the NAAQS with projected average and maximum design values exceeding the NAAQS, and monitoring sites with projected average design values below the NAAQS but with projected maximum design values exceeding the NAAQS. The projected 2023 ozone design values and 2014-2016 measured design values for monitors in the United States have not changed since they were first presented in the October 2017 memorandum.

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[7] CAMx v6.40 was the most recent public release version of CAMx at the time EPA updated its modeling in fall 2017. ("Comprehensive Air Quality Model with Extension version 6.40 User's Guide" Ramboll Environ, December 2016. *http://www.camx.com/*.)

[8] For the updated modeling, 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 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-interstate-ozone-transport-modeling-data-2015-ozone*.

[9] *http://www.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf*.

[10] EPA's modeling uses 12 kilometer^2 grid cells.

[11] A model grid cell is identified as a "water" cell if more than 50 percent of the grid cell is water based on the 2006 National Land Cover Database. Grid cells that meet this criterion are treated as entirely over water in the Weather Research Forecast (WRF) modeling used to develop the 2011 meteorology for EPA's air quality modeling.

[12] *See* 81 FR 74530-74532 (October 26, 2016).

In this memorandum, EPA is identifying 2023 potential nonattainment and maintenance receptors with respect to the 2015 NAAQS, following its approach taken for previous NAAQS. This information is based on applying the CSAPR method for identifying potential nonattainment and maintenance receptors, and presents the design values in two ways: first, following the "3 x 3" approach to evaluating all sites, and second, following the modified approach for coastal monitoring sites in which "overwater" modeling data were not included in the calculation of future year design values. After incorporating these approaches, the modeling results suggest, based on the approach used for previous NAAQS, 11 monitoring sites outside of California as potential nonattainment receptors and 14 monitoring sites outside of California as potential maintenance receptors. *See* Attachment B for this receptor information.

Air Quality Modeling of 2023 Contributions

After identifying potential downwind air quality problems by projecting base period 2009-2013 average and maximum ozone design values to 2023 at monitoring sites nationwide, EPA next performed nationwide, state-level ozone source apportionment modeling using the CAMx Anthropogenic Precursor Culpability Analysis (APCA) technique[13] to provide information regarding the expected contribution of 2023 base case nitrogen oxides (NO_X) and volatile organic compound (VOC) emissions from all sources in each state to projected 2023 ozone concentrations at each air quality monitoring site. In the source apportionment model run, EPA tracked the ozone formed from each of the following contribution categories (*i.e.*, "tags"):

- States – anthropogenic NO_X and VOC emissions from each of the contiguous 48 states and the District of Columbia tracked individually (EPA combined emissions from all anthropogenic sectors in a given state);
- Biogenics – biogenic NO_X and VOC emissions domain-wide (*i.e.*, not by state);
- Initial and Boundary Concentrations – concentrations transported into the modeling domain from the lateral boundaries;
- Tribal Lands – the emissions from those tribal lands for which EPA has point source inventory data in the 2011 NEI (EPA did not model the contributions from individual tribes);
- Canada and Mexico – anthropogenic emissions from sources in those portions of Canada and Mexico included in the modeling domain (EPA did not separately model contributions from Canada or Mexico);
- Fires – combined emissions from wild and prescribed fires domain-wide (*i.e.*, not by state); and
- Offshore – combined emissions from offshore marine vessels and offshore drilling platforms (*i.e.*, not by state).

EPA performed the CAMx source apportionment model simulation for the period May 1 through September 30 using the 2023 future base case emissions and 2011 meteorology for this

[13] As part of this technique, ozone formed from reactions between biogenic and anthropogenic VOC and NO_X are assigned to the anthropogenic emissions.

time period.[14] EPA processed hourly contributions[15] from each tag to obtain the 8-hour average contributions corresponding to the time period of the 8-hour daily maximum concentration on each day in the 2023 model simulation. This step was performed for those model grid cells containing monitoring sites to obtain 8-hour average contributions for each day at the location of each site. EPA then processed the model-predicted contributions on each day at each monitoring site location to identify the contributions on the subset of days in the 2023 modeling with the top 10 model-predicted maximum daily 8-hour average concentrations. The daily 8-hour average contributions on the top 10 concentration days in 2023 were applied in a relative sense to quantify the contributions to the 2023 average design value at each site.

In the CSAPR and CSAPR Update modeling efforts, EPA had used a slightly different approach by basing the average future year contribution on future year modeled values that exceeded the NAAQS or the top 5 days, whichever was greater. While technically sound, EPA's previous approach resulted in different contributions for an individual linkage depending on the level of the NAAQS. For the modeling effort described in this memorandum, EPA considered comments on the January 2017 NODA and developed and incorporated the flexibility of calculating the contribution metric using contributions on the top 10 future year days. As some commenters have indicated, this approach makes the contribution metric values more consistent across monitoring sites and more robust in terms of being independent of the level of the NAAQS. The contributions from each tag to each monitoring site identified as a potential nonattainment or maintenance receptor in 2023 are provided in Attachment C.[16]

Conclusion

States may consider using this national modeling to develop SIPs that address requirements of the good neighbor provision for the 2015 ozone NAAQS. When doing so, EPA recommends that states include in any such submission state-specific information to support their reliance on the 2023 modeling data. Further, states may supplement the information provided in this memorandum with any additional information that they believe is relevant to addressing the good neighbor provision requirements. States may also choose to use other information to identify nonattainment and maintenance receptors relevant to development of their good neighbor SIPs. If this is the case, states should submit that information along with a full explanation and technical analysis. EPA encourages collaboration among states linked to a common receptor and among linked upwind and downwind states in developing and implementing a regionally consistent approach. We recommend that states reach out to EPA Regional offices and work together to accomplish the goal of developing, submitting, and reviewing approvable SIPs that address the good neighbor provision for the 2015 ozone NAAQS.

Finally, as indicated previously in this memorandum, in addition to the flexibilities already incorporated into EPA's modeling effort (*i.e.*, considering the removal of modeled values in "over water" grid cells and EPA's modified approach for calculating the contribution metric), EPA is

[14] *See* the October 2017 memorandum for a description of these model inputs.

[15] Ozone contributions from anthropogenic emissions under "NOx-limited" and "VOC-limited" chemical regimes were combined to obtain the net contribution from NOx and VOC anthropogenic emissions in each state.

[16] Given stakeholder input on the 2017 NODA and other analyses, EPA elected to represent the contribution information in this memorandum using the alternative approach for projecting design values for sites in coastal areas.

evaluating whether states may have additional flexibilities as they work to prepare and submit approvable good neighbor SIPs for the 2015 ozone NAAQS (*see* Attachment A). EPA looks forward to discussing these and other potential flexibilities with states over the next few months, which will help inform states' development of their good neighbor SIP submittals, as well as EPA's development of further information on good neighbor SIPs.

Please share this information with the air agencies in your Region.

For Further Information

If you have any questions concerning this memorandum, please contact Norm Possiel at (919) 541-5692, *possiel.norm@epa.gov* for modeling information or Beth Palma at (919) 541-5432, *palma.elizabeth@epa.gov* for any other information.

Attachments

A. Preliminary List of Potential Flexibilities Related to Analytical Approaches for Developing a Good Neighbor State Implementation Plan
B. Projected Ozone Design Values at Potential Nonattainment and Maintenance Receptors Based on EPA's Updated 2023 Transport Modeling
C. Contributions to 2023 8-hour Ozone Design Values at Projected 2023 Nonattainment and Maintenance Sites

Attachment A

Preliminary List of Potential Flexibilities Related to Analytical Approaches for Developing a Good Neighbor State Implementation Plan

The Environmental Protection Agency believes states may be able to consider certain approaches as they develop good neighbor state implementation plans (SIPs) addressing the 2015 ozone National Ambient Air Quality Standards (NAAQS). To that end, EPA has reviewed comments provided in various forums, including comments on EPA's January 2017 Notice of Data Availability (NODA) regarding ozone transport modeling data for the 2015 ozone NAAQS, and seeks feedback from interested stakeholders on the following concepts. This list is organized in the familiar four-step transport framework discussed on pages 2-3 of the memorandum above, but EPA is open to alternative frameworks to address good neighbor obligations or considerations outside the four-step process. The purpose of this attachment is to identify potential flexibilities to inform SIP development and seek feedback on these concepts. EPA is not at this time making any determination that the ideas discussed below are consistent with the requirements of the CAA, nor are we specifically recommending that states use these approaches. Determinations regarding states' obligations under the good neighbor provision would be made through notice-and-comment rulemaking.

EPA has identified several guiding principles to consider when evaluating the appropriateness of the concepts introduced in this attachment, including:

- Supporting states' position as "first actors" in developing SIPs that address section 110(a)(2)(D) of the CAA;
- Consistency with respect to EPA's SIP actions is legally required by the statute and regulations (*see* CAA § 301(a)(2) and 40 CFR part 56) and is a particularly acute issue with respect to regional transport issues in which multiple states may be implicated;
- Compliance with statutory requirements and legal precedent from court decisions interpreting the CAA requirements;
- Encouraging collaboration among states linked to a common receptor and among linked upwind and downwind states in developing and applying a regionally consistent approach to identify and implement good neighbor obligations; and
- The potential value of considering different modeling tools or analyses in addition to 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.

EPA intends to reflect on feedback received on these concepts and communicate closely with air agencies as they prepare and submit SIPs to address the good neighbor provisions for the 2015 ozone NAAQS.

Analytics

- Consideration of appropriate alternate base years to those used in EPA's most recent modeling (*e.g.*, appropriate alternative base years should be selected consistent with EPA's air quality modeling guidance suggesting that years with meteorology conducive to ozone formation are appropriate).
- Consideration of an alternate future analytic year. EPA has identified 2023 as an appropriate analytic year to consider when evaluating transport obligations for the 2015 ozone NAAQS; however, another year may also be appropriate.
- Use of alternative power sector modeling consistent with EPA's emission inventory guidance.
- Consideration of state-specific information in identifying emissions sources [*e.g.*, electric generating units (EGUs) and non-EGUs] and controls (*e.g.*, combustion/process controls, post-combustion controls) that are appropriate to evaluate.

Step 1 – Identify downwind air quality problems

- Identification of maintenance receptors.
  - Evaluate alternative methodologies to give independent meaning to the term "interfere with maintenance" under CAA section 110(a)(2)(D)(i)(I).
  - Identify maintenance receptors that are at risk of exceeding the NAAQS (even if they do not currently violate the standard) using an alternative approach that does not rely on the projection of maximum design values.
  - Identify maintenance receptors where current, presumably "clean," measured data are shown through analysis to occur during meteorological conditions conducive to ozone formation such that exceedances are unlikely to reoccur in the future.
- Consideration of downwind air quality context.
  - Consider the role of designations issued in FY 2018 based on approved air quality monitors.
  - Assess current and projected local emissions reductions and whether downwind areas have considered and/or used available mechanisms for regulatory relief.
- Consideration of model performance.
  - Consider removal of certain data from modeling analysis for the purposes of projecting design values and calculating the contribution metric where data removal is based on model performance and technical analyses support the exclusion.

Step 2 – Identify upwind states that contribute to those downwind air quality problems to warrant further review and analysis

- Considerations related to determining contributions.
  - EPA has used the Anthropogenic Precursor Culpability Analysis (APCA) approach for the purpose of quantifying contribution to downwind receptors. We have received questions regarding the use of other modeling approaches (*e.g.*, Ozone Source Apportionment Technology, Decoupled Direct Method, and zero-out brute force sensitivity runs) to help quantify ozone impacts from upwind states.
- Considerations related to evaluating contributions (contributions contained in Attachment C are not based upon a particular significance threshold).
  - Establishing a contribution threshold based on variability in ozone design values that leverage some of the analytics and statistical data created to support the development of the Significant Impact Level for ozone.

- Consideration of different contribution thresholds for different regions based on regional differences in the nature and extent of the transport problem.
- An evaluation of "collective contribution" in the receptor region to determine the extent to which a receptor is "transport influenced." The results of this analysis could be applied before assessing whether an individual state is linked to a downwind receptor (*i.e.*, above the contribution threshold).

Step 3 – Identifying air quality, cost, and emission reduction factors to be evaluated in a multifactor test to identify emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind, if any

- Consideration of international emissions, in a manner consistent with EPA's Ozone Cooperative Compliance Task Force efforts to fully understand the role of background ozone levels and appropriately account for international transport.[17]
  - Develop consensus on evaluation of the magnitude of international ozone contributions relative to domestic, anthropogenic ozone contributions for receptors identified in step 1. As contained in Attachment C, EPA recognizes that a number of non-U.S. and non-anthropogenic sources contribute to downwind nonattainment and maintenance receptors.
  - Consider whether the air quality, cost, or emission reduction factors should be weighted differently in areas where international contributions are relatively high.
- 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 NO_X 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.
- Considerations for states linked to maintenance receptors.
  - Consider whether the remedy for upwind states linked to maintenance receptors could be less stringent than for those linked to nonattainment receptors.
  - For example, consider whether upwind states could satisfy linkage(s) to maintenance receptors based on recent historic or base case emissions levels.

Step 4 – Adopt permanent and enforceable measures needed to achieve emissions reductions (translating the control levels identified in Step 3 into enforceable emissions limits)

- EPA welcomes concepts from stakeholders regarding Step 4, including potential EPA actions that could serve as a model as well as the relationship to previous transport rules.

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[17] See *Final Report on Review of Agency Actions that Potentially Burden the Safe, Efficient Development of Domestic Energy Resources Under Executive Order 13783* (October 25, 2017) and *Report to Congress on Administrative Options to Enable States to Enter into Cooperative Agreements to Provide Regulatory Relief for Implementing Ozone Standards* (August 14, 2017).

Attachment B

Projected Ozone Design Values at Potential Nonattainment and Maintenance Receptors Based on EPA's Updated 2023 Transport Modeling

This attachment contains projected ozone design values at those individual monitoring sites that are projected to be potential nonattainment or maintenance receptors based on the Environmental Protection Agency's updated transport modeling for 2023. The scenario name for the updated modeling is "2023en." The data are in units of parts per billion (ppb).

The following data are provided in the table below:

1. Base period 2009 – 2013 average and maximum design values based on 2009 – 2013 measured data.

2. Projected 2023 average and maximum design values 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 monitors are excluded from the projection calculations ("No Water"). Note that the modified approach only affects the projection of design values for monitoring sites in or near coastal areas.

3. 2016 ozone design values based on 2014 – 2016 measured data (N/A indicates that a 2016 design value is not available). The following Web site has additional information on the 2016 design values: *https://www.epa.gov/air-trends/air-quality-design-values#report*.

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.

Note also: Site 550790085 in Milwaukee Co., WI would be a nonattainment receptor using projected design values based on the "No Water" cell approach, but would not be a receptor with the "3 x 3" approach. Conversely, site 360850067 in Richmond Co., NY would be a nonattainment receptor using the "3 x 3" approach, but would not be a receptor with the "No Water" cell approach.

Site ID	St	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
40130019	AZ	Maricopa	76.7	79	69.3	71.4	69.3	71.4	73
40131004	AZ	Maricopa	79.7	81	69.8	71.0	69.8	71.0	75
60190007	CA	Fresno	94.7	95	79.2	79.4	79.2	79.4	86
60190011	CA	Fresno	93.0	96	78.6	81.2	78.6	81.2	89
60190242	CA	Fresno	91.7	95	79.4	82.2	79.4	82.2	86
60194001	CA	Fresno	90.7	92	73.3	74.4	73.3	74.4	91
60195001	CA	Fresno	97.0	99	79.6	81.2	79.6	81.2	94
60250005	CA	Imperial	74.7	76	73.3	74.6	73.3	74.6	76
60251003	CA	Imperial	81.0	82	79.0	80.0	79.0	80.0	76
60290007	CA	Kern	91.7	96	77.7	81.3	77.7	81.3	87

Site ID	St	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
60290008	CA	Kern	86.3	88	71.3	72.8	71.3	72.8	81
60290014	CA	Kern	87.7	89	74.1	75.2	74.1	75.2	84
60290232	CA	Kern	87.3	89	73.7	75.2	73.7	75.2	77
60295002	CA	Kern	90.0	91	75.9	76.8	75.9	76.8	87
60296001	CA	Kern	84.3	86	70.9	72.4	70.9	72.4	81
60311004	CA	Kings	87.0	90	71.7	74.2	71.7	74.2	84
60370002	CA	Los Angeles	80.0	82	73.3	75.1	73.3	75.1	88
60370016	CA	Los Angeles	94.0	97	86.1	88.9	86.1	88.9	96
60371201	CA	Los Angeles	90.0	90	79.8	79.8	79.8	79.8	85
60371701	CA	Los Angeles	84.0	85	78.1	79.1	78.1	79.1	90
60372005	CA	Los Angeles	79.5	82	72.3	74.6	72.3	74.6	83
60376012	CA	Los Angeles	97.3	99	85.9	87.4	85.9	87.4	96
60379033	CA	Los Angeles	90.0	91	76.3	77.2	76.3	77.2	88
60392010	CA	Madera	85.0	86	72.1	72.9	72.1	72.9	83
60470003	CA	Merced	82.7	84	69.9	71.0	69.9	71.0	82
60650004	CA	Riverside	85.0	85	76.7	76.7	76.7	76.7	N/A
60650012	CA	Riverside	97.3	99	83.6	85.1	83.6	85.1	93
60651016	CA	Riverside	100.7	101	85.2	85.5	85.2	85.5	97
60652002	CA	Riverside	84.3	85	72.4	73.0	72.4	73.0	81
60655001	CA	Riverside	92.3	93	79.5	80.1	79.5	80.1	87
60656001	CA	Riverside	94.0	98	78.3	81.6	78.3	81.6	91
60658001	CA	Riverside	97.0	98	87.0	87.9	87.0	87.9	94
60658005	CA	Riverside	92.7	94	83.2	84.4	83.2	84.4	91
60659001	CA	Riverside	88.3	91	73.7	75.9	73.7	75.9	86
60670012	CA	Sacramento	93.3	95	74.5	75.9	74.5	75.9	83
60675003	CA	Sacramento	86.3	88	69.9	71.3	69.9	71.3	79
60710005	CA	San Bernardino	105.0	107	96.2	98.1	96.2	98.1	108
60710012	CA	San Bernardino	95.0	97	84.1	85.8	84.1	85.8	91
60710306	CA	San Bernardino	83.7	85	76.2	77.4	76.2	77.4	86
60711004	CA	San Bernardino	96.7	98	89.8	91.0	89.8	91.0	101
60712002	CA	San Bernardino	101.0	103	93.1	95.0	93.1	95.0	97
60714001	CA	San Bernardino	94.3	97	86.0	88.5	86.0	88.5	90
60714003	CA	San Bernardino	105.0	107	94.1	95.8	94.1	95.8	101
60719002	CA	San Bernardino	92.3	94	80.0	81.4	80.0	81.4	86
60719004	CA	San Bernardino	98.7	99	88.4	88.7	88.4	88.7	104
60990006	CA	Stanislaus	87.0	88	74.8	75.7	74.8	75.7	83
61070006	CA	Tulare	81.7	85	69.1	71.9	69.1	71.9	84
61070009	CA	Tulare	94.7	96	76.1	77.2	76.1	77.2	89

Site ID	St	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
61072002	CA	Tulare	85.0	88	68.9	71.4	68.9	71.4	80
61072010	CA	Tulare	89.0	90	73.1	73.9	73.1	73.9	83
61112002	CA	Ventura	81.0	83	70.5	72.2	70.5	72.2	77
80050002	CO	Arapahoe	76.7	79	69.3	71.3	69.3	71.3	N/A
80350004	CO	Douglas	80.7	83	71.1	73.2	71.1	73.2	77
80590006	CO	Jefferson	80.3	83	71.3	73.7	71.3	73.7	77
80590011	CO	Jefferson	78.7	82	70.9	73.9	70.9	73.9	80
80690011	CO	Larimer	78.0	80	71.2	73.0	71.2	73.0	75
81230009	CO	Weld	74.7	76	70.2	71.4	70.2	71.4	70
90010017	CT	Fairfield	80.3	83	69.8	72.1	68.9	71.2	80
90013007	CT	Fairfield	84.3	89	71.2	75.2	71.0	75.0	81
90019003	CT	Fairfield	83.7	87	72.7	75.6	73.0	75.9	85
90099002	CT	New Haven	85.7	89	71.2	73.9	69.9	72.6	76
240251001	MD	Harford	90.0	93	71.4	73.8	70.9	73.3	73
260050003	MI	Allegan	82.7	86	69.0	71.8	69.0	71.7	75
261630019	MI	Wayne	78.7	81	69.0	71.0	69.0	71.0	72
360810124	NY	Queens	78.0	80	70.1	71.9	70.2	72.0	69
360850067	NY	Richmond	81.3	83	71.9	73.4	67.1	68.5	76
361030002	NY	Suffolk	83.3	85	72.5	74.0	74.0	75.5	72
480391004	TX	Brazoria	88.0	89	74.0	74.9	74.0	74.9	75
481210034	TX	Denton	84.3	87	69.7	72.0	69.7	72.0	80
482010024	TX	Harris	80.3	83	70.4	72.8	70.4	72.8	79
482011034	TX	Harris	81.0	82	70.8	71.6	70.8	71.6	73
482011039	TX	Harris	82.0	84	71.8	73.6	71.8	73.5	67
484392003	TX	Tarrant	87.3	90	72.5	74.8	72.5	74.8	73
550790085	WI	Milwaukee	80.0	82	65.4	67.0	71.2	73.0	71
551170006	WI	Sheboygan	84.3	87	70.8	73.1	72.8	75.1	79

Attachment C

Contributions to 2023 8-hour Ozone Design Values at Projected 2023 Nonattainment and Maintenance Sites

This attachment contains tables with the projected ozone contributions from 2023 anthropogenic nitrogen oxide and volatile organic compound emissions in each state to each potential nonattainment receptor and maintenance receptor (based on the 2015 ozone National Ambient Air Quality Standards) in the United States, following the approach for identification of such receptors EPA has used in the past, with slight modification.[18] In addition to the state contributions, we have included the contributions from each of the other categories tracked in the contribution modeling, including point source emissions on Tribal lands, anthropogenic emissions in Canada and Mexico, emissions from offshore sources, fires, biogenics, and contributions from initial and boundary concentrations.

The contribution information is provided in a three-part table for all of the projected receptors throughout the country, except California, and a separate three-part table for the projected receptors in California. For each monitoring site, we provide the site ID, county name, and state name in the first three columns of the table. This information is followed by columns containing the projected 2023 average and maximum design values based on the "No Water" cell approach. Next, in Parts 1 and 2 of each table, we provide the contributions from each state and the District of Columbia, individually. Finally, in Part 3 of each table, we provide the contributions from the Tribal lands, Canada and Mexico, offshore, fires, initial and boundary concentrations (Boundary), and biogenics categories. The units of the 2023 design values and contributions are parts per billion (ppb). Note that the contributions presented in these tables may not sum exactly to the 2023 average design value due to truncation of the contributions to two places to the right of the decimal.

[18] For the purposes of creating the contribution tables, data are provided for sites identified as potential nonattainment and maintenance receptors using projected design values based on the "No Water" cell approach. In addition, we provide the contributions to the Richmond Co., NY site that would be a nonattainment receptor in the "3 x 3" approach.

Contributions to 2023 Nonattainment and Maintenance Sites Outside of California (Part 1)

Site ID	County	State	2023en Average	2023en Maximum	AL	AZ	AR	CA	CO	CT	DE	DC	FL	GA	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT
40130019	Maricopa	AZ	69.3	71.4	0.00	25.19	0.00	1.87	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40131004	Maricopa	AZ	69.8	71.0	0.00	27.40	0.00	2.03	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80050002	Arapahoe	CO	69.3	71.3	0.00	0.29	0.00	1.20	22.94	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.28	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
80350004	Douglas	CO	71.1	73.2	0.00	0.38	0.01	1.27	24.71	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.26	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
80590006	Jefferson	CO	71.3	73.7	0.01	0.49	0.03	1.32	25.52	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.27	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03
80590011	Jefferson	CO	70.9	73.9	0.01	0.30	0.02	1.50	24.72	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.32	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
80690011	Larimer	CO	71.2	73.0	0.00	0.46	0.00	1.55	21.74	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.10	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
81230009	Weld	CO	70.2	71.4	0.01	0.49	0.02	0.95	24.44	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.09	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04
90010017	Fairfield	CT	68.9	71.2	0.08	0.03	0.07	0.03	0.07	8.70	0.18	0.04	0.02	0.09	0.01	0.39	0.44	0.11	0.09	0.34	0.05	0.01	1.18	0.06	0.50	0.17	0.03	0.21	0.03
90013007	Fairfield	CT	71.0	75.0	0.14	0.05	0.13	0.05	0.09	4.64	0.35	0.06	0.05	0.17	0.01	0.72	0.97	0.16	0.13	0.89	0.11	0.01	1.80	0.12	0.70	0.15	0.07	0.38	0.02
90019003	Fairfield	CT	73.0	75.9	0.14	0.05	0.13	0.05	0.09	3.71	0.40	0.08	0.05	0.17	0.01	0.67	0.83	0.17	0.13	0.79	0.11	0.00	2.17	0.10	0.63	0.14	0.07	0.37	0.02
90099002	New Haven	CT	69.9	72.6	0.06	0.04	0.08	0.05	0.08	9.10	0.30	0.04	0.02	0.07	0.02	0.46	0.50	0.16	0.14	0.32	0.08	0.01	1.37	0.18	0.73	0.19	0.04	0.29	0.04
240251001	Harford	MD	70.9	73.3	0.31	0.07	0.17	0.07	0.12	0.00	0.03	0.65	0.11	0.32	0.02	0.84	1.35	0.23	0.23	1.52	0.19	0.00	22.60	0.00	0.79	0.13	0.08	0.59	0.04
260050003	Allegan	MI	69.0	71.7	0.35	0.08	1.64	0.09	0.18	0.00	0.00	0.00	0.09	0.18	0.03	19.62	7.11	0.77	0.77	0.58	0.70	0.00	0.01	0.00	3.32	0.11	0.40	2.61	0.06
261630019	Wayne	MI	69.0	71.0	0.11	0.07	0.27	0.13	0.17	0.00	0.00	0.00	0.05	0.09	0.05	2.37	2.51	0.44	0.44	0.65	0.22	0.00	0.02	0.00	20.39	0.31	0.09	0.92	0.08
360810124	Queens	NY	70.2	72.0	0.11	0.06	0.09	0.08	0.11	0.57	0.38	0.05	0.07	0.16	0.03	0.73	0.69	0.26	0.19	0.42	0.13	0.00	1.56	0.24	1.26	0.17	0.04	0.38	0.05
360850067	Richmond	NY	67.1	68.5	0.24	0.08	0.13	0.09	0.12	0.27	0.43	0.05	0.09	0.28	0.02	0.80	0.92	0.23	0.21	0.84	0.16	0.00	1.74	0.03	0.98	0.12	0.08	0.46	0.03
361030002	Suffolk	NY	74.0	75.5	0.12	0.06	0.12	0.08	0.11	0.83	0.22	0.04	0.04	0.12	0.03	0.64	0.69	0.20	0.20	0.49	0.13	0.01	1.24	0.04	0.94	0.18	0.06	0.39	0.06
480391004	Brazoria	TX	74.0	74.9	0.35	0.08	0.90	0.21	0.30	0.00	0.00	0.00	0.21	0.14	0.08	1.00	0.32	0.40	0.47	0.14	3.80	0.00	0.00	0.00	0.22	0.34	0.63	0.88	0.10
481210034	Denton	TX	69.7	72.0	0.49	0.07	0.58	0.13	0.27	0.00	0.00	0.00	0.27	0.34	0.06	0.23	0.16	0.10	0.40	0.11	1.92	0.00	0.01	0.00	0.08	0.11	0.33	0.24	0.07
482010024	Harris	TX	70.4	72.8	0.39	0.04	0.29	0.12	0.13	0.00	0.00	0.00	0.39	0.26	0.05	0.34	0.13	0.17	0.17	0.10	3.06	0.00	0.00	0.00	0.06	0.06	0.50	0.38	0.05
482011034	Harris	TX	70.8	71.6	0.32	0.03	0.54	0.10	0.15	0.00	0.00	0.00	0.53	0.16	0.04	0.51	0.12	0.27	0.32	0.05	3.38	0.00	0.00	0.00	0.17	0.23	0.39	0.63	0.05
482011039	Harris	TX	71.8	73.5	0.37	0.04	0.99	0.12	0.20	0.00	0.00	0.00	0.23	0.13	0.05	0.88	0.24	0.33	0.33	0.11	4.72	0.00	0.00	0.00	0.27	0.20	0.79	0.88	0.07
484392003	Tarrant	TX	72.5	74.8	0.37	0.08	0.78	0.15	0.33	0.00	0.00	0.00	0.18	0.26	0.07	0.29	0.18	0.19	0.69	0.13	1.71	0.00	0.01	0.00	0.13	0.15	0.27	0.38	0.10
550790085	Milwaukee	WI	71.2	73.0	0.14	0.04	0.40	0.07	0.08	0.00	0.00	0.00	0.06	0.06	0.03	15.10	5.28	0.79	0.35	0.77	0.72	0.00	0.03	0.00	2.01	0.40	0.28	0.93	0.10
551170006	Sheboygan	WI	72.8	75.1	0.14	0.08	0.51	0.12	0.11	0.00	0.00	0.00	0.07	0.07	0.04	15.73	7.11	0.45	0.46	0.81	0.84	0.00	0.03	0.00	2.06	0.28	0.30	1.37	0.06

Contributions to 2023 Nonattainment and Maintenance Sites Outside of California (Part 2)

Site ID	County	State	2023en Average	2023en Maximum	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
40130019	Maricopa	AZ	69.3	71.4	0.00	0.09	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.00	0.00	0.22	0.06	0.00	0.00	0.02	0.00	0.00	0.01
40131004	Maricopa	AZ	69.8	71.0	0.00	0.14	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.11	0.06	0.00	0.00	0.03	0.00	0.00	0.00
80050002	Arapahoe	CO	69.3	71.3	0.34	0.33	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.12	0.11	0.00	0.00	0.00	0.02	0.00	0.30	1.23	0.00	0.00	0.04	0.00	0.00	1.04
80350004	Douglas	CO	71.1	73.2	0.32	0.32	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.12	0.10	0.00	0.00	0.00	0.02	0.00	0.36	1.08	0.00	0.00	0.04	0.00	0.00	1.00
80590006	Jefferson	CO	71.3	73.7	0.41	0.31	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.24	0.10	0.00	0.00	0.00	0.02	0.00	1.02	0.83	0.00	0.00	0.04	0.00	0.00	0.81
80590011	Jefferson	CO	70.9	73.9	0.36	0.38	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.18	0.10	0.00	0.00	0.00	0.02	0.00	0.94	1.04	0.00	0.00	0.03	0.00	0.00	1.03
80690011	Larimer	CO	71.2	73.0	0.25	0.37	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.03	0.00	0.40	1.05	0.00	0.00	0.10	0.00	0.00	0.88
81230009	Weld	CO	70.2	71.4	0.27	0.24	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.08	0.04	0.00	0.00	0.00	0.03	0.00	1.05	0.54	0.00	0.00	0.05	0.00	0.00	0.58
90010017	Fairfield	CT	68.9	71.2	0.06	0.00	0.01	6.24	0.04	17.31	0.29	0.07	1.04	0.15	0.00	5.11	0.01	0.06	0.03	0.15	0.30	0.03	0.01	1.27	0.02	0.68	0.26	0.07
90013007	Fairfield	CT	71.0	75.0	0.07	0.01	0.02	6.94	0.06	14.12	0.40	0.07	1.84	0.21	0.00	6.32	0.02	0.11	0.02	0.31	0.44	0.04	0.01	1.51	0.01	1.10	0.24	0.08
90019003	Fairfield	CT	73.0	75.9	0.07	0.01	0.02	7.75	0.06	15.80	0.43	0.06	1.60	0.21	0.01	6.56	0.02	0.12	0.02	0.28	0.45	0.04	0.01	1.91	0.01	1.14	0.20	0.08
90099002	New Haven	CT	69.9	72.6	0.09	0.01	0.03	5.06	0.04	15.03	0.32	0.15	1.17	0.24	0.01	4.87	0.02	0.04	0.04	0.12	0.41	0.04	0.02	1.26	0.04	0.61	0.25	0.10
240251001	Harford	MD	70.9	73.3	0.13	0.01	0.00	0.07	0.09	0.16	0.42	0.07	2.77	0.35	0.02	4.32	0.00	0.11	0.04	0.43	0.74	0.05	0.00	5.05	0.04	2.78	0.24	0.12
260050003	Allegan	MI	69.0	71.7	0.16	0.02	0.00	0.00	0.16	0.00	0.05	0.09	0.19	1.31	0.01	0.05	0.00	0.04	0.05	0.65	2.39	0.06	0.00	0.04	0.05	0.11	1.95	0.12
261630019	Wayne	MI	69.0	71.0	0.17	0.03	0.00	0.01	0.08	0.06	0.20	0.12	3.81	0.62	0.05	0.18	0.00	0.05	0.04	0.27	1.12	0.09	0.00	0.16	0.07	0.23	1.08	0.18
360810124	Queens	NY	70.2	72.0	0.12	0.02	0.06	8.57	0.07	13.55	0.35	0.12	1.88	0.32	0.02	7.16	0.04	0.09	0.05	0.13	0.58	0.07	0.07	1.56	0.03	1.01	0.38	0.14
360850067	Richmond	NY	67.1	68.5	0.12	0.02	0.00	10.53	0.09	6.57	0.37	0.09	2.05	0.36	0.01	10.41	0.00	0.10	0.04	0.36	0.70	0.07	0.00	1.67	0.02	1.54	0.30	0.12
361030002	Suffolk	NY	74.0	75.5	0.12	0.02	0.01	8.88	0.06	18.11	0.23	0.20	1.76	0.34	0.03	6.86	0.00	0.05	0.05	0.22	0.60	0.07	0.02	0.99	0.06	0.81	0.25	0.14
480391004	Brazoria	TX	74.0	74.9	0.23	0.06	0.00	0.00	0.08	0.00	0.04	0.06	0.06	0.90	0.05	0.01	0.00	0.04	0.05	0.28	26.00	0.14	0.00	0.02	0.06	0.02	0.40	0.27
481210034	Denton	TX	69.7	72.0	0.15	0.04	0.00	0.00	0.13	0.01	0.09	0.03	0.08	1.23	0.03	0.04	0.00	0.09	0.03	0.14	26.69	0.10	0.00	0.05	0.05	0.04	0.08	0.25
482010024	Harris	TX	70.4	72.8	0.08	0.03	0.00	0.00	0.05	0.00	0.14	0.04	0.05	0.20	0.03	0.02	0.00	0.14	0.02	0.26	25.62	0.08	0.00	0.06	0.03	0.05	0.07	0.14
482011034	Harris	TX	70.8	71.6	0.16	0.03	0.00	0.00	0.04	0.00	0.09	0.04	0.05	0.68	0.02	0.01	0.00	0.10	0.03	0.09	25.66	0.07	0.00	0.03	0.02	0.03	0.22	0.15
482011039	Harris	TX	71.8	73.5	0.19	0.03	0.00	0.00	0.06	0.00	0.04	0.06	0.05	0.58	0.03	0.01	0.00	0.03	0.04	0.30	22.82	0.08	0.00	0.02	0.04	0.01	0.28	0.20
484392003	Tarrant	TX	72.5	74.8	0.30	0.04	0.00	0.00	0.14	0.01	0.09	0.05	0.10	1.71	0.05	0.05	0.00	0.08	0.07	0.15	27.64	0.15	0.00	0.05	0.09	0.05	0.13	0.28
550790085	Milwaukee	WI	71.2	73.0	0.06	0.01	0.00	0.00	0.08	0.02	0.04	0.23	0.87	0.76	0.02	0.33	0.00	0.02	0.03	0.31	1.22	0.04	0.00	0.12	0.09	0.59	13.39	0.09
551170006	Sheboygan	WI	72.8	75.1	0.06	0.03	0.00	0.00	0.14	0.02	0.04	0.10	1.10	0.95	0.04	0.41	0.00	0.02	0.02	0.31	1.65	0.06	0.00	0.10	0.07	0.64	9.09	0.12

Contributions to 2023 Nonattainment and Mainte[illegible]ce Sites Outside of California (Part 3)

Site ID	County	State	2023en Average	2023en Maximum	Tribal	Canada/ Mexco	Offshore	Fire	Boundary	Biogenic
40130019	Maricopa	AZ	69.3	71.4	0.06	3.29	0.37	0.49	34.74	2.52
40131004	Maricopa	AZ	69.8	71.0	0.06	2.70	0.34	0.56	33.85	2.24
80050002	Arapahoe	CO	69.3	71.3	0.22	0.55	0.14	0.46	34.84	4.24
80350004	Douglas	CO	71.1	73.2	0.21	0.71	0.16	0.47	34.74	4.19
80590006	Jefferson	CO	71.3	73.7	0.21	0.90	0.17	0.66	31.41	5.40
80590011	Jefferson	CO	70.9	73.9	0.16	0.70	0.16	0.45	32.96	4.74
80690011	Larimer	CO	71.2	73.0	0.25	0.78	0.19	1.74	34.54	5.71
81230009	Weld	CO	70.2	71.4	0.23	1.04	0.15	1.57	31.11	6.08
90010017	Fairfield	CT	68.9	71.2	0.00	1.64	0.65	0.20	16.73	3.28
90013007	Fairfield	CT	71.0	75.0	0.01	1.35	1.93	0.34	17.17	4.01
90019003	Fairfield	CT	73.0	75.9	0.01	1.37	1.96	0.33	17.00	4.09
90099002	New Haven	CT	69.9	72.6	0.01	1.58	2.15	0.22	17.17	4.13
240251001	Harford	MD	70.9	73.3	0.01	0.79	0.32	0.42	15.28	5.32
260050003	Allegan	MI	69.0	71.7	0.02	0.54	0.36	0.93	11.85	8.91
261630019	Wayne	MI	69.0	71.0	0.02	3.13	0.17	0.44	20.06	6.93
360810124	Queens	NY	70.2	72.0	0.01	1.73	1.39	0.25	17.87	4.45
360850067	Richmond	NY	67.1	68.5	0.01	1.44	0.83	0.35	15.46	4.75
361030002	Suffolk	NY	74.0	75.5	0.01	1.85	1.24	0.30	18.94	4.49
480391004	Brazoria	TX	74.0	74.9	0.02	0.44	2.31	2.05	24.02	5.60
481210034	Denton	TX	69.7	72.0	0.01	0.92	1.23	0.87	24.69	6.42
482010024	Harris	TX	70.4	72.8	0.01	0.28	4.83	0.77	27.83	2.66
482011034	Harris	TX	70.8	71.6	0.01	0.24	3.91	1.75	25.71	3.44
482011039	Harris	TX	71.8	73.5	0.01	0.47	4.04	2.09	24.67	4.50
484392003	Tarrant	TX	72.5	74.8	0.02	1.24	1.18	1.34	24.38	6.44
550790085	Milwaukee	WI	71.2	73.0	0.01	0.82	0.43	0.37	16.67	6.70
551170006	Sheboygan	WI	72.8	75.1	0.01	0.69	0.55	0.64	17.53	7.51

Contributions to 2023 Nonattainment and Maintenance Sites in California (Part 1)

Site ID	County	State	2023 Average	2023 Maximum	AL	AZ	AR	CA	CO	CT	DE	DC	FL	GA	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT
60190007	Fresno	CA	79.2	79.4	0.00	0.16	0.00	35.68	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60190011	Fresno	CA	78.6	81.2	0.00	0.15	0.00	35.20	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60190242	Fresno	CA	79.4	82.2	0.00	0.21	0.00	31.98	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60194001	Fresno	CA	73.3	74.4	0.00	0.03	0.00	34.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60195001	Fresno	CA	79.6	81.2	0.00	0.12	0.00	35.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60250005	Imperial	CA	73.3	74.6	0.00	0.62	0.00	9.28	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60251003	Imperial	CA	79.0	80.0	0.00	0.67	0.00	11.34	0.07	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290007	Kern	CA	77.7	81.3	0.00	0.07	0.00	29.99	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290008	Kern	CA	71.3	72.8	0.00	0.17	0.00	26.44	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290014	Kern	CA	74.1	75.2	0.00	0.11	0.00	31.54	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60290232	Kern	CA	73.7	75.2	0.00	0.03	0.00	32.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60295002	Kern	CA	75.9	76.8	0.00	0.13	0.00	28.33	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60296001	Kern	CA	70.9	72.4	0.00	0.16	0.00	28.50	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60370002	Los Angeles	CA	73.3	75.1	0.00	0.23	0.00	39.68	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60370016	Los Angeles	CA	86.1	88.9	0.00	0.27	0.00	46.61	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60371201	Los Angeles	CA	79.8	79.8	0.00	0.37	0.00	35.55	0.06	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60371701	Los Angeles	CA	78.1	79.1	0.00	0.27	0.00	42.09	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60372005	Los Angeles	CA	72.3	74.6	0.00	0.32	0.00	37.39	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60376012	Los Angeles	CA	85.9	87.4	0.00	0.42	0.00	39.86	0.08	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60379033	Los Angeles	CA	76.3	77.2	0.00	0.34	0.00	25.79	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60392010	Madera	CA	72.1	72.9	0.00	0.20	0.00	28.39	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60470003	Merced	CA	69.9	71.0	0.00	0.10	0.00	28.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60650004	Riverside	CA	76.7	76.7	0.00	0.22	0.00	41.92	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60650012	Riverside	CA	83.6	85.1	0.00	0.21	0.00	38.65	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60651016	Riverside	CA	85.2	85.5	0.00	0.22	0.00	35.47	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60652002	Riverside	CA	72.4	73.0	0.00	0.27	0.00	16.57	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60655001	Riverside	CA	79.5	80.1	0.00	0.20	0.00	24.70	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60656001	Riverside	CA	78.3	81.6	0.00	0.17	0.00	39.14	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60658001	Riverside	CA	87.0	87.9	0.00	0.27	0.00	47.69	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60658005	Riverside	CA	83.2	84.4	0.00	0.25	0.00	45.60	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60659001	Riverside	CA	73.7	75.9	0.00	0.16	0.00	37.28	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60670012	Sacramento	CA	74.5	75.9	0.00	0.01	0.00	35.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60675003	Sacramento	CA	69.9	71.3	0.00	0.00	0.00	34.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60710005	San Bernardino	CA	96.2	98.1	0.00	0.23	0.00	48.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60710012	San Bernardino	CA	84.1	85.8	0.00	0.46	0.00	24.28	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60710306	San Bernardino	CA	76.2	77.4	0.00	0.14	0.00	29.72	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60711004	San Bernardino	CA	89.8	91.0	0.00	0.35	0.00	47.69	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60712002	San Bernardino	CA	93.1	95.0	0.00	0.14	0.00	51.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60714001	San Bernardino	CA	86.0	88.5	0.00	0.21	0.00	41.23	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60714003	San Bernardino	CA	94.1	95.8	0.00	0.10	0.00	52.53	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60719002	San Bernardino	CA	80.0	81.4	0.00	0.45	0.00	22.21	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60719004	San Bernardino	CA	88.4	88.7	0.00	0.10	0.00	49.35	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60990006	Stanislaus	CA	74.8	75.7	0.00	0.03	0.00	34.16	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61070006	Tulare	CA	69.1	71.9	0.00	0.06	0.00	7.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61070009	Tulare	CA	76.1	77.2	0.00	0.07	0.00	23.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61072002	Tulare	CA	68.9	71.4	0.00	0.12	0.00	30.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61072010	Tulare	CA	73.1	73.9	0.00	0.03	0.00	30.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61112002	Ventura	CA	70.5	72.2	0.00	0.32	0.00	29.51	0.06	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Contributions to 2023 Nonattainment and Maintenance Sites in California (Part 2)

Site ID	County	State	2023 Average	2023 Maximum	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
60190007	Fresno	CA	79.2	79.4	0.00	0.51	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.00	0.00	0.05	0.00	0.00	0.01
60190011	Fresno	CA	78.6	81.2	0.00	0.44	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.00	0.00	0.05	0.00	0.00	0.01
60190242	Fresno	CA	79.4	82.2	0.00	0.64	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.03	0.10	0.00	0.00	0.07	0.00	0.00	0.01
60194001	Fresno	CA	73.3	74.4	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
60195001	Fresno	CA	79.6	81.2	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
60250005	Imperial	CA	73.3	74.6	0.00	0.09	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.20	0.05	0.00	0.00	0.02	0.00	0.00	0.04
60251003	Imperial	CA	79.0	80.0	0.00	0.25	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.09	0.06	0.00	0.00	0.02	0.00	0.00	0.03
60290007	Kern	CA	77.7	81.3	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.00	0.15	0.00	0.00	0.03
60290008	Kern	CA	71.3	72.8	0.00	0.31	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.10	0.00	0.00	0.01
60290014	Kern	CA	74.1	75.2	0.00	0.38	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.08	0.00	0.00	0.00
60290232	Kern	CA	73.7	75.2	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.17	0.00	0.00	0.00
60295002	Kern	CA	75.9	76.8	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.00	0.00	0.05	0.00	0.00	0.02
60296001	Kern	CA	70.9	72.4	0.00	0.58	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.02	0.00	0.00	0.00
60370002	Los Angeles	CA	73.3	75.1	0.00	0.12	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.16	0.03	0.00	0.00	0.04	0.00	0.00	0.01
60370016	Los Angeles	CA	86.1	88.9	0.00	0.14	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.18	0.03	0.00	0.00	0.05	0.00	0.00	0.02
60371201	Los Angeles	CA	79.8	79.8	0.00	0.17	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.13	0.09	0.00	0.00	0.05	0.00	0.00	0.03
60371701	Los Angeles	CA	78.1	79.1	0.00	0.11	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.19	0.03	0.00	0.00	0.05	0.00	0.00	0.02
60372005	Los Angeles	CA	72.3	74.6	0.00	0.08	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.00	0.00	0.00	0.00	0.21	0.06	0.00	0.00	0.04	0.00	0.00	0.02
60376012	Los Angeles	CA	85.9	87.4	0.00	0.18	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.03	0.16	0.00	0.00	0.00	0.00	0.00	0.21	0.08	0.00	0.00	0.07	0.00	0.00	0.04
60379033	Los Angeles	CA	76.3	77.2	0.00	0.15	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.02	0.19	0.00	0.00	0.00	0.00	0.00	0.15	0.04	0.00	0.00	0.07	0.00	0.00	0.02
60392010	Madera	CA	72.1	72.9	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.00	0.00	0.06	0.00	0.00	0.02
60470003	Merced	CA	69.9	71.0	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
60650004	Riverside	CA	76.7	76.7	0.00	0.14	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.00	0.00	0.03	0.00	0.00	0.01
60650012	Riverside	CA	83.6	85.1	0.00	0.24	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.08	0.00	0.00	0.00
60651016	Riverside	CA	85.2	85.5	0.00	0.28	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00
60652002	Riverside	CA	72.4	73.0	0.00	0.18	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.22	0.04	0.00	0.00	0.02	0.00	0.00	0.02
60655001	Riverside	CA	79.5	80.1	0.00	0.11	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.04	0.12	0.00	0.00	0.00	0.00	0.00	0.26	0.03	0.00	0.00	0.07	0.00	0.00	0.02
60656001	Riverside	CA	78.3	81.6	0.00	0.19	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.00	0.00	0.02	0.00	0.00	0.02
60658001	Riverside	CA	87.0	87.9	0.00	0.15	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.12	0.03	0.00	0.00	0.06	0.00	0.00	0.01
60658005	Riverside	CA	83.2	84.4	0.00	0.14	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.00	0.00	0.06	0.00	0.00	0.01
60659001	Riverside	CA	73.7	75.9	0.00	0.15	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.00	0.04	0.00	0.00	0.01
60670012	Sacramento	CA	74.5	75.9	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.20	0.00	0.00	0.00
60675003	Sacramento	CA	69.9	71.3	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00
60710005	San Bernardino	CA	96.2	98.1	0.00	0.25	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.20	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.00	0.00	0.07	0.00	0.00	0.01
60710012	San Bernardino	CA	84.1	85.8	0.00	0.15	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.02	0.11	0.00	0.00	0.00	0.00	0.00	0.12	0.06	0.00	0.00	0.04	0.00	0.00	0.03
60710306	San Bernardino	CA	76.2	77.4	0.00	0.06	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.04	0.00	0.00	0.00
60711004	San Bernardino	CA	89.8	91.0	0.00	0.14	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.22	0.04	0.00	0.00	0.05	0.00	0.00	0.02
60712002	San Bernardino	CA	93.1	95.0	0.00	0.16	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.23	0.00	0.00	0.00	0.00	0.00	0.13	0.01	0.00	0.00	0.08	0.00	0.00	0.00
60714001	San Bernardino	CA	86.0	88.5	0.00	0.19	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.05	0.00	0.00	0.00
60714003	San Bernardino	CA	94.1	95.8	0.00	0.21	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.25	0.00	0.00	0.00	0.00	0.00	0.12	0.08	0.00	0.00	0.15	0.00	0.00	0.01
60719002	San Bernardino	CA	80.0	81.4	0.00	0.14	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.00	0.00	0.28	0.05	0.00	0.00	0.04	0.00	0.00	0.04
60719004	San Bernardino	CA	88.4	88.7	0.00	0.20	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.23	0.00	0.00	0.00	0.00	0.00	0.11	0.07	0.00	0.00	0.14	0.00	0.00	0.01
60990006	Stanislaus	CA	74.8	75.7	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.11	0.00	0.00	0.01
61070006	Tulare	CA	69.1	71.9	0.00	0.05	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00
61070009	Tulare	CA	76.1	77.2	0.00	0.11	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.07	0.00	0.00	0.00
61072002	Tulare	CA	68.9	71.4	0.00	0.21	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.16	0.00	0.00	0.00
61072010	Tulare	CA	73.1	73.9	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.17	0.00	0.00	0.00
61112002	Ventura	CA	70.5	72.2	0.00	0.18	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.02	0.16	0.00	0.00	0.00	0.00	0.00	0.13	0.08	0.00	0.00	0.08	0.00	0.00	0.03

Contributions to 2023 Nonattainment and Maintenance Sites in California (Part 3)

Site ID	County	State	2023 Average	2023 Maximum	Tribal	Canada/ Mexco	Offshore	Fire	Boundary	Biogenic
60190007	Fresno	CA	79.2	79.4	0.00	0.29	1.19	1.39	32.52	6.85
60190011	Fresno	CA	78.6	81.2	0.01	0.33	1.13	1.62	32.34	6.78
60190242	Fresno	CA	79.4	82.2	0.00	0.31	1.24	1.48	34.92	7.88
60194001	Fresno	CA	73.3	74.4	0.00	0.12	1.68	0.87	27.76	7.90
60195001	Fresno	CA	79.6	81.2	0.00	0.20	1.75	1.12	32.10	7.66
60250005	Imperial	CA	73.3	74.6	0.01	19.87	1.17	0.71	38.68	2.11
60251003	Imperial	CA	79.0	80.0	0.01	18.74	1.14	0.61	43.58	2.08
60290007	Kern	CA	77.7	81.3	0.00	0.30	1.59	3.27	33.68	7.70
60290008	Kern	CA	71.3	72.8	0.01	0.67	1.96	1.05	32.77	7.30
60290014	Kern	CA	74.1	75.2	0.00	0.31	1.68	0.85	31.31	7.37
60290232	Kern	CA	73.7	75.2	0.00	0.13	1.67	1.11	29.43	7.73
60295002	Kern	CA	75.9	76.8	0.00	0.35	1.34	3.80	33.45	7.68
60296001	Kern	CA	70.9	72.4	0.00	0.50	1.59	0.63	30.55	7.98
60370002	Los Angeles	CA	73.3	75.1	0.01	1.47	3.53	0.82	24.67	2.15
60370016	Los Angeles	CA	86.1	88.9	0.01	1.73	4.14	0.97	28.98	2.53
60371201	Los Angeles	CA	79.8	79.8	0.02	1.74	4.20	1.29	32.92	2.83
60371701	Los Angeles	CA	78.1	79.1	0.01	1.82	4.16	0.97	25.57	2.35
60372005	Los Angeles	CA	72.3	74.6	0.01	1.76	4.10	1.17	24.34	2.37
60376012	Los Angeles	CA	85.9	87.4	0.02	2.27	4.69	1.22	32.85	3.43
60379033	Los Angeles	CA	76.3	77.2	0.01	1.82	3.52	0.45	40.73	2.75
60392010	Madera	CA	72.1	72.9	0.00	0.23	1.22	1.30	32.12	7.30
60470003	Merced	CA	69.9	71.0	0.00	0.37	1.94	1.12	30.92	5.97
60650004	Riverside	CA	76.7	76.7	0.01	1.37	3.64	0.72	25.79	2.34
60650012	Riverside	CA	83.6	85.1	0.00	1.30	3.33	0.31	36.48	2.66
60651016	Riverside	CA	85.2	85.5	0.00	1.60	3.00	3.09	38.71	2.54
60652002	Riverside	CA	72.4	73.0	0.01	2.29	1.39	2.24	46.66	2.08
60655001	Riverside	CA	79.5	80.1	0.01	2.71	2.67	3.03	42.81	2.40
60656001	Riverside	CA	78.3	81.6	0.00	1.13	4.03	0.53	30.14	2.55
60658001	Riverside	CA	87.0	87.9	0.01	1.76	4.77	0.77	28.27	2.68
60658005	Riverside	CA	83.2	84.4	0.01	1.68	4.56	0.73	27.04	2.57
60659001	Riverside	CA	73.7	75.9	0.00	1.71	4.96	1.03	25.56	2.43
60670012	Sacramento	CA	74.5	75.9	0.00	0.12	0.88	1.16	29.33	5.92
60675003	Sacramento	CA	69.9	71.3	0.00	0.06	0.79	1.26	26.47	6.04
60710005	San Bernardino	CA	96.2	98.1	0.00	1.36	3.68	0.44	38.71	2.77
60710012	San Bernardino	CA	84.1	85.8	0.02	1.33	1.83	0.33	53.12	1.93
60710306	San Bernardino	CA	76.2	77.4	0.00	0.67	2.10	0.50	40.62	2.02
60711004	San Bernardino	CA	89.8	91.0	0.01	2.03	4.00	0.95	31.07	2.74
60712002	San Bernardino	CA	93.1	95.0	0.00	1.58	4.58	0.75	31.34	2.82
60714001	San Bernardino	CA	86.0	88.5	0.00	0.91	2.69	0.37	37.56	2.45
60714003	San Bernardino	CA	94.1	95.8	0.00	0.98	4.15	0.69	31.70	2.90
60719002	San Bernardino	CA	80.0	81.4	0.01	2.80	2.23	3.20	45.72	2.29
60719004	San Bernardino	CA	88.4	88.7	0.00	0.92	3.90	0.65	29.78	2.72
60990006	Stanislaus	CA	74.8	75.7	0.00	0.34	2.19	1.77	30.24	5.06
61070006	Tulare	CA	69.1	71.9	0.00	0.33	0.55	4.43	53.61	2.46
61070009	Tulare	CA	76.1	77.2	0.00	0.43	1.44	3.40	39.41	7.08
61072002	Tulare	CA	68.9	71.4	0.00	0.25	1.58	0.95	26.88	7.42
61072010	Tulare	CA	73.1	73.9	0.00	0.15	1.78	1.17	30.26	8.67
61112002	Ventura	CA	70.5	72.2	0.02	1.65	4.60	1.01	29.69	2.75

STATEMENT OF CONSIDERATION
Relating to the Proposed SIP Revision for the 2015 Ozone Infrastructure State Implementation Plan

Energy and Environment Cabinet
Kentucky Department for Environmental Protection
Division for Air Quality

Response to Comments for Kentucky's proposed SIP submittal to address Clean Air Act (CAA) Sections 110(a)(1) and (2), regarding the 2015 ozone National Ambient Air Quality Standards (NAAQS) Infrastructure State Implementation Plan (I-SIP).

Beginning August 23, 2018 until September 21, 2018, the Energy and Environment Cabinet (Cabinet) provided an opportunity for the public to review and comment on the proposed SIP revision addressing CAA sections 110(a)(1) and (2) for the 2015 ozone NAAQS. The Cabinet made available the public notice of the comment period and public hearing on the Division for Air Quality's website, and mailed the public notice to interested individuals registered on the regulatory mailing lists maintained by the Cabinet.

The following people submitted written statements during the public comment period:

Name	Title/Agency/Organization/Entity/Other
Scott Davis	U.S. EPA
Steven E. Flint, PE	Director, Division of Air Resources of New York State Department of Environmental Conservation
David M. Flannery	Legal Counsel, Midwest Ozone Group
Jason Wilkerson	Senior Environmental Engineer, LG&E and KU Energy
Aaron Messing, Matthew E. Miller	Legal Fellow and Staff Attorney of Sierra Club

A public hearing was conducted on September 21, 2018, at 10:00 a.m. at 300 Sower Boulevard in Frankfort, Kentucky.

The following people attended this public hearing:

Name	Title/Agency/Organization/Entity/Other	Testimony
Brian Clark	Executive Director, Kentucky Petroleum Marketers	No
Stephanie Stumbo	Attorney, Goss Samford Attorneys at Law	No
Larry Taylor	Environmental Scientist Consultant, Office of the Commissioner, DEP	No

The following people from the Division for Air Quality attended this public hearing:

Name and Title
Lauren Hedge, Environmental Scientist (Cabinet Representative)
Anna Bowman, Environmental Scientist

Summary of Comments and Responses

1. Comment: The modeling performed by Alpine Geophysics (Alpine) in support of Kentucky's 2015 ozone interstate transport SIP determined downwind nonattainment monitors in 2023 and evaluated the significance of upwind states contributions for the 2015 ozone national ambient air quality standards (NAAQS) based on alternative flexibilities and/or analytics proposed in the EPA' s March 27, 2018 Memorandum *(Information on the Interstate Transport State Implementation Plan Submissions for the 2015 Ozone NAAQS under the Clean Air Act Section 110(a)(2)(D)(i)(I).* As discussed on page 50 of the SIP submission, the use of these flexibilities provide alternative results than the EPA's 2023 modeling platform in terms of downwind receptors and Kentucky' s projected contribution. We would like to have further discussions on these differences and below provide examples.

a. Page 51 - Alpine projects the Harford County, Maryland, monitor as a nonattainment receptor with an average design value of 71.1 parts per billion (ppb). In the submittal, Kentucky indicates that the EPA's modeling platform did not account for newly announced unit retirements, fuel switching and modifications. Please identify any specific emission reductions anticipated in the downwind state that Kentucky believes were not accounted for in the EPA's modeling. To the extent that Kentucky believes anticipated emission reductions would address the average design value of 71.1 ppb identified in the Alpine modeling, Kentucky should also explain how such reductions would address maintenance concerns at this same receptor, given both the EPA modeling and the Alpine modeling identified a maximum design value of 73.3 ppb and 73.5 ppb, respectively.

Response: The Cabinet acknowledges this comment. The Cabinet has amended the language on page19, within Kentucky's proposed 2015 ozone I-SIP, to reflect the use of EPA's 1 ppb threshold from its August 31, 2018 memo.[1] The Cabinet believes the 1 ppb threshold is a sound alternative in identifying emissions contributions. EPA's memo states, "Thus, the use of a 1 ppb threshold to identify linked upwind states still provides the potential, at step 3, for meaningful emissions reductions in linked upwind states in order to aid downwind states with attainment and maintenance of the 2015 ozone NAAQS." Further, as stated in the EPA v. EME Homer City Generation case. "EPA does not view the obligation under the good neighbor provision as

[1] EPA, *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.* (August 31, 2018)

a requirement for upwind states to bear all of the burden for resolving downwind air quality problems. Rather, it is an obligation that upwind and downwind states share responsibility for addressing air quality problems. If, after implementation of reasonable emissions reductions by an upwind state, a downwind air quality problem persists, whether due to international emissions or emissions originating within the downwind state, the EPA can relieve the upwind state of the obligation to make additional reductions to address that air quality problem. But the statute does not absolve the upwind state of the obligation to make reasonable reductions in the first instance."[2] Kentucky has made the necessary reasonable reductions, which can be found within the Emission Trends section of the proposed 2015 ozone I-SIP, starting on page 30. EPA's EGU modeling platform for 2023 emissions did not account for the planned shutdown of units 1 and 2 at the E.W. Brown facility in February of 2019 which would reduce Kentucky emissions by another 471 tons of NO_x. The Cabinet concludes that EPA's on-the-books regulations and controls, as well as enforceable permit conditions, will continue to limit any impact to the maintenance monitor from Kentucky sources.

b. Page 53 - Kentucky says that the EPA"... did not run separate models to assess how much the emissions from Canada and Mexico contributed to monitors within the U.S. Alpine determined that accounting for the contribution of emissions from Canada and Mexico would impact the attainment status of several monitors." The EPA believes these statements blend different aspects of accounting for contributions from Canada and Mexico. Specifically, the EPA did provide separate contribution data for emissions from in the portions of Canada and Mexico within the modeling domain, as did Alpine. However, Alpine applied these contributions to the projected 2023 design values to lower the design values by the amount of contribution from Canada and Mexico. Please provide more information to support the technical basis for this approach to calculating design values. The application of this approach does not address the maintenance concerns at this same receptor, given both the EPA modeling and the Alpine modeling identified a maximum design value of 73.3 ppb and 73.5 ppb, respectively, and would still be above the NAAQS even without inclusion of the 2023 Canada and Mexico contributions.

Response: The Cabinet acknowledges this comment. International emissions may significantly contribute to the maintenance monitor referenced above. To clarify, the Cabinet included the Alpine modeling to more accurately account for the contributions from international transport. As such, EPA's modeled contribution underestimates the international contributions and overestimates the impacts of emissions from Kentucky sources on the maintenance monitor.

c. Pages 54-55 - Kentucky suggests that the degree of reductions required of upwind states linked to maintenance receptors should be different than that required for upwind states linked to nonattainment receptors. However, Kentucky does not propose how the obligations of upwind states should differ for the former group of upwind states. As noted, the EPA's modeling links emissions from Kentucky to one

[2] 81 FR 74504, 81 FR 74536 (Oct. 26, 2016); Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS

maintenance receptor in Harford County, Maryland, based on the 1 ppb threshold. The Alpine modeling identifies this receptor as nonattainment, which Kentucky asserts would have an average design value below the NAAQS if certain other factors, addressed in prior comments, were considered. The EPA notes that the obligation to address maintenance of the NAAQS also applies to receptors identified as nonattainment receptors. Therefore, considering the results of either modeling platform, Kentucky should explain how it has addressed its projected interference to maintenance of the NAAQS at the Harford County receptor.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges this comment. As provided on pages 20-30, the permanent and enforceable measures to address the requirements of CAA section 110(a)(2)(D)(i)(I) control the emissions of NO_x and VOC from Kentucky sources that may impact downwind maintenance receptors. Additional reductions and downward trends of NO_x emissions from point sources in Kentucky are detailed on pages 30-33 of the proposed SIP. Further, on pages 40-45 of the proposed SIP, the Cabinet details the local contributions influencing the Harford maintenance monitor and the local controls that can be implemented to reduce ozone levels. As stated by the Midwest Ozone Group (MOG), "When an area is measuring nonattainment of a NAAQS, as is the case with the areas linked to Kentucky, 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."[3]

2. Comment: The analysis of Step 1 and Step 2 includes an intricate combination of the EPA's 12-kilometer (km) modeling and Alpine's 4-km modeling. The outcome of this approach appears to be that Kentucky is linked for nonattainment and maintenance (i.e. prong 1 and prong 2) to the receptor in Harford County, Maryland where the 2023 average design value for this site based on Alpine's modeling is 71.1 ppb. The approach in the SIP involves mixing and matching the contribution data from the EPA' s modeling with design values from Alpine's modeling. The EPA is unclear as to how this additional information would provide a basis to conclude that Kentucky does not significantly contribute to downwind receptors. An alternative, more straightforward approach would be to rely entirely upon the EPA' s projected design values and contribution data and apply the 1 ppb screening threshold established in the EPA' s August 31, 2018 Memorandum to the contributions from Kentucky to downwind receptors. Specifically, the EPA's modeling projects that the Harford site will be a maintenance-only receptor with a 2023 average design value of 70.9 ppb. *See* Analysis of

[3] Flannery, David M. (Midwest Ozone Group), *Proposed Infrastructure State Implementation Plan Related to the 2015 Ozone NAAQS.* 21 Sep 2018: Page 9.

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. The EPA's modeling also shows that this site is the only receptor to which Kentucky contributes above 1 ppb. Thus, under this approach Kentucky would only be linked to the maintenance receptor in Harford County, Maryland.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges this comment. In accordance with 40 CFR 51.102, the Cabinet made the proposed SIP available for public review and comment on August 23, 2018. On August 31, 2018, EPA published a memo regarding the analysis of contribution thresholds for use in CAA section 110(a)(2)(D)(i)(I) interstate transport SIP submissions for the 2015 ozone NAAQS. After review of the memo, the Cabinet concurs with EPA's assessment of the 1 ppb threshold and that the Harford monitor is considered a maintenance monitor.

3. Comment: The SIP refers to a number of expected electricity generating units (EGU) closures, plans for fuel-switching, and other actions that are expected to reduce future nitrogen oxide (NO_x) emissions in Kentucky (page 31). As indicated in comment 1 above, in the SIP revision, please identify which of these actions were not accounted for in the EPA's 2023 modeling. Also, in support of Kentucky's analysis, please provide an estimate of the anticipated ozone season NO_x emissions reductions from these actions in 2023. The EPA encourages Kentucky to include information about NO_x reduction efforts, costs, and air quality impacts which may help provide the Agency with additional rationales for why further NO_x reduction is not needed. In addition, Kentucky should consider including information related to steps 3 (identification of emissions reductions necessary - considering costs and air quality factors - to prevent an identified upwind state from contributing significantly to those downwind monitors) and 4 of EPA' s traditional 4-step framework. This discussion should include information about EGU as well as non-EGU sources. If the Commonwealth intends to rely on the anticipated reductions related to these facilities as measures to address its contribution to downwind receptors, then the Commonwealth would need to consider providing a separate SIP revision that incorporates these emission reductions into the SIP and demonstrates how the reductions at these facilities will affect the receptors to which the Commonwealth is linked.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges this comment. EPA's EGU modeling platform for 2023 emissions did not account for the planned shutdown of units 1 and 2 at the E.W. Brown facility in February of 2019 which would reduce Kentucky's NO_x emissions by another 471 tons. Kentucky emissions have decreased significantly as detailed in the Emission Trends section of the proposed 2015 ozone I-SIP, starting on page 30. EPA's updated modeling, along with the 1 ppb threshold memo, show Kentucky significantly contributing to one maintenance monitor located in Harford, Maryland. Pages 40-45 of the proposed SIP, discusses the local contributions influencing the Harford maintenance monitor and the local controls that can be implemented to reduce ozone levels. The Cabinet does not agree that maintenance monitors should require the same magnitude of reductions as nonattainment monitors from upwind states. The benefits of local controls on all source sectors should be considered first, prior to pursuing controls of sources in upwind states. Additionally, the Cabinet agrees with EPA's ruling "that section 110(a)(2)(D)(i)(I) of the CAA only requires upwind states to prohibit emission that will significantly contribute to nonattainment or interfere with maintenance of the NAAQS in other states. It does not shift to upwind states the full responsibility for ensuring that all areas in downwind states attain and maintain the NAAQS." (81 FR 74515)

4. Comment: To obtain full approval for prong 4, a state can either rely on a fully approved regional haze SIP or provide a demonstration in its infrastructure SIP submission that emissions within its jurisdiction do not interfere with other air agencies ' plans to protect visibility. The EPA acknowledges Kentucky's ongoing work to obtain a full approval of its regional haze SIP, including a pending SIP submission that would change the Commonwealth's reliance from the Clean Air Interstate Rule to the Cross-State Air Pollution Rule for for [sic] certain regional haze requirements.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges the comment. On September 4, 2018, the Cabinet submitted a proposed revision to the Kentucky Regional Haze SIP requesting EPA to change Kentucky's reliance from the Clean Air Interstate Rule (CAIR) to reliance on the Cross State Air Pollution Rule (CSAPR) to satisfy Best Available Retrofit Technology (BART). The proposed submittal was provided to Federal Land Managers (FLMs) for a 60-day review and comment period. The public comment period closed October 4, 2018. The Cabinet intends to submit a final revision in the near future.

5. Comment: Kentucky's prehearing submittal discusses use of a 1.0 ppb threshold in relation to the 2015 EPA Significant Impact Level (SIL) guidance. On April 17, 2018, the EPA released guidance on ozone and particulate matter significant impact levels (SILs) for the prevention of significant deterioration (PSD) permitting program. The EPA has not made the determination that the SIL, developed for source-specific (PSD) purposes, could be considered an appropriate threshold to use when assessing contribution from an entire-state. The EPA's August 31, 2018, memorandum regarding use of a 1.0 threshold, stated that the amount of upwind collective contribution captured with the 1 percent and 1.0 ppb thresholds was generally comparable and that it may be reasonable and appropriate for states to use a 1 ppb contribution threshold. The EPA recommends Kentucky consider referring to this memorandum as part of its rationale for comparing its contribution to a 1 ppb threshold. *See* Memorandum from Peter Tsirigotis, Director, OAQPS to Regional Air Division Directors, re: 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, available at https://www.epa.gov/sites/production/files/2018-09/documents/contrib_thresholds_sip_subm_2015_ozone_memo_08_31_18.pdf. If Kentucky believes it is appropriate to use the 1 ppb threshold in its SIP development, then the Commonwealth would only be linked to one potential maintenance receptor for the 2015 ozone

NAAQS in the EPA's 2023 air quality modeling in Harford County, Maryland (which Alpine modeling identifies as a nonattainment receptor). The EPA notes that the contribution threshold alone was not intended to represent a "significant contribution" as suggested on page 51 of the SIP submission, but rather a contribution that merits more consideration to determine *if* a state impacting a downwind receptor above that threshold will significantly contribute to nonattainment or interfere with maintenance of the NAAQS.

Response: The Cabinet concurs with the comment and has updated the narrative on page 19.

6. Comment: On page 31 of the prehearing submission, the EPA notes that Kentucky cites to the Cross-State Air Pollution Rule (CSAPR) Update as part of its interstate transport demonstration for the 2015 ozone NAAQS. The Update trading program provides for reductions of annual and ozone season nitrogen oxides (NO_x) and sulfur dioxide emissions from EGUs, and the analyses used to develop the Update rule were based on data and inputs specific to addressing downwind nonattainment and maintenance issues for the 1997 and 2008 ozone NAAQS. The EPA suggests the Commonwealth modify the discussion on page 31 to clarify that the CSAPR trading programs were developed to address states' 110(a)(2)(D)(i)(I) obligations for the 1997 and 2008 ozone NAAQS but may provide NO_x emission reduction co-benefits for the 2015 ozone NAAQS.
(Scott Davis, U.S. EPA)

Response: The Cabinet concurs with the comment and has updated the narrative which can now be found on page 32.

7. Comment: The EPA recommends that Kentucky include a statement noting that 40 CFR 51.308(i)(4) requires states to maintain continuing consultation procedures with the Federal Land Managers regarding any regional haze plan (or plan revision), and includes progress reports, and that Kentucky maintains such procedures in the Commonwealth's regional haze plan and progress report.
(Scott Davis, U.S. EPA)

Response: The Cabinet acknowledges the comment. The Code of Federal Regulations (CFR) reference regarding continuing consultation procedures with the FLMs has been changed to "40 CFR 51.308(i)(4)" and a statement concerning this requirement has been added to the narrative on page 58. The Cabinet maintains these required consultation procedures in our regional haze plan, and submitted our progress report for the first regional haze implementation period on September 17, 2014. EPA approved this progress report on October 12, 2017 (82 FR 36707).

8. Comment: 401 KAR 51:240 (CSAPR NO_x Annual) and 401 KAR 51:250 (CSAPR NO_x Ozone Season) are currently listed with other SIP-approved provisions. The EPA suggests that the Commonwealth provide a note that it provided these regulations for approval into the SIP on September 13, 2018.

(Scott Davis, U.S. EPA)

Response: The Cabinet concurs with the comment and has updated the narrative.

9. Comment: DEC commends Kentucky on the reductions in ozone precursor emissions to date, but requests that KY DEP take additional measures to resolve its current significant contributions to the NYMA for the 2015 ozone NAAQS, rather than waiting to see whether its contributions are resolved years into the future. Most importantly, KY DEP should make enforceable commitments for all control measures and operational changes (e.g., unit shutdowns) discussed in this transport analysis.
(Steven Flint, New York Division of Air Resources)

Response: The Cabinet does not concur with the comment. Pages 32-33 within Kentucky's proposed 2015 ozone I-SIP discuss additional emission reductions as a result of conversions from coal to gas and permanent closures. Additionally, the Cabinet includes enforceable limitations in the Title V operating permits issued to Kentucky EGUs. All operational changes are enforced through permitting actions. Furthermore, as discussed on 39 within Kentucky's proposed 2015 ozone I-SIP, when additional EGUs operate on High Electric Demand Days (HEDD), NO_x emissions increase, which contributes to higher monitored ozone levels. According to the HEDD Initiative conducted by the Ozone Transport Commission (OTC), most Simple Cycle (SC) turbine units in New York, also referred to as peakers, were installed prior to 1987; peakers installed prior to 1987 emit NO_x at a significantly higher rate than those installed after 1987.[4] During the OTC/MANE-VU Joint Committees' Meeting held on September 21, 2018, New Jersey presented their analysis of an ozone event in the Ozone Transport Region. The analysis concluded that 50% of Simple Cycle (SC) units in New York are significant contributors to NO_x rates greater than 2.8/MWhr, 20% of SC units emit well over 10 lb/MWhr, and 21 units emit greater than 20 lb/MWhr.[5] The Cabinet urges New York to implement local controls first before placing unreasonable burden on Kentucky to implement more controls.

10. Comment: Without enforceable emission limits being implemented at facilities as assumed in the faulty 2023 modeling, there is no guarantee that any emission reductions will actually occur. This serves to underrepresent the extent of downwind nonattainment and maintenance issues, and minimizes the extent of ozone transport from upwind states such as Kentucky. Additional monitors in the New York City metropolitan area, including in New York State, would likely be shown to be significantly impacted by Kentucky if not for the various issues in EPA's modeling. Irrespective of projected future design values and emissions contributions, Kentucky is obligated to resolve its current significant contributions to the New York City

[4] "Background, High Electric Demand Day (HEDD) Initiative", New York Department of Environmental Conservation. http://midwestozonegroup.com/files/New_York_Peakers.pptx
[5] "OTC/MANE-VU Joint Committees' Meeting", Ozone Transport Commission. https://otcair.org/upload/Documents/Meeting%20Materials/OTC_SAS_Public_09212018.pdf

metropolitan area, which continues to record exceedances of the 2008 and 2015 ozone NAAQS. *(Steven Flint, New York Division of Air Resources)*

Response: The Cabinet does not concur with the comment. EPA's March 27, 2018 updated modeling does not link Kentucky to any downwind monitors located in New York. Further, the August 31, 2018 EPA memo demonstrates that Kentucky does not significantly contribute to any downwind nonattainment monitors. As discussed on pages 38-39 within Kentucky's proposed 2015 ozone I-SIP, when additional EGUs operate on High Electric Demand Days (HEDD), NO_x emissions increase, which contributes to higher monitored ozone levels. According to the HEDD Initiative conducted by the OTC, most Simple Cycle (SC) turbine units in New York, also referred to as peakers, were installed prior to 1987; peakers installed prior to 1987 emit NO_x at a significantly higher rate than those installed after 1987.[6] During the OTC/MANE-VU Joint Committees' Meeting held on September 21, 2018, New Jersey presented their analysis of an ozone event in the Ozone Transport Region. The analysis concluded that 50% of Simple Cycle (SC) units in New York are significant contributors to NO_x rates greater than 2.8/MWhr, 20% of SC units emit well over 10 lb/MWhr, and 21 units emit greater than 20 lb/MWhr.[7] The Cabinet urges New York to implement local controls first before placing unreasonable burden on Kentucky to implement more controls.

11. Comment: KY DEP claims that "NO_x emissions from EGUs will continue to decrease with the implementation of the CSAPR Update," along with unit retirements. Despite the CSAPR Update being fully implemented, Kentucky sources have not been optimizing their existing controls and NYMA continues to monitor NAAQS exceedances, due in large part to pollution transport from upwind states like Kentucky.
(Steven Flint, New York Division of Air Resources)

Response: The Cabinet does not concur with the comment. EPA's March 27, 2018 updated modeling does not link Kentucky to any downwind monitors located in New York. Further, the August 31, 2018 EPA memo demonstrates that Kentucky does not significantly contribute to any downwind nonattainment monitors. As discussed on pages 38-39 within Kentucky's proposed 2015 ozone I-SIP, when additional EGUs operate on High Electric Demand Days (HEDD), NO_x emissions increase, which contributes to higher monitored ozone levels. According to the HEDD Initiative conducted by the OTC, most Simple Cycle (SC) turbine units in New York, also referred to as peakers, were installed prior to 1987; peakers installed prior to 1987 emit NO_x at a significantly higher rate than those installed after 1987.[8] During the OTC/MANE-VU Joint Committees' Meeting held on September 21, 2018, New Jersey presented their analysis of an

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[6] "Background, High Electric Demand Day (HEDD) Initiative", New York Department of Environmental Conservation. http://midwestozonegroup.com/files/New_York_Peakers.pptx
[7] "OTC/MANE-VU Joint Committees' Meeting", Ozone Transport Commission. https://otcair.org/upload/Documents/Meeting%20Materials/OTC_SAS_Public_09212018.pdf

[8] "Background, High Electric Demand Day (HEDD) Initiative", New York Department of Environmental Conservation. http://midwestozonegroup.com/files/New_York_Peakers.pptx

ozone event in the Ozone Transport Region. The analysis concluded that 50% of Simple Cycle (SC) units in New York are significant contributors to NO_x rates greater than 2.8/MWhr, 20% of SC units emit well over 10 lb/MWhr, and 21 units emit greater than 20 lb/MWhr.[9] The Cabinet urges New York to implement local controls first before placing unreasonable burden on Kentucky to implement more controls.

12. Comment: First, KY DEP must apply enforceable limits to assure projected emission reductions take place. 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."[10] 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."[11] Without specific enforceable emissions limits and control measures, DEC submits that the SIP is incomplete and does not meet the requirements of the CAA and implementing regulations.[12] *(Steven Flint, New York Division of Air Resources)*

Response: The Cabinet does not concur with the comment. The Cabinet includes enforceable limitations in the Title V operating permits issued to Kentucky EGUs, including the regulatory requirements of CSAPR under 40 CFR Part 97. Additionally, the Permanent and Enforceable Measures portion of the SIP, in the Element D section, lists the Kentucky Administrative Regulations that include standards of performance for new and existing facilities, as well as RACT requirements, applicable to VOC and NO_x-emitting facilities. Furthermore, as stated by MOG, "When an area is measuring nonattainment of a NAAQS, as is the case with the areas linked to Kentucky, 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."[13] The Cabinet has added this language to the document.

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[9] "OTC/MANE-VU Joint Committees' Meeting", Ozone Transport Commission. https://otcair.org/upload/Documents/Meeting%20Materials/OTC_SAS_Public_09212018.pdf

[10] 42 U.S.C. §7410(a)(2)(A)
[11] 40 CFR Part 51, App. V, §2.2(g)
[12] 42 U.S.C. §7410(a)(2) and 40 CFR 60.24
[13] Flannery, David M. (Midwest Ozone Group), *Proposed Infrastructure State Implementation Plan Related to the 2015 Ozone NAAQS.* 21 Sep 2018: Page 9.

13. Comment: KY DEP should institute emission limits consistent with SCR optimization at all EGUs forecasted by U.S. EPA to operate at a 0.1 lb/mmBtu emission rate in 2023, including unit 3 at the Paradise Fossil Plant.[14] While KY DEP touts the shutdown of two coal boilers at Paradise, the remaining unit had 2017 ozone season nitrogen oxide (NO_x) emissions of 2,425 tons at an emission rate of 0.223 lb/mmBtu.[15] Had it operated its SCR controls to achieve the assumed rate of 0.1 lb/mmBtu, this one unit by itself would have reduced its 2017 ozone season NO_x emissions by an additional 1,338 tons.
(Steven Flint, New York Division of Air Resources)

Response: The Cabinet does not concur with the comment. The U.S. EPA Air Markets Program Data shows in 2017 that New York had a total of 73 units with an emissions rate above 0.2 lb/mmBtu, 66 of those units operate above 0.4 lb/mmBtu with emissions rates as high as 0.8 lb/mmBtu. The number of units above 0.2 lb/mmBtu in New York is far greater than the units in Kentucky, where only 4 of 27 units are above 0.4 lb/mmBtu. In order to prevent over control of upwind states, the downwind states should be required to reduce emissions from local sources. As stated in the EPA v. EME Homer City Generation case, "EPA does not view the obligation under the good neighbor provision as a requirement for upwind states to bear all of the burden for resolving downwind air quality problems. Rather, it is an obligation that upwind and downwind states share responsibility for addressing air quality problems. If, after implementation of reasonable emissions reductions by an upwind state, a downwind air quality problem persists, whether due to international emissions or emissions originating within the downwind state, the EPA can relieve the upwind state of the obligation to make additional reductions to address that air quality problem. But the statute does not absolve the upwind state of the obligation to make reasonable reductions in the first instance."[16] Sources within Kentucky have made the necessary reasonable reductions, which can be found within the Emission Trends section of the proposed 2015 ozone I-SIP starting on page 30.

14. Comment: Second, KY DEP should implement emission controls on its major stationary sources based on a more stringent control threshold. New York and other downwind states, such as Connecticut, have already adopted control measures that are considerable more stringent than most upwind states. For example, DEC applies Reasonable Available Control Technology (RACT) requirements statewide on both EGUs and non-EGUs, at a current cost threshold of $5,500 per ton of NO_x reduced; meanwhile, many upwind states – including Kentucky – unreasonably rely on EPA's flawed claim that EGU NO_x reductions that cost more than $1,400 per ton would not be cost-effective. For the 2017 ozone season, emissions from Kentucky's electric generating sector were 400% (16,000 tons) greater than electric generating emissions in New York, with an average emission rate over 200% higher.[17]
(Steven Flint, New York Division of Air Resources)

[14] "2023en_Engineering_Analysis_Unit_File.xls" workbook released with October 27, 2017 Page Memorandum
[15] U.S. EPA Air Markets Program Data
[16] 81 FR 74504, 81 FR 74536 (Oct. 26, 2016); Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS
[17] U.S. EPA Air Markets Program Data

Response: The Cabinet acknowledges the comment. The Cabinet includes enforceable limitations in the Title V operating permits issued to Kentucky EGUs, including the regulatory requirements of CSAPR under 40 CFR Part 97. Additionally, the Permanent and Enforceable Measures portion of the SIP, in the Element D section, lists the Kentucky Administrative Regulations that include standards of performance for new and existing facilities, as well as RACT requirements, applicable to VOC and NO_x-emitting facilities. For EGUs, EPA explained in the CSAPR Update rule the reasoning behind the $1,400 per ton cost threshold, "emission budgets reflecting the $1,400 per ton cost threshold do not over-control upwind states' emissions relative to either the downwind air quality problems to which they are linked or the 1 percent contribution threshold that triggered further evaluation." Furthermore, as discussed on pages 38-39 within Kentucky's proposed 2015 ozone I-SIP, when additional EGUs operate on High Electric Demand Days (HEDD), NO_x emissions increase, which contributes to higher monitored ozone levels. According to the HEDD Initiative conducted by the OTC, most Simple Cycle (SC) turbine units in New York, also referred to as peakers, were installed prior to 1987; peakers installed prior to 1987 emit NO_x at a significantly higher rate than those installed after 1987.[18] During the OTC/MANE-VU Joint Committees' Meeting held on September 21, 2018, New Jersey presented their analysis of an ozone event in the Ozone Transport Region. The analysis concluded that 50% of Simple Cycle (SC) units in New York are significant contributors to NO_x rates greater than 2.8/MWhr, 20% of SC units emit well over 10 lb/MWhr, and 21 units emit greater than 20 lb/MWhr. [19] The Cabinet urges New York to implement local controls first before placing unreasonable burden on Kentucky to implement more controls.

15. Comment: While it is true that ozone concentrations are declining over the long term,[20] KY DEP ignores current trends at monitors in the NYMA. Presented below are ozone design value trends for the Stratford and Westport monitors, which show some variation, but both have design values equal to or higher than in 2009 and exhibit an overall flat or increasing design value trend since 2009.[21] This trend has developed despite continual NO_x and volatile organic compound reductions from New York, New Jersey, and Connecticut to fulfill their reasonable further progress obligations pursuant to 2008 ozone NAAQS requirements (with actual reductions having greatly exceeded the required three percent per year), further highlighting the need for upwind emission reductions.
(Steven Flint, New York Division of Air Resources)

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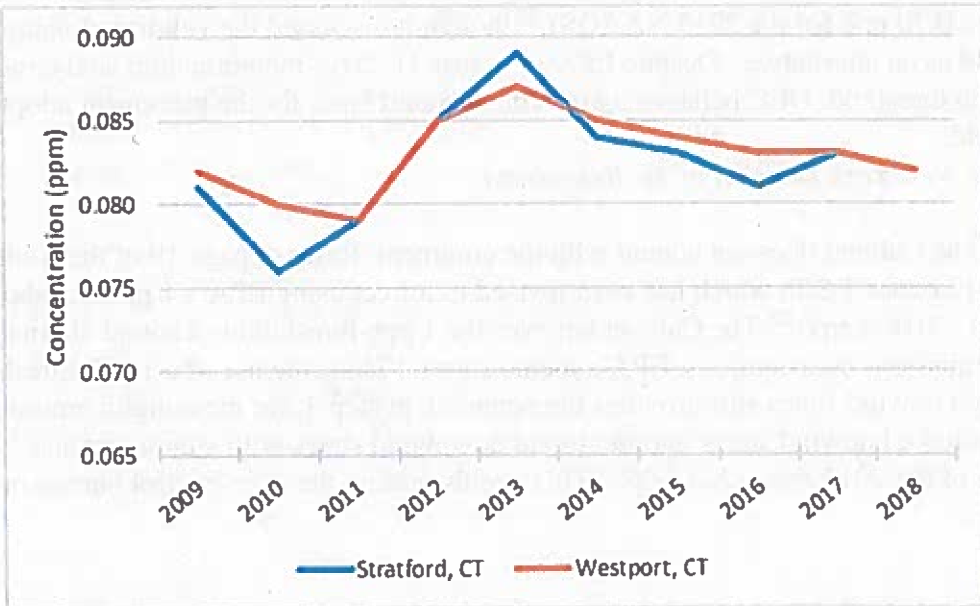
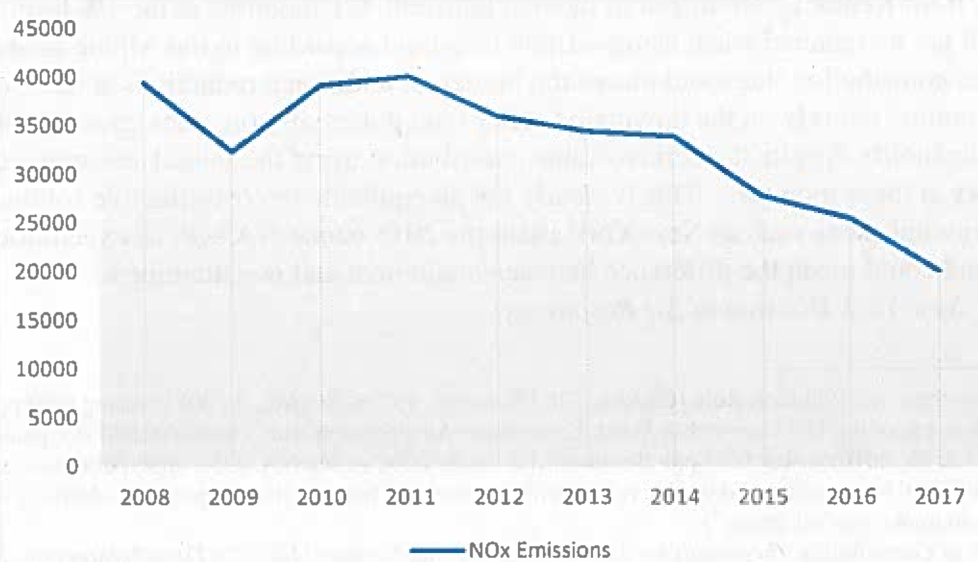
[18] "Background, High Electric Demand Day (HEDD) Initiative", New York Department of Environmental Conservation. http://midwestozonegroup.com/files/New_York_Peakers.pptx
[19] "OTC/MANE-VU Joint Committees' Meeting", Ozone Transport Commission. https://otcair.org/upload/Documents/Meeting%20Materials/OTC_SAS_Public_09212018.pdf
[20] KY DEP's Proposed Infrastructure State Implementation Plan for the 2015 Ozone National Ambient Air Quality Standards, Table 4 – "Design Values for Kentucky-Linked Downwind Connecticut Monitors"
[21] Note that 2018 design values are preliminary and represent exceedances as of September 5



Response: The Cabinet does not concur with the comment. The figure below, located on page 31 of Kentucky's proposed 2015 ozone I-SIP, is comprised of Kentucky EGU ozone season NO_x emissions from 2008-2017. This figure shows a steady decline of Kentucky EGU emissions since 2011. The decline of Kentucky emissions does not correlate with the Connecticut monitors referenced in New York's comments. This is further evidence that Kentucky is not a significant contributor to downwind receptors in the Northeast.

2008 – 2017 Ozone Season NO_x Emissions for Kentucky EGUs (tpy)



Note: Chart 2 data obtained from EPA's Air Markets Program Data: https://ampd.epa.gov/ampd/

16. Comment: KY DEP chose to utilize the longstanding contribution threshold of 1% of the standard (i.e., 0.70 ppb for the 2015 NAAQS),[22] though it discussed the validity of using a 1 ppb threshold as an alternative. Despite EPA's August 31, 2018 memorandum analyzing the use of a 1 ppb threshold, DEC believes there is not a sound basis for the piecemeal adoption of such threshold.
(Steven Flint, New York Division of Air Resources)

Response: The Cabinet does not concur with the comment. Refer to page 19 of the Kentucky proposed 2015 ozone I-SIP, which has been revised to reflect using EPA's 1 ppb threshold from its August 31, 2018 memo.[23] The Cabinet believes the 1 ppb threshold is a sound alternative in identifying emissions contributions. EPA's memo states, "Thus, the use of a 1 ppb threshold to identify linked upwind states still provides the potential, at step 3, for meaningful emissions reductions in linked upwind states in order to aid downwind states with attainment and maintenance of the 2015 ozone NAAQS." This avoids putting the over-control burden on upwind states.

17. Comment: Rather, the continued use of the 1% threshold is required for consistency across all states and because it is directly tied to the level of the NAAQS; thus, it is a far superior fit to the reductions needed for downwind attainment. If upwind states selectively use a higher contribution threshold while downwind states face a lower, more stringent NAAQS, it will have the inequitable effect of requiring downwind states to reduce their emissions *even more* at greater cost to compensate for upwind states doing *even less* at lower costs. The contribution threshold is tied not only to the linkages established under step 2 of the CSAPR framework, but the resulting emissions budgets for upwind states under step 3. It is unreasonable and clearly inequitable for upwind states, on an ad hoc basis, to use a higher contribution screening threshold at the same time downwind states face a lower NAAQS. For example, while contributions from Kentucky are linked to the two Fairfield, CT monitors at the 1% level, the linkage would not be retained when using a 1 ppb threshold according to the Alpine modeling.[24] Using a higher contribution threshold places the burden of additional reductions at these other downwind monitors entirely on the downwind states (and potentially on other upwind states using a 1% threshold), despite the demonstrable contribution using the settled 1% approach from Kentucky at these monitors. This is clearly not an equitable or cost-effective solution to ensuring downwind states such as New York attain the 2015 ozone NAAQS as expeditiously as practicable, and could mean the difference between attainment and nonattainment.
(Steven Flint, New York Division of Air Resources)

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[22] See, e.g., Cross-State Air Pollution Rule (CSAPR), 76 FR 48208, 48236-38 (Aug. 8, 2011) (using 0.80 ppb as threshold, which is 1% of the 1997 ozone NAAQS); Cross-State Air Pollution Rule Update (CSAPR Update), 81 FR 74504, 74518 (Oct. 26, 2016) (using 0.75 ppb threshold, 1% of the 2008 ozone NAAQS; "much of the ozone nonattainment problem being addressed by this rule is still the result of the collective impacts of relatively small contributions from many upwind states.").

[23] EPA, *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.* (August 31, 2018)

[24] KY DEP's Proposed Infrastructure State Implementation Plan for the 2015 Ozone National Ambient Air Quality Standards, Table 9 – "Kentucky Significant Contribution using 1.0 ppb Significant Threshold"

Response: The Cabinet does not concur with the comment and believes the 1 ppb threshold is a sound alternative in identifying emissions contributions. EPA's August 31, 2018 memo states, "Thus, the use of a 1 ppb threshold to identify linked upwind states still provides the potential, at step 3, for meaningful emissions reductions in linked upwind states in order to aid downwind states with attainment and maintenance of the 2015 ozone NAAQS."[25] This avoids putting the over-control burden on upwind states.

18. Comment: Consideration of international emissions also adds support to the conclusion that there is no further obligation to reduce emissions: MOG urges that the Cabinet not only recognize (as it does on page 53 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, but also that but for international emissions there would be no downwind problems areas at all and therefore no need to for additional action to be undertaken to satisfy the requirements of CAA section 110(a)(2)(D)(i)(I).
(David M. Flannery, Midwest Ozone Group)

Response: The Cabinet acknowledges the comment.

19. Comment: Given the dominant role of mobile sources in impacting on ozone air quality, MOG urges that the Cabinet 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 Kentucky. 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.
(David M. Flannery, Midwest Ozone Group)

Response: The Cabinet acknowledges the comment. The Cabinet has referenced CAA section 107(a), encouraging downwind states to first look into local controls on their emission sources before expecting upwind states to enforce more strict control measures, which would lead to over-control. This solidifies statements that were already within Kentucky's proposed 2015 ozone I-SIP, which refer to violating monitors located along Interstate 95.

20. Comment: In the case of Kentucky, EPA's modeling data below show that at the 1% threshold, Kentucky would be linked to 4 non-attainment monitors and one maintenance monitor. Applying the 1 ppb threshold to this data would eliminate any linkage to non-attainment monitor reduce to 1 the linkage to any maintenance monitor. Moving to the 2 ppb threshold would completely eliminate all linkage to any non-attainment or maintenance monitor. We urge the Cabinet to carefully evaluate these additional flexibilities as further support for the conclusion that Kentucky has already satisfied the requirements of CAA section

[25] EPA, *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;* page 4 (August 31, 2018)

110(a)(2)(D)(i)(I).
(*David M. Flannery, Midwest Ozone Group*)

Response: The Cabinet acknowledges the comment. The Cabinet believes the 1 ppb threshold is a sound alternative in identifying emissions contributions and has updated the narrative on page 19 to rely on EPA's August 31, 2018 memo.

21. Comment: An important flexibility that should be considered is an alternative method for determining which monitors should be considered "maintenance" monitors. We urge that the Cabinet 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 Kentucky is needed to address the requirements of CAA section 110(a)(2)(D)(i)(I).
(*David M. Flannery, Midwest Ozone Group*)

Response: The Cabinet acknowledges the comment. The Cabinet agrees that EPA's current method of determining maintenance monitors needs to be re-evaluated.

22. Comment: As an alternative to maintenance monitors being accorded the same weight as nonattainment monitors, we urge that the Cabinet 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…
(*David M. Flannery, Midwest Ozone Group*)

Response: The Cabinet acknowledges the comment. The Cabinet agrees that EPA's current method of determining maintenance monitors needs to be re-evaluated.

23. Comment: …while Kentucky would not be linked to any maintenance monitor at a significance threshold of 2ppb, 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 Cabinet apply an alternate methodology to assess maintenance monitors that is different than any method it would apply to assess nonattainment monitors. Any impacts, which Kentucky 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 Kentucky sources as is well-demonstrated by these comments and the Cabinet's proposed GNS.
(*David M. Flannery, Midwest Ozone Group*)

Response: The Cabinet acknowledges the comment and agrees that EPA's current method of determining maintenance monitors needs to be re-evaluated and that on-the-books regulations and controls, as well as enforceable permit conditions, will continue to limit any impact to maintenance monitors from Kentucky sources.

24. Comment: LG&E and KU Energy supports the conclusion of the proposed SIP that no additional emission reductions beyond existing and planned controls are necessary to mitigate any contribution Kentucky may have on downwind monitors to comply with CAA section 110(a)(2).
(Jason Wilkerson, LG&E and KU Energy)

Response: The Cabinet acknowledges the comment.

25. Comment: Additionally, LG&E and KU Energy concur with the comments submitted on September 21, 2018 by the Midwest Ozone Group in support of the proposed SIP revision.
(Jason Wilkerson, LG&E and KU Energy)

Response: The Cabinet acknowledges the comment.

26. Comment: LG&E and KU Energy has identified one area of the proposed SIP that needs correction as listed here: Page 31, Emission Totals after CSAPR Implementation, second paragraph: This section makes reference that the "Louisville Gas & Electric Company's (LG&E) Cane Run Station converted Unit 7 to natural gas…" Revisions should be made to correctly state "Louisville Gas & Electric Company's (LG&E) Cane Run Station constructed and began operating a natural gas combined cycle unit (CR7) in 2015 and retired all remaining coal-fired units the same year."
(Jason Wilkerson, LG&E and KU Energy)

Response: The Cabinet acknowledges the comment and made the necessary corrections.

27. Comment: The Cabinet decision essentially to rely on existing state laws in conjunction with EPA's 2008 approval, for purposes of satisfying the 2015 ozone NAAQS, is arbitrary and capricious, and unsupported by evidence, and fails to satisfy the plain statutory requirement that Kentucky's SIP ensure that the Commonwealth does not contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to the 2015 ozone NAAQS. 42 U.S.C. § 7420(a)(2)(D)(i)(I).
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. The commenter fails to recognize the control strategies identified in Kentucky's proposed 2015 ozone I-SIP that limit NO_x and VOC emissions from Kentucky sources. Further, the commenter does not acknowledge the significant decline in emissions from Kentucky sources as detailed in the *Emissions Trends* section of Element D of the proposed SIP. EPA has determined that Kentucky does not significantly contribute to any nonattainment monitor for the 2015 ozone NAAQS.

28. Comment: EPA's own, most recent determinations show that Kentucky's previously approved SIP is stale and does not show compliance with the 2015 ozone NAAQS; Kentucky's attempt simply to point to existing state-law provisions fails to address the Commonwealth's significant contributions to nonattainment and maintenance that EPA projects will persists in 2023.[26]
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. EPA's March 27, 2018 updated modeling, released to specifically address the 2015 ozone NAAQS, demonstrates that Kentucky does not significantly contribute to any downwind nonattainment monitors.

29. Comment: Because EPA's modeling shows that Kentucky is in fact contributing significantly to nonattainment and maintenance at five monitors in three states under the 2015 standard, Kentucky obviously may not claim that is has no further obligations under the 2015 ozone NAAQS.
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. EPA's March 27, 2018 updated modeling was released to specifically address the 2015 ozone NAAQS. Further, the August 31, 2018 EPA memo demonstrates that Kentucky does not significantly contribute to any downwind nonattainment monitor.

30. Comment: The Cabinet's apparent argument that other sources also contribute significantly to failing air quality at downwind monitors is legally irrelevant; it simply does not obviate the need for Kentucky to address *its own* significant contribution.[27]
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. The commenter fails to recognize the control strategies identified in Kentucky's proposed 2015 ozone I-SIP that limit NO_x and VOC emissions from Kentucky sources. Further, the commenter does not acknowledge the significant decline in emissions from Kentucky sources as detailed in the *Emissions Trends* section of Element D of the proposed SIP. EPA has determined that Kentucky does not significantly contribute to any nonattainment monitor for the 2015 ozone NAAQS.

[26] Sierra Club continues to underscore and protest, as it has in prior comments to the Cabinet as well as EPA, the unreasonableness of EPA's modeling being based on 2023, which is beyond relevant attainment dates for marginal areas (which at least the Maryland and Wisconsin counties are) for the 2015 standard. Using an earlier year, as is proper, would only exacerbate the flaws discussed herein; but, as explained above, the August 2018 SIP Proposal is untenable even with EPA's 2023 modeling basis.
[27] *See id.* at 32-49.

31. Comment: The submission's observations about meteorological data and HYSPLIT back trajectories are unpersuasive because EPA's CAMx modeling *already* incorporates meteorological inputs and links downwind air quality at specific locations with upwind emissions originating in Kentucky.[28]
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. The use of HYSPLIT and meteorological data on the noted pages is not to address any projected emissions from EPA's CAMx modeling. Rather, the figures represent ozone exceedance days at monitors that Kentucky was previously linked to using EPA's initial modeling. However, Kentucky is no longer linked to those monitors as they are no longer identified as nonattainment monitors for 2023 based on EPA's 1 ppb threshold memo dated August 31, 2018.

32. Comment: Among other fatal deficiencies, [Alpine's modeling] utilized an inappropriate and arbitrary significance threshold (1 ppb rather than 1% of the NAAQS); and in any event, even if one were to accept the Alpine modeling, four of the five nonattainment or maintenance monitors linked to Kentucky still recorded maximum design values above the 2015 ozone NAAQS, and for all five monitors Kentucky's contribution exceeded 1 percent of the NAAQS.[29]
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. Page 19 of the SIP states that "Using the 1 ppb threshold, there is only one monitor that shows a significant contribution from Kentucky."

33. Comment: The Cabinet's assertion that existing provisions of state law will "address the requirements," vis-à-vis Kentucky's legal obligations to satisfy the 2015 ozone NAAQS, is unreasonable vague and non-committal; more detailed explanation and explicit guarantees, based on binding legal obligations, are required. The Cabinet points to existing local, state and federal regulations and other legal obligations in attempt to satisfy its obligations under Section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.[30]
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. The commenter fails to recognize the control strategies identified in Kentucky's proposed 2015 ozone I-SIP that limit NO_x and VOC emissions from Kentucky sources. Further, the commenter does not acknowledge the significant decline in emissions from Kentucky sources as detailed in the *Emissions Trends* section of Element D of the proposed SIP. EPA has determined that Kentucky does not significantly contribute to any nonattainment monitor for the 2015 ozone NAAQS.

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[28] *See, e.g., id. at* 37, 42, 49.
[29] *See id.* at 51.
[30] *Id.* at 19-28.

34. Comment: Given that EPA already took into account the suite of control measures identified in the August 2018 SIP Proposal, and yet still found that Kentucky emissions were significantly interfering with downwind attainment and maintenance of the 2015 ozone NAAQS, Kentucky's submittal is inadequate and unlawful.
(Aaron Messing and Matthew Miller, Sierra Club)

Response: The Cabinet does not concur with the comment. Kentucky is no longer linked to any downwind nonattainment monitors in 2023 based on EPA's August 31, 2018 memo which provides the option of using the 1 ppb contribution threshold.