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September 24, 2018

Mr. William Wehrum
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Dear Messrs. Wehrum and Leopold:

I write on behalf of the Air Stewardship Coalition ("ASC"). Enclosed for your consideration are ASC's initial comments to the petition submitted to the U.S. Environmental Protection Agency ("EPA") by the New York Department of Environmental Conversation under Section 126(b) of the Clean Air Act (the "Petition"). ASC respectfully requests that EPA deny the Petition.

Please do not hesitate to contact me at 202-736-8547 if you have any questions.

Sincerely,

Samuel B. Boxerman

Encl.

cc: Justin Schwab, Deputy General Counsel, EPA

September 24, 2018

AIR STEWARDSHIP COALITION
INITIAL COMMENTS IN RESPONSE TO
NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SECTION 126 PETITION

On March 12, 2018, the New York State Department of Environmental Conservation filed a petition with the U.S. Environmental Protection Agency ("EPA" or the "Agency") under Section 126 of the Clean Air Act (the "Act" or "CAA") (the "Petition" or "NY Petition"). New York claims it cannot or will not achieve and maintain compliance with the 2008 and the 2015 National Ambient Air Quality Standards ("NAAQS") for ozone. It contends more than 350 sources ("named sources")—which span nearly all industry sectors across nine Midwest states—are the cause of New York's ozone attainment issues, and petitions EPA to issue rules requiring new controls and emission limits on the named sources.

New York's petition is without merit and should be rejected. The Petition is an unprecedented attempt by one state to set emission standards in nine other states for more than 350 arbitrarily selected facilities, spanning nearly every major industry sector in the United States. In fact, New York faces no ozone attainment issues outside of the New York Metropolitan Area ("NYMA"), and the Petition presents grossly misleading and deeply flawed modeling in an effort to try to link the named sources in other states to the problems alleged in the NYMA.

In addition, although New York did not share its modeling with EPA, ASC obtained and reviewed New York's modeling. ASC's close review demonstrates that New York used a non-standard approach that is not found in EPA's regulations or guidance. Moreover, New York fails to meet its burden of showing that there are highly cost-effective emission control technologies available that the named sources are not already implementing. Instead, New York insists that EPA impose New York's preferred control strategies wholesale on hundreds of out-of-state sources without providing any specific data with regard to cost, feasibility, or effectiveness, and without considering in any way the extensive restrictions on emissions already imposed by the individual states.

As such, the NY Petition fails to satisfy the requirements of Section 126. Not only does New York fail to meet its burden, independent assessment of the existing regulations and available emissions control technologies already in place demonstrates that Section 126 relief is not merited. EPA should deny the NY Petition.

INTRODUCTION

The Air Stewardship Coalition ("ASC") submits these initial comments for EPA's consideration as it analyzes the NY Petition. ASC is an ad hoc group of trade associations and companies that seeks to assist EPA and states in addressing alleged interstate transport issues

under the CAA.[1] Our members include and represent industrial facilities targeted by the NY Petition. These facilities have already undertaken emissions reductions under EPA regulations and State Implementation Plans ("SIPs") issued under the Act, as well as through other mechanisms.

New York's petition is an abuse of Section 126. Congress did not create in Section 126 a tool for one state to demand that sources across the nation be subjected to that state's laws or preferences. Instead, Congress created a mechanism for federal and state partnership under Section 110 of the Act. Through this exercise in cooperative federalism, EPA and states have worked together to develop SIPs to address emissions, including the transport of nitrogen oxides ("NOx") and its contribution to downwind ozone formation. The state SIPs and other federal and state regulatory tools complement one another to ensure that sources properly reduce NOx emissions to comply with NAAQS, including at the sources named in the NY Petition.

Section 126, therefore, is an extraordinary mechanism through which EPA can impose direct control on a single major stationary source or group of stationary sources only if the downwind state proves to EPA that a major source or group of stationary sources emits or would emit in violation of Section 110. To meet its burden of proof, in accordance with EPA's four-step framework for identifying and addressing interstate transport issues (the "Transport Framework"),[2] a petitioner must show that (1) the downwind state faces an actual non-attainment or maintenance issue (Step One), (2) the named upwind source contributes beyond a threshold amount to the alleged downwind attainment issue (Step Two), and (3) a highly cost-effective control measure[3] is available that could be installed at the named source and would address the excess emissions (Step Three). Only if these are established by the petitioner may EPA fashion a remedy to control a source that is the subject of a Section 126 petition (Step Four). However, because EPA cannot "over-control" a source, EPA should take action only after evaluating current emissions data, photochemical modeling results and data, the on-the-books regulations, permit requirements, operational realities and constraints for the relevant sources, and the economic and technical feasibility for any potential control option.

EPA never has invoked its Section 126 authority lightly, and it should not do so here for three fundamental reasons:

First, the NY Petition regarding the 2008 ozone NAAQS fails EPA's four-step Transport Framework.

- The NY Petition fails under Step One. Chautauqua County and nearly half of the receptors identified in the NY Petition are, in fact, attaining the 2008 (and 2015)

[1] ASC includes the following entities: American Chemistry Council, American Fuel & Petrochemical Manufacturers, American Petroleum Institute, Chamber of Commerce of the United States of America, National Association of Manufacturers, Portland Cement Association, ExxonMobil Corporation, Kinder Morgan, Inc., Holcim US, Inc., Lima Refining Company, Marathon Petroleum Company LP, Saudi Basic Industries Corporation (SABIC), and TransCanada U.S. Pipelines.

[2] *See* 83 Fed. Reg. 16,064, 16,070 (Apr. 13, 2018) ("CT Denial") (describing four steps of the Transport Framework).

[3] *See* 63 Fed. Reg. 57,356, 57,379 (Oct. 27, 1998) ("NOx SIP Call").

NAAQS; thus, there can be no significant contribution to those receptors. Moreover, when international emissions and exceptional events are properly considered, there are no actionable downwind attainment issues. Additionally, EPA modeling shows that all receptors identified in the NY Petition will attain the 2008 ozone NAAQS by 2023 under existing transport regulation.

- The NY Petition also fails under Step Two. New York has failed to meet its burden to "link" the named sources to downwind attainment issues with the 2008 NAAQS—a failure exacerbated by the fact that it has yet to provide EPA with its modeling files. ASC has obtained these files, however, and they reveal that New York relied on a non-standard ozone contribution metric of maximum, instead of average, ozone design values—an approach EPA previously rejected. New York's reliance on this approach, combined with outdated emissions data and other serious modeling flaws, presents unreliable, distorted results on which EPA cannot rely. New York's modeling when corrected, and proper modeling that uses standard EPA techniques, demonstrate that named sources in eight of the named states are not contributing more than 1 part per billion ("ppb") to downwind nonattainment with the 2008 ozone NAAQS as of 2017. This is not sufficient to support action under Section 126.

  Moreover, New York assumes that a link is shown under Section 126 if upwind sources contribute 1 percent of the NAAQS or more to downwind nonattainment. Nothing in the CAA mandates that threshold, and ASC urges EPA to require a higher significance threshold for Section 126 petitions, as it had historically for these types of petitions. In setting the threshold, ASC urges EPA to account for the increasingly lower NAAQS, as well as cross-border emissions and exceptional events, to assess whether an upwind source or group of sources "contributed significantly" to downwind nonattainment or interfere with maintenance. At a minimum, EPA should not set the significant contribution threshold it applies for the NY Petition at less than 1 ppb.

- The NY Petition also fails under Step Three. Foremost, New York has failed to offer any evidence or data to show that there are highly cost-effective controls that could be implemented at the 357 named sources. Instead of undertaking this assessment, New York simply demands that EPA impose New York's own form of presumptive "reasonably available control technology" ("RACT")—ignoring that RACT is itself a case-by-case analysis—without showing how this will cost-effectively address alleged transport issues. In all events, there are ample reasons to find that sufficient measures already are in place. Indeed, EPA's modeling has determined that the named sources in the nine states already have in place control technologies that are addressing NOx emissions to ensure compliance with the ozone NAAQS.

- Because New York has not met it burden under Steps One through Three, EPA cannot impose under Step Four the additional controls preferred by New York on the hundreds of named sources.

Second, New York's allegations with respect to the 2015 ozone NAAQS are premature and should be rejected. States have yet to submit SIPs addressing their ozone transport

obligations, and EPA has yet to determine if any state has failed to meet this obligation with respect to the 2015 ozone NAAQS. EPA cannot reasonably find under Section 126 that a source emits or would emit in violation of the good neighbor provision where EPA has not made a finding that such a failure exists. Indeed, EPA only issued its guidance for these SIP submittals on March 27, 2018, and states are still working through a number of complex issues, including assessing up-to-date emissions information and analyzing background ozone contributions from extraordinary events and international (non-U.S.) sources, among others. In any event, New York has failed to prove that significant contributions exist with respect to the 2015 ozone NAAQS.

Third, the NY Petition fails to identify either a "major source" or "group of stationary sources" as required by Section 126. Congress limited Section 126 to a single major source or a "group" of stationary sources. It is not a wide-ranging tool for states to impose their preferences on other states, as New York requests here. New York has not named a "group" of sources, but arbitrarily and indiscriminately targeted 357 different sources from nine states, spanning hundreds of thousands of square miles, from diverse industries with a wide range of NOx emission sources covered by multiple source categories. New York's NOx emissions threshold of 400 tons per year ("tpy") or more is not a cognizable group under Section 126, as there is no legal or technical significance to the annual emissions level New York has selected. The Petition effectively asks the Agency to target arbitrarily hundreds of unrelated sources to impose costly control technologies. EPA must deny the NY Petition.

BACKGROUND

A. EPA regulation of interstate transport.

1. CAA Section 110 and the SIP process.

Congress created a system for addressing interstate transport of regulated pollutants under Section 110 of the CAA. CAA Section 110(a)(2)(D)(i)(I), known as "the good neighbor provision," requires upwind states to restrict emissions that contribute significantly to nonattainment or interfere with maintenance of a NAAQS in a downwind state.[4] To meet good neighbor obligations, Congress provided states with the opportunity to regulate sources, and provided EPA with authority to impose additional regulations where needed.

Under Section 110, states have the primary obligation to address the good neighbor provision after EPA adopts a new NAAQS by designing a SIP.[5] SIPs will include emission limitation requirements to address air quality in nonattainment areas, such as setting a presumptive cost-efficiency level of RACT that is suited to that particular state.[6] Congress allows states at least three years from the date a new or revised NAAQS is promulgated to design

[4] 42 U.S.C. § 7410(a)(2)(D)(i)(I).

[5] *EPA v. EME Homer City Generation, L.P.*, 134 S. Ct. 1584, 1600-01 (2014); 42 U.S.C. § 7410(a)(1)-(2) ("*EME Homer City*").

[6] *See* 42 U.S.C. § 7502(c)(1).

a SIP for EPA review.[7] EPA then has authority to require a state to revise its SIP (through a SIP call). The statute then gives EPA two more years to design and issue a federal implementation plan ("FIP") if it finds that a SIP does not fully address a state's responsibilities.[8] Under this process, EPA addresses states' good neighbor obligations under the Act's principles of cooperative federalism—first allowing each state to address interstate transport, with federal backstop authority reserved for limited circumstances when state efforts are insufficient.

When federal intervention is necessary, EPA addresses states' good neighbor obligations through interstate transport rules that assess a multitude of factors.[9] The Agency undertakes complex air quality modeling that it must update regularly to remain accurate. It considers other federal and state regulatory actions such as NAAQS attainment designations, controls required in operating permits under other regulations such as the New Source Review ("NSR")/Prevention of Significant Deterioration ("PSD") program, existing requirements such as NOx budget trading and state RACT requirements, and states' participation in regional initiatives. It also assesses existing and future operations[10] and practical feasibility of technological controls in various industries and source categories. EPA must align the implementation of a transport rule with relevant NAAQS attainment dates.[11]

Crucially, EPA cannot "over-control" emissions.[12] EPA's transport rules thus balance the Agency's duty to assist states in meeting their good neighbor obligations against the mandate that EPA cannot require an upwind state to "reduce emissions by more than the amount necessary to achieve attainment in every downwind state to which it is linked."[13] The D.C. Circuit remanded the original Cross-State Air Pollution Rule ("CSAPR") on this basis, and EPA revised its approach under the CSAPR Update to avoid this prohibited over-control of sources in upwind states.[14] To achieve this balance, EPA assesses states' good neighbor obligations through the Transport Framework, as discussed below.

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[7] 42 U.S.C. § 7410(a)(1); 42 U.S.C. § 7410(b).

[8] 42 U.S.C. § 7410(c)(1).

[9] 63 Fed. Reg. 57,356, *supra* n.3 (NOx SIP Call created NOx ozone budget trading program to reduce interstate transport to satisfy good neighbor provision); 70 Fed. Reg. 25,162 (May 12, 2005) (Clean Air Interstate Rule ("CAIR") addressing 1997 PM and ozone NAAQS); 76 Fed. Reg. 48,208 (Aug. 8, 2011) (Cross-State Air Pollution Rule ("CSAPR") to address the 1997 ozone NAAQS); 81 Fed. Reg. 75,504 (Oct. 26, 2016) (CSAPR Update included FIPs to address 2008 NAAQS).

[10] *E.g.*, EPA Proposal, Determination Regarding Good Neighbor Obligations for the 2008 ozone National Ambient Air Quality Standard, 83 Fed. Reg. 31,915, 31,934 at n. 97 (July 10, 2018) ("CSAPR Close-Out Proposal") (EPA uses the U.S. Energy Information Administration (EIA) Form 860 as a source for upcoming controls, retirements, and new units.).

[11] *North Carolina v. EPA*, 531 F.3d 896, 911-12 (D.C. Cir 2008).

[12] *EME Homer City*, 134 S. Ct. at 1608-09.

[13] *EME Homer City*, 134 S. Ct. at 1608-09.

[14] *EME Homer City Generation, L.P. v. EPA*, 795 F.3d 118 (D.C. Cir. 2015) ("*EME II*") (upholding CSAPR in large part and remanding CSAPR without vacatur for EPA to reassess states' ozone season NOx emission budgets); *see also EME Homer City Generation, L.P. v. EPA*, 696 F.3d 7 (D.C. Cir 2012) ("*EME I*") (vacating CSAPR); *EME Homer City*, 134 S. Ct. 1584, *supra* n.5 (reversing *EME I* and remanding to D.C. Circuit).

2. CAA Section 126(b) petitions.

Under Section 126, a state may petition EPA to shut down or directly impose emission limitations and compliance schedules on a major source or group of stationary sources.[15] The petitioning state must prove the named source or group "emits or would emit" in violation of the good neighbor provision—*i.e.*, in amounts that significantly contribute to nonattainment or interfere with maintenance of a NAAQS in a downwind state.[16] If EPA finds that the state has met its burden to demonstrate this, then EPA may impose certain controls, but only if needed to meet that state's good neighbor obligation within three years.[17]

B. New York's Section 126 petition.

The NY Petition makes sweeping (and unsupported) allegations that there are ozone attainment problems in the NYMA and in the farthest western corner of New York, Chautauqua County.[18] The NY Petition asserts that monitors in the NYMA are experiencing nonattainment of the 2008 ozone NAAQS of 75 ppb, and that it expects these monitors will be designated nonattainment for the 2015 ozone NAAQS of 70 ppb.[19] It states that Chautauqua County meets the 2008 ozone NAAQS, but its ability to maintain attainment of the 2008 and 2015 ozone NAAQS is "threatened."[20]

New York targets 357 arbitrarily selected facilities in Illinois, Indiana, Kentucky, Maryland, Michigan, Ohio, Pennsylvania, Virginia, and West Virginia that it alleges emit 400 tpy or more of NOx and which purportedly contribute to ozone concentrations in New York. New York explains that it identified sources in these nine states because these are states EPA identified in the CSAPR Update as contributing 1 percent or more of the 2008 ozone NAAQS to ozone concentrations at nonattainment or maintenance receptors in New York.[21]

The named sources are from the most highly regulated industry sectors in the United States, including cement, chemicals, electric generation, midstream oil and gas, paper, refining, and steel. Through voluntary investments, consent decrees, federal and state regulation, and multi-state regional programs, these sources have implemented emission control technologies or

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[15] 42 U.S.C. § 7426(b)-(c).

[16] 42 U.S.C. § 7426(b).

[17] 42 U.S.C. § 7426(c). EPA has typically received and acted on Section 126 petitions *after* EPA promulgated a transport rule, and EPA assessed the relevant transport rule in deciding whether to grant or deny these petitions. 65 Fed. Reg. 2674 (Jan. 18, 2000); *Appalachian Power Co. v. EPA*, 249 F.3d 1031 (D.C. Cir. 2001) (after NOx SIP Call, EPA made Section 126 findings and required sources to participate in NOx emission budget trading program); 71 Fed. Reg. 25,328 (Apr. 28, 2006) (EPA denied 126 petition after issuing CAIR, finding states did not contribute significantly to downwind air quality problems and that CAIR FIPs would address any other needed reductions).

[18] *See* NY Petition at 1.

[19] *See* NY Petition at 1.

[20] *See* NY Petition at 1.

[21] NY Petition at 6. Notably, the NY Petition shows that NOx sources in New Jersey purportedly have an air quality impact on New York, but New York excludes New Jersey sources from the scope of requested relief, with no explanation.

have switched to lower emitting fuel sources, all with the result of materially reducing their NOx emissions.

New York asks EPA to impose New York's RACT requirements on the targeted facilities; these would require additional NOx controls costing up to $5,000 per ton of NOx removed. Even for those facilities that may have installed controls meeting the definition of "New York" RACT or for electric generating units ("EGUs") with three-year average emission rates at 0.15 lb/mmBtu or less, New York requests that EPA set a continuous emission limit on a 24-hour average basis. According to the petition, selective catalytic reduction ("SCR") and selective non-catalytic reduction ("SNCR") would be the controls that would satisfy RACT.

ARGUMENT

I. EPA Should Deny the NY Petition Regarding the 2008 Ozone NAAQS Because It Fails under EPA's Four-Step Transport Framework.

EPA has established a four-step Transport Framework to assess the interstate transport of ozone through the CAA's good neighbor provision in Section 110(a)(2)(D)(i)(I). Following this approach, it is plain that the NY Petition should be denied.

A. EPA's Transport Framework is a reasonable tool to assess the NY Petition.

ASC urges EPA to follow the Transport Framework for evaluating the NY Petition. The CAA directs EPA to decide whether a source or group of stationary sources emits or would emit any air pollutant in violation of the good neighbor provision.[22] However, the Act does not specify how EPA should determine whether a source contributes significantly to nonattainment or interferes with maintenance of a NAAQS in a downwind state.[23]

EPA developed the four-step Transport Framework to facilitate such determinations.[24] Using this well-established approach would be sound policy in this instance. EPA has used the Transport Framework in its interstate transport regulations, including the NOx SIP Call, Clean Air Interstate Rule ("CAIR"), CSAPR, and the CSAPR Update, in issuing final decisions on the 2004 North Carolina Section 126 petition,[25] the 2016 Connecticut Section 126 petition,[26] and the

[22] CAA § 126(b).

[23] *See* CAA § 110(a)(2)(D)(i).

[24] *See e.g.*, CSAPR Update at 74,517-23 (describing framework).

[25] 71 Fed. Reg. 25,328, 25,330.

[26] 83 Fed. Reg. 16,064 (Apr. 13, 2018).

2017 Delaware and Maryland 126 petitions.[27] Moreover, courts have vetted and upheld the Framework for use in EPA's interstate transport regulations.[28]

Applying this consistent practice here is reasonable and desirable. The Framework's four-step review requires the petitioning state to (1) show there is a real NAAQS nonattainment/maintenance issue present (Step One), (2) establish there is a link between the NAAQS issue and the upwind state's sources (Step Two), (3) prove there are highly cost-effective technologies available at the named source to address the alleged upwind contribution (Step Three),[29] and (4) only if the previous conditions are met, the agency may fashion an appropriate remedy (Step Four). This ensures that reasonable, fact-based decisions that rely on sound science form the basis for an EPA Section 126 decision. The NY Petition fails to identify any reasonable basis for deviating from EPA's well established practice.

That stated, ASC urges EPA to consider whether to adjust the level of emissions EPA deems sufficient to establish the required link (Step Two) between the upwind sources and the downwind receptors. There are compelling reasons to adjust that level, as we detail below, and ASC proposes an improved method for determining the appropriate level.

B. The NY Petition must be denied under Step One of the Transport Framework.

To satisfy Step One, New York must demonstrate that receptors within the state actually experience or will experience nonattainment or interference with maintenance.[30] If a receptor does not or would not experience attainment problems, then there is no good neighbor violation with respect to that receptor. New York's Petition fails Step One for several reasons:

1. Chautauqua County is in, and is predicted to remain in, attainment with the ozone NAAQS.

Foremost, New York has failed to show that Chautauqua County has any current or anticipated ozone attainment problem. In fact, the data contradict the claim. To determine whether a downwind receptor is experiencing or would experience an attainment problem, EPA considers two categories of information: monitored ozone data, and modeled projections of air quality data for a selected analytic or future year. Each of these two categories allows EPA to calculate ozone design values. Ozone design values are the three-year average of the fourth-

[27] EPA Final Response to DE & MD 126 Petitions (not yet published in the Federal Register) (issued Sept. 14, 2018) ("DE & MD Denial").

[28] *See North Carolina v. EPA*, *supra* n.11 (finding flaws with CAIR but upholding the four-step Transport Framework); *see also Am. Mining Congress v. EPA*, 824 F.2d 1177, 1182 (consistent agency interpretation merits more judicial deference) (citing *INS v. Cardoza-Fonseca*, 480 U.S. 421, 446 at n. 30 (1987)).

[29] *See Appalachian*, 249 F.3d at 1040 (citing *Michigan v. EPA*, 213 F.3d 663 (D.C. Cir. 2000) (upholding EPA's use of cost-effectiveness criteria in determining which upwind sources contribute significantly to nonattainment in downwind states)).

[30] *See* CT Denial at 16,070; DE & MD Denial at 36-38.

highest maximum daily 8-hour average ozone ("MDA8 ozone"). Attainment is determined by an ozone design value.

New York concedes that Chautauqua County "attained the [2008] NAAQS by the marginal attainment deadline of July 20, 2015."[31] Indeed, New York itself recommended that EPA designate Chautauqua County as in attainment with the 2015 ozone NAAQS,[32] as New York's own data shows the Dunkirk monitor in Chautauqua County at a design value of 67 ppb—well under the 2015 ozone NAAQS of 70 ppb.[33]

Despite its own representations and these data, New York nonetheless insists that upwind sources somehow "threaten" Chautauqua County's ability to maintain attainment with the 2008 (and 2015) ozone NAAQS.[34] This claim is baseless, and New York provides no information or data to support it. To the contrary, experts at Ramboll (retained by ASC) have evaluated the relevant, recent ozone data.[35] Ramboll's analysis confirms New York's own representations that Chautauqua County already attains and will continue to attain both the 2008 and 2015 ozone NAAQS.[36]

Specifically, in 2016, EPA determined that Jamestown/Chautauqua County has been in attainment for the 2008 ozone NAAQS as of July 20, 2015, based on the observed 2012-2014 design value of 71 ppb.[37] In 2017, EPA designated Chautauqua County as Attainment/Unclassifiable for the more stringent 2015 ozone NAAQS using observed 2014-2016 ozone design value of 68 ppb.[38] In 2018, EPA also proposed determining that the county attains the 2008 ozone NAAQS, based on an observed 2015-2017 design value of 68 ppb.[39] These most recent data—which should govern EPA's review of the NY Petition[40]—show that Chautauqua

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[31] NY Petition at 4.

[32] NY Dep't of Envtl. Conservation, Letter to Judith A. Enck, Regional Administration, USEPA Region 2 at 2 (Sept. 22, 2016), https://www.epa.gov/sites/production/files/2016-11/documents/ny-rec.pdf ("NY Recommendation"); *see also* EPA Response to Designations (Dec. 20, 2017) https://www.epa.gov/sites/production/files/2017-12/documents/ozone_designation_new_york_governors_120-day_letter.pdf (agreeing with attainment recommendation as to Chautauqua County).

[33] NY Recommendation at 3-4 (design value calculated as the 2013 through 2015 average annual fourth-highest daily maximum 8-hour average ozone concentration, using quality-assured, certified air quality data in EPA's Air Quality System).

[34] NY Petition at 1.

[35] Ramboll's team is led by Ralph Morris. Mr. Morris is an internationally recognized expert in air quality modeling and a principal developer of the Comprehensive Air Quality Model with extensions ("CAMx") photochemical grid model used by EPA. *See* Declaration of Ralph Morris (April 25, 2018).

[36] *See* Ramboll Technical Report (Sept. 24, 2018) (Attachment A) ("Ramboll Technical Report"), Appendix 1, Memorandum, Ramboll to Air Stewardship Coalition, Ozone Attainment Issues in Western New York (2018) ("Ramboll Chautauqua County Memo").

[37] 81 Fed. Reg. 26,697 (May 4, 2016).

[38] 82 Fed. Reg. 54,232, 54,264 (Nov. 16, 2017).

[39] 83 Fed. Reg. 34,506 (July 20, 2018).

[40] *See, e.g.*, DE & MD Denial at 50-51 (EPA must consider representative data to avoid over-control prohibited under Supreme Court holding in *EME Homer City*, 134 S. Ct. at 1608–09).

County is and will remain below not only the 2008 ozone NAAQS, but also the 2015 ozone NAAQS.[41]

EPA should reject the NY Petition's unsubstantiated claim that Chautauqua County "remains in danger of exceeding the ozone NAAQS, particularly the 2015 standard."[42] To the contrary, the data show that Chautauqua County ozone concentrations are actually *declining* and that the County will continue to attain the 2008 (and the 2015) ozone NAAQS in the future. Observed data show that ozone concentrations have been steadily and precipitously declining in Chautauqua County over the past decade.[43] As discussed above, EPA's own modeled projections of future year ozone design values for 2017 show attainment of both NAAQS for Chautauqua County.[44] Additionally, EPA projected the *maximum* ozone design values in 2023 to be 10 ppb below the ozone NAAQS.[45] In its recently released CSAPR Close-Out Proposal, EPA data and modeling show that Chautauqua County ozone design values would remain well below the 2008 and 2015 ozone NAAQS.[46]

New York has failed to show that Chautauqua County has any current or anticipated ozone attainment problem. In fact, the data show attainment.[47] Because the NY Petition cannot satisfy Step One, the NY Petition should be denied as to Chautauqua County.

2. New York erred by seeking relief based on attainment receptors.

Second, New York fails to demonstrate that each of the receptors identified in its petition is experiencing issues with NAAQS attainment. Absent this demonstration, New York cannot support its argument that EPA must control upwind sources.

The NY Petition misleadingly implies that 11 monitoring sites in upstate NY and 10 sites in the NYMA have ozone nonattainment or maintenance issues in 2017.[48] Closer assessment shows the upstate NY monitoring sites are in attainment with the 2008 ozone NAAQS in 2017, and all but 3 of the sites in the NYMA have 2017 ozone design values below the 2008 ozone

[41] *See* Ramboll Chautauqua County Memo at 2.

[42] NY Petition at 4.

[43] *See* Ramboll Chautauqua County Memo at Figure 1 (depicting trends).

[44] Ramboll Chautauqua County Memo at Table 1.

[45] *See* Ramboll Chautauqua County Memo at Table 1.

[46] *See* CSAPR Close-Out Proposal, Air Quality Modeling Technical Support Document for the Updated 2023 Projected Ozone Design Values at B-19, EPA Docket EPA-HQ-OAR-2018-0225-0040 (June 2018), https://www.regulations.gov/document?D=EPA-HQ-OAR-2018-0225-0040.

[47] *E.g.*, *New York v. EPA*, 852 F.2d 574, 580 (D.C. Cir. 1988) (upholding EPA denial of Section 126 petition where both EPA modeling and petitioner data failed to show an actual NAAQS violation).

[48] NY Petition Table 2; *see also* NY Petition Table 3.

NAAQS.[49] But as discussed in subsequent sections,[50] the air quality issues attributed to these lone sites do not warrant the extraordinary relief that New York seeks.

EPA should reject New York's attempt to rely on monitoring receptors that are in attainment because, as outlined above, Section 126 only addresses *violations* of the good neighbor provision.[51] As these receptors are not presenting attainment issues, they cannot form the basis of a 126 petition. EPA clearly cannot impose controls under Section 126 on sources whose emissions do not contribute to downwind nonattainment or interfere with maintenance of the NAAQS.[52]

New York then theorizes that these receptors *might* face attainment issues one day. New York, however, makes no attempt to support this assertion. It provided no data to show that its attainment receptors "will" experience nonattainment or maintenance interference based on modeled future air quality concentrations for a relevant attainment date. New York merely asserts, with no supporting data or analysis, that certain monitors "may ultimately exceed" the 2015 ozone NAAQS, "depending on ozone concentrations in future years."[53] New York provides no information on projected ozone concentrations in future years relevant to 2015 ozone attainment that would support its statement.

As Ramboll documents, the exclusion of attainment receptors from the NY Petition removes 18 receptors from the Petition based on the observed 2017 design values, CSAPR Update average ozone design values for 2017, and CSAPR Update maximum ozone design values for 2017.[54] These receptors—*i.e.*, nearly all of the receptors in New York identified in the petition—have 2017 design values below both the 2008 and 2015 ozone NAAQS.

Quite simply, upwind sources cannot contribute significantly to nonattainment when nonattainment does not exist. Moreover, New York makes no attempt to meet its burden to demonstrate that these receptors will experience air quality problems. Hence, New York fails to satisfy Step One as to the attainment receptors identified in its petition. The NY Petition should be denied as to these receptors on this basis alone.

3. EPA should exclude ozone from international transport and exceptional events in determining whether New York is experiencing attainment problems under Step One of the Transport Framework.

EPA also should reject the NY Petition because when contributions from international sources and exceptional events are considered, New York does not have any ozone attainment

[49] *See* Ramboll Technical Report at Table 2-1.

[50] *See infra*, Sections I.C., I.D., I.E., III.

[51] CT Denial at 16,074-75 and DE & MD Denial at 106 ("a violation of [the good neighbor provision] is a condition precedent for action under CAA section 126(b)").

[52] *EME Homer City*, 134 S. Ct. at 1608-09 (EPA cannot over-control).

[53] NY Petition at 14.

[54] Ramboll Technical Report at Table 2-1, Table 2-2; *see also* 40 C.F.R. part 50, Appendix U (specific methodology for calculating the ozone design values, including computational formulas and data completeness requirements).

issues warranting action under Section 126. Indeed, given the extraordinary scope of those contributions, it is particularly appropriate to consider those contributions in evaluating the NY Petition.

The CAA's framework supports considering these other ozone sources under Step One of EPA's Transport Framework. Again, the starting point is Section 126, which directs EPA to determine whether an upwind major source or group of stationary sources "emits or would emit" a relevant pollutant that "will contribute significantly" to issues with downwind NAAQS compliance. To determine whether a source actually emits pollutants that in fact *contribute significantly* to downwind issues, EPA should consider *all* potential contributions in order to assess the relative contribution of an upwind state or a domestic source or group of sources, as opposed to these exceptional events or non-domestic sources of ozone. By assessing all contributions, EPA can evaluate the upwind contribution in context to assess whether it may be actually significant—which is commonly understood to be "of a noticeably or measurably large amount."[55]

Moreover, CAA provisions addressing international emissions confirm that EPA should consider fully those emissions when assessing Section 126 petitions. The CAA expressly recognizes that states and regulated entities are not the only sources of downwind ozone concentration. As such, CAA Section 179B allows states to show in their NAAQS attainment demonstrations that a nonattainment area would have met the ozone NAAQS "but for emissions emanating from outside of the United States" and thus should receive regulatory relief from planning and control requirements.[56] Congress recognized that states and regulated entities cannot be expected to incur costs to increase controls so that foreign sources of nonattainment are allowed to persist.

Here, modeling that removes the contribution of international anthropogenic emissions indicates that New York would be well below the 2008 ozone NAAQS "but for" emissions emanating from outside the United States.[57] Additionally, eliminating international anthropogenic emissions reduces the 2011 baseline ozone design values by up to 3.2 ppb. Eliminating these emissions results in 2017 future year design values well below the 2008 ozone NAAQS for all New York receptors identified in the Petition.[58] It is this Administration's policy that "the Administrator shall ensure that EPA continues to take into consideration a State's ability to meet and attain NAAQS that may be affected by international transport of criteria pollutants."[59] EPA should follow that policy in addressing the NY Petition.

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[55] *Significant*, Merriam-Webster (Online Ed.).

[56] *See* 42 U.S.C. § 7509a(b); 81 Fed. Reg. 68,216, 68,246 (Oct. 3, 2016) ("Exceptional Events Rule").

[57] Ramboll Technical Report at 20-21.

[58] *See* Ramboll Technical Report at Table 2-6.

[59] *See* Presidential Memorandum for the Administrator of the Environmental Protection Agency (Apr. 12, 2018) https://www.whitehouse.gov/presidential-actions/presidential-memorandum-administrator-environmental-protection-agency/.

Additionally, EPA should also exclude under Step One of the Transport Framework ozone caused by exceptional events. Exceptional events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable using techniques that states or other agencies may implement to attain and maintain attainment of the NAAQS. Exceptional events include wildfires, stratospheric ozone intrusions, and volcanic and seismic activities. CAA Section 319(b)(2) expressly directs EPA to consider exceptional events in evaluating air quality monitoring data, and EPA has promulgated a regulatory framework to address exceptional events.[60]

Here, 2016 Canadian wildfires have led to higher ozone concentrations in New York, thus creating the potential for attainment problems that are completely unrelated to the named sources.[61] Those should be excluded from any consideration of New York's petition in assessing the contribution from upwind states. Unlike its neighboring states, New York has, to date, failed to pursue exclusion for these wildfires that impact the 2016, 2017, and 2018 design values at the receptors it identified in its Petition.[62] At a minimum, it should be EPA policy under Section 126 that a state should first seek to avail itself of the process of excluding exceptional events from any determination of NAAQS compliance before seeking the extraordinary relief afforded under Section 126.

In short, it is entirely fair and reasonable for EPA to consider these international emissions and exceptional events before deciding whether to impose additional costs and burdens on U.S. sources. New York is essentially asking EPA to require 357 sources across the country to spend millions of dollars on emission controls to address emissions from other countries or due to exceptional events over which the named sources have no control. Before costly new controls are imposed, the real contributions should be evaluated—which necessarily includes evaluating cross-border emissions and emissions from exceptional events.

4. EPA should deny the NY Petition as to the 2008 ozone NAAQS because the CSAPR Update satisfies states' good neighbor obligations for the 2008 ozone NAAQS.

EPA also should deny the NY Petition under Step One because EPA already has found that the good neighbor obligations have been satisfied for the 2008 NAAQS. The named sources in the NY Petition are located in states covered by EPA's 2016 CSAPR Update.[63] Under that rule, EPA directly imposed federal emission limitation requirements in the form of limits through FIPs on 22 states to address their good neighbor obligations with respect to the 2008 ozone NAAQS. EPA either had previously found that these states failed to submit a complete good neighbor SIP or had issued a final determination disapproving the states' good neighbor SIP

[60] Exceptional Events Rule, 81 Fed. Reg. 68,216, *supra* n. 56. The D.C. Circuit recently upheld EPA's Exceptional Events Rule. *Natural Res. Defense Council v. EPA*, No. 16-1412 (D.C. Cir. July 20, 2018).

[61] *See* Letter from Midwest Ozone Group at 12-18 (May 31, 2018).

[62] *See* https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-connecticut, https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-new-jersey, https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-massachusetts.

[63] 81 Fed. Reg. at 74,506.

submittals.[64] The rule updated the CSAPR ozone season NOx emission budgets for these states to achieve cost-effective NOx reductions from the states' EGUs and required them to participate in a revised CSAPR ozone season NOx allowance trading program.[65] At the time, EPA could not tell if these mandates would be sufficient for the states to satisfy their good neighbor obligations.[66]

Now, updated information and modeling described in EPA's CSAPR Close-Out Proposal show that all U.S. receptors will be in attainment with the 2008 ozone NAAQS by 2023. EPA evaluated whether upwind states will contribute significantly to attainment problems based on future year projections of air quality, in addition to current measured data.[67] To determine the appropriate year by which sources could implement emission reduction efforts, EPA considered upcoming attainment dates for the 2008 ozone NAAQS, the timeframes to implement further emission reduction strategies (including EGU and non-EGU control technologies), and the time in which EPA could promulgate a rule with emission reduction requirements. Based on that analysis, EPA concluded 2023 is the appropriate year.[68]

EPA then applied its Transport Framework using the updated information and modeling to determine whether 20 upwind states identified in the CSAPR Update had remaining good neighbor obligations.[69] The data and EPA's comprehensive analysis showed that they do not. As such, EPA has already determined that there will be no remaining nonattainment or maintenance receptors for the 2008 ozone NAAQS in the eastern United States in 2023.[70]

Based on this finding, there is nothing left for EPA to consider in the NY Petition regarding the 2008 ozone NAAQS, as there can be no significant contribution of concern from upwind states where there is no nonattainment or maintenance receptor downwind. The states subject to the CSAPR Update, including the states named in the NY Petition, satisfy their good neighbor obligations for the 2008 ozone NAAQS.[71]

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[64] CSAPR Close-Out Proposal at 31,921.

[65] CSAPR Close-Out Proposal at 31,919.

[66] CSAPR Update at 74,508, 74,521.

[67] *See North Carolina v. EPA*, 531 F.3d at 913-14; CSAPR Close-Out Proposal at 31,925.

[68] CSAPR Close-Out Proposal at 31,931.

[69] Separately, EPA Region 4 took final action to approve the good neighbor SIP submitted by Kentucky. 83 Fed. Reg. 33,730 (July 17, 2018).

[70] CSAPR Close-Out Proposal at 31,936.

[71] *See* CSAPR Close-Out Proposal at 31,937; *see also* Stephen Page 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) at 1 (Oct. 27, 2017), https://www.epa.gov/sites/production/files/2017-10/documents/final_2008_o3_naaqs_transport_memo_10-27-17b.pdf ("Page Memorandum").

C. There is no link between the named sources and attainment or maintenance issues in the NYMA with respect to the 2008 ozone NAAQS (Step Two of Transport Framework).

To satisfy Step Two, a petitioning state must link the upwind state(s) to any identified downwind receptors that showed nonattainment or maintenance issues in Step One. To prove a link, the petition first must prove that an upwind state contributes to downwind nonattainment. EPA has previously found a link with an upwind state if the state contributed 1 percent or more of the ozone NAAQS to the identified downwind receptors. Second, the petition must identify that the named source or group of sources within that state emits or would emit in violation of the good neighbor provision. A source may be found to "emit" in violation of the good neighbor provision if, based on current or reasonably anticipated future emission levels accounting for existing conditions, the upwind state's emissions contribute to downwind attainment problems and the source can be further controlled consistent with Step Three (discussed *infra*).[72]

Even assuming New York could satisfy Step One, EPA should deny the Petition under Step Two of EPA's Transport Framework based on a multitude of legal and modeling flaws: New York failed to establish a "link" to alleged downwind attainment problems, used an incomplete modeling period, did not use current emissions information, used an improper ozone contribution metric, used an inferior modeling approach, failed to account for existing regulations, and did not conduct a model performance evaluation.[73] Additionally, proper modeling shows that the required links cannot be established. Finally, while New York relies on a 1 percent screening threshold, ASC urges EPA to require a higher significance threshold for the NY Petition. At a minimum, EPA should not set the significant contribution threshold for the Petition at less than 1 ppb, and should consider whether a threshold higher than 1 ppb may be warranted to reasonably identify whether a source merits further analysis under Section 126.

1. New York failed to meet its burden of establishing that named sources are linked to nonattainment or maintenance problems.

As an initial matter, New York's petition fails Step Two because the State has failed to meet its burden of proof to demonstrate a link between the named sources and its alleged attainment issues. In support of its contentions, New York used a photochemical air quality model to analyze alleged air quality impacts on its state. In running this model, New York relied on certain emissions databases as inputs, including emissions inventories reflecting data from the named sources and meteorological modeling. Yet, while the NY Petition includes many assertions, New York did not provide its modeling data or full modeling analyses and assumptions to EPA when it submitted its Section 126 petition. New York expressly

[72] *See* CT Denial at 16,070.

[73] At Step Two, EPA need not consider Chautauqua County or any of the other receptors currently and projected to remain in attainment of the 2008 and 2015 ozone NAAQS. Instead, EPA should only consider monitors that New York shows to be in nonattainment or present maintenance issues.

acknowledged it bears the burden, yet it chose not to meet it.[74] New York thus asks EPA to assess a petition that it fails to support with actual data. On that basis alone, EPA can and should deny the NY Petition.

Indeed, the Information Quality Act and EPA's Information Quality Guidelines require information EPA relies upon to support its decisions, which would include the Agency's findings in response to a Section 126 petition, to be accurate and reliable.[75] The information must meet standards for quality and objectivity, which requires that the information "as a matter of substance, is accurate, reliable, and unbiased."[76] Because New York chose not to provide this data with its petition, EPA cannot assess the accuracy and reliability of the state's claim as the Agency must before making this determination.

ASC obtained New York's data, after making a formal New York Freedom of Information Law ("FOIL") request. An analysis of the data perhaps explains New York's failure to share it with EPA. The modeling is deeply flawed and would not be of sufficient quality to merit reliance by EPA. Rather, as summarized here and detailed in the Ramboll Technical Report, New York has not used the most current representative data, used outdated modeling approaches, and engaged in several modeling adjustments that do not conform to EPA practice and industry standards, all of which combine to paint an inaccurate picture that distorts the alleged contribution of upwind sources to the ozone NAAQS in downwind receptors in the NYMA. As a result of these pervasive flaws, New York falls well short of its burden.

a. New York used an incomplete modeling period.

EPA should reject the NY Petition because New York used only half the modeling period.[77] The summer ozone season runs from May 1 through September 30. Yet, New York "chose to model" May 18 through July 30.[78] Thus, New York's ozone contribution modeling covers only half of the ozone season. EPA should not rely on New York's modeling based on this inexplicable shortcut.

b. New York does not use the most current emissions information.

EPA also should reject the NY Petition because it does not use the most current emissions information. To satisfy Step Two of the Transport Framework, there must be a "link" between the upwind state and the downwind state based on air quality analysis using representative, current data and modeling inputs. New York relied on the 1 percent of the

[74] *See* NY Petition at 2 ("[T]he burden on a state filing a petition pursuant to section 126(b) is to demonstrate that any major stationary source or group of stationary sources emits or would emit an air pollutant that leads to difficulty attaining or maintaining a NAAQS.").

[75] EPA Office of Envtl. Info., "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency" (EPA/260-R-02-008), § 5.3 (Oct. 2002) ("Information Quality Guidelines").

[76] Information Quality Guidelines at § 5.1.

[77] *See* Ramboll Technical Report at 26.

[78] NY Petition at 11.

NAAQS contribution found in the CSAPR Update between the nine designated states and New York. Even assuming that is the right metric, this is only a starting point. New York must next demonstrate that the current operations and reasonably anticipated future emission levels, accounting for current conditions, of each source or group of stationary sources show that it emits or would emit in violation of the good neighbor provision.[79]

To make that demonstration, EPA guidance directs a petitioner to use the most recently available emissions data to conduct air quality modeling.[80] The courts have expressed this direction to use updated data inputs.[81]

New York, however, does not account for current information.[82] There are current, publicly available emissions data for EGU sources—2017 almost-actual emissions reported to EPA, 2017 Continuous Emissions Monitoring ("CEM") NOx data in the EPA Clean Air Markets Division ("CAMD") database. Instead of this accurate, available, recent data of actual emissions, New York relies entirely on 2017 *projections*, which are derived from the 2011 National Emissions Inventory ("NEI") data.[83] New York then searched through a separate inventory ("2014 NEI") to pick out more sources to include in its petition.[84] Picking and choosing among these now outdated data, New York modeled its base case and future year projections.[85] EPA should reject New York's modeling as unreliable because it is not based on the most current available data.

c. New York uses an improper ozone contribution metric.

Second, EPA should not and cannot rely on New York's modeling because New York has used a non-standard method for calculating the ozone contribution from upwind states/sources to "link" the named sources to the NYMA receptors. The NY Petition claims that it "generally" followed EPA's ozone contribution modeling used in the CSAPR Update, but this is misleading.[86] In fact, New York uses an ozone contribution metric that is inconsistent with both the design values used to measure compliance with air quality standards and the method EPA has followed in its air quality modeling to assess cross-state emissions. This flaw—which

[79] *See* CT Denial at 16,070.

[80] EPA, Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze at 32, December 2014 ("EPA Modeling Guidance").

[81] *E.g.*, *West Virginia v. EPA*, 362 F.3d 861, 870 (D.C. Cir. 2004) (preferring inputs used in the "significant overlap between [EPA's] modeled time period and the regulated time period" in determining projected growth rates).

[82] Ramboll Technical Report at 27-28.

[83] NY Petition at 10.

[84] NY Petition at 10.

[85] NY Petition at 11.

[86] NY Petition at 11 ("DEC's CMAQ modeling analysis generally followed the method described for ozone contribution modeling in EPA's Technical Support Document for the CSAPR Update, with some adjustments" and citing to CSAPR Update TSD, *infra*).

can only be observed by reviewing the actual modeling data New York declined to provide to EPA—taints New York's entire petition and is ample grounds for a swift EPA denial.

Specifically, ASC's close review of the modeling data it obtained from New York reveals that New York used the **single day with the highest upwind state ozone contribution to a specific receptor** to set the ozone contribution metric. This non-standard approach is not found in EPA's regulations or guidance. On the contrary, New York's approach is squarely inconsistent with EPA's methodology for projecting ozone design values. EPA projects the future year air quality design value for the 8-hour ozone NAAQS based on the **10-day *average*** of the 10 highest daily maximum 8-hour average concentrations in the simulated period.[87]

New York's single-day maximum method creates an invalid comparison, which then results in overstated contribution estimates. First, if the ozone design value is the standard being measured and that is based on a multi-day average, then so too must the metric used to assess the scope of a state's contribution to that standard, because "the magnitude of the contributions is directly related to the magnitude of the design value at each site."[88] A consequence of New York's flawed approach is that it makes the atypical absolute daily maximum into the contribution metric. This leads to New York's modeling grossly overestimating upwind state contributions.[89] Put another way, New York has created a distorted apples-to-oranges method that compares a single daily maximum to a multi-day, average-based design value, which results in biased, overstated contribution estimates.

Further, New York's non-standard approach is inconsistent with the methods EPA has used to evaluate cross-state air pollution.[90] Both EPA's 2011 CSAPR and 2016 CSAPR Update used the ***average*** ozone contribution metric to assess the link of upwind states to downwind nonattainment and maintenance receptors because it is much more robust than using a maximum day contribution metric:

> EPA used multiple ozone metrics, including the average contribution and maximum single day contribution to downwind nonattainment. ***EPA believes the average contribution (calculated over multiple high ozone days) is a robust metric compared to the maximum contribution on a single day.*** EPA believes that this approach is preferable because it uses a robust metric, it is consistent with the approach for PM2.5, and it provides for a consistent approach that takes into account, and is applicable to, any future ozone standards below 0.08 ppm.[91]

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[87] EPA Modeling Guidance at 101; Ramboll Technical Report at 30-31.

[88] CSAPR Update at 74,537; *see* EPA, Air Quality Modeling Technical Support Document for the Final Cross State Air Pollution Rule Update at 16-19 (Aug. 2016), https://www.epa.gov/sites/production/files/2017-05/documents/aq_modeling_tsd_final_csapr_update.pdf ("CSAPR Update TSD").

[89] Ramboll Technical Report at 32-33.

[90] Ramboll Technical Report at 31.

[91] 76 Fed. Reg. at 48,238 (emphasis added).

Moreover, EPA also relies on this standard ***average*** contribution approach to support its 2015 ozone NAAQS preliminary interstate transport assessment.[92] New York offers no legal or technical justification for diverging from the standard approach EPA has applied consistently.[93]

In sum, New York has buried in its modeling data a non-standard, biased metric that is not found in EPA rules or guidance and that EPA rejected in developing CSAPR. This non-standard method forms a central basis for New York's petition, but New York fails to justify it or explain why it chose a metric different from that used consistently by EPA. Thus, EPA cannot and should not rely upon the conclusions of New York's modeling based on this improper ozone contribution metric.

d. New York uses an inferior modeling approach.

Third, EPA should reject New York's approach under Step Two because the State has not used the best, most current tools available for conducting its air quality analysis. Rather, New York uses a form of modeling that "zeroes out" the volatile organic compound ("VOC") and NOx emissions from the 400-tpy sources from each state. As explained in greater detail in the Ramboll Technical Report, this modeling technique unrealistically assumes NOx emissions are simultaneously eliminated from the over 350 named facilities across nine states and then claims to evaluate the contributions of these sources to 2017 baseline ozone levels.[94] The flaw in this method is that by removing the target source entirely, the environment in which ozone is formed is altered, and thus the zero-out modeling results cannot depict the resulting 2017 ozone contributions accurately.[95] EPA now uses source apportionment modeling, which captures the nonlinear relationship between sources and a receptor with respect to ozone.[96] The source apportionment tools are widely available and generally accepted as the state-of-the-art technique when modeling the long range transport of pollutants. EPA should not rely on New York's inferior modeling analysis.

e. New York's data and modeling are not representative because they fail to account for existing regulations.

Fourth, EPA cannot rely on New York's data under Step Two because New York does not explain how it accounts for the existing regulations that have reduced, and will continue to

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[92] EPA, Air Quality Modeling Technical Support Document for the 2015 Ozone NAAQS Preliminary Interstate Transport Assessment at 15-16 (Dec. 2016), https://www.epa.gov/sites/production/files/2017-01/documents/aq_modeling_tsd_2015_o3_naaqs_preliminary_interstate_transport_assessmen.pdf.

[93] New York's approach is also internally inconsistent. While New York ratchets up the contribution metric by using a single day maximum, it still compares that to the standard averaging used to determine ozone design values. NY Petition at 11. The result is to increase the numerator (contribution) and keep the denominator (design value) the same to produce a higher contribution percentage.

[94] Ramboll Technical Report at 26-27.

[95] Ramboll Technical Report at 27.

[96] Ramboll Technical Report at 27.

reduce, NOx emissions from the states in which the named sources are located.[97] EPA must use current information, taking into account existing regulations, in assessing interstate transport obligations. Only by accounting for all the existing requirements for reducing NOx emissions can EPA properly assess whether additional controls are needed to satisfy a state's good neighbor obligations. Otherwise, EPA risks over-controlling a source, which is beyond the agency's authority.[98]

New York, however, does not consider existing regulations and ignores recent EPA actions to review whether additional measures are necessary to address NOx emissions in the states in which the named sources are located. As the table below summarizes, EPA is actively addressing states' good neighbor obligations with respect to the 2008 (and 2015) ozone NAAQS.

NY 126 Petition	MD 126 Petition	DE 126 Petitions	SIP Status (2008 NAAQS)	CSAPR II FIPs	FIP Status	CSAPR Close-Out Proposal (2008 NAAQS)	SIP Status (2015 ozone NAAQS)
Illinois	-	-	EPA evaluated, SIP incomplete	EPA issued FIP	By 12/6/18	No further obligation	In progress
Indiana	EPA evaluated, final action issued 9/14/18	-	EPA evaluated, SIP disapproved	EPA issued FIP	By 7/15/18	No further obligation	In progress
Kentucky	EPA evaluated, final action issued 9/14/18	-	EPA evaluated, final SIP approval as of 7/17/18, 83 FR 33730	EPA issued FIP	By 6/30/18	SIP approved	In progress
Maryland	-	-	EPA evaluated, SIP incomplete	EPA issued FIP	By 8/19/18	No further obligation	In progress
Michigan	-	-	EPA evaluated, SIP incomplete	EPA issued FIP	By 12/6/18	No further obligation	In progress
Ohio	EPA evaluated, final action issued 9/14/18	-	EPA evaluated, SIP disapproved	EPA issued FIP	By 7/15/18	No further obligation	In progress
Pennsylvania	EPA evaluated, final action issued 9/14/18	EPA evaluated, final action issued 9/14/18	EPA evaluated, SIP incomplete	EPA issued FIP	By 12/6/18	No further obligation	In progress
Virginia	-	-	EPA evaluated, SIP incomplete	EPA issued FIP	By 12/6/18	No further obligation	In progress

[97] *Cf.* DE & MD Denial at 10 (noting that the DE and MD petitions acknowledge existing regulatory programs to support their arguments).

[98] *EME Homer City*, 134 S. Ct. at 1608-09; *see* CT Denial at 26,677.

NY 126 Petition	MD 126 Petition	DE 126 Petitions	SIP Status (2008 NAAQS)	CSAPR II FIPs	FIP Status	CSAPR Close-Out Proposal (2008 NAAQS)	SIP Status (2015 ozone NAAQS)
West Virginia	EPA evaluated, final action issued 9/14/18	EPA evaluated, final action issued 9/14/18	EPA evaluated, SIP incomplete	EPA issued FIP	By 12/6/18	No further obligation	In progress

Moreover, New York also ignored various regulatory programs in place at the federal and state level that will address NOx emissions in the named states. For example, Ozone Transport Region ("OTR") states—which include Maryland, New York, Pennsylvania, and Virginia—are subject to CSAPR Update NOx emission allowance trading, state RACT regulations, Ozone Transport Commission ("OTC") Model Rules, High Energy Demand Day controls, Tier 3 gasoline, and Boiler Maximum Achievable Control Technology ("MACT") implementation.[99] Other states are also subject to various state RACT implementation requirements.[100]

These regulatory programs have or will require NOx emission reductions, yet New York fails to acknowledge these programs or explain why EPA should impose emissions limitations on top of these existing regulatory requirements. As such, again, New York has failed to meet its burden to justify the relief it seeks.

f. New York failed to conduct a model performance evaluation.

Finally, New York failed to demonstrate that its model performed correctly in accordance with statistical best practices and regulatory guidance.[101] New York does not verify that the model adequately reproduces the observed ozone concentrations for the base year (2011), and it has not checked for overestimation bias. EPA explains why a modeling performance evaluation ("MPE") is necessary:

> The objective of the MPE is to demonstrate that the base case model can simulate observed pollution concentrations during historical pollution episodes, and to develop confidence that the model can reliably predict how future pollution levels will change in response to changes in emissions. A particular concern in photochemical models is that compensating errors in the model can cause the model to reproduce observed pollution concentrations in the base case while incorrectly representing the emissions, dispersion and chemistry processes that control pollution formation. Models that achieve good performance through compensating errors will generally not be reliable for predicting how pollution levels will respond to future emissions reductions. Thus, a key goal of the MPE is to demonstrate

[99] Ramboll RACT Analysis (Attachment B) at 1, 4-5.

[100] Ramboll RACT Analysis, Table 1.

[101] EPA Modeling Guidance at 62-94.

> that the model is getting good results for the right reason (Russell and Dennis, 2000).[102]

Without demonstrating that it conducted a model performance evaluation that corrected for bias, EPA cannot rely on New York's modeling.

2. Modeling shows that nearly all of the upwind states identified in the NY Petition are not linked to its alleged downwind attainment issues.

Even beyond New York's failure to meet its burden, the data in fact show that the named sources in nearly all upwind states cannot be linked to the alleged downwind attainment issue.[103]

First, Ramboll conducted three modeling analyses: (1) a corrected run of New York's modeling method ("CSAPR Approximate"); (2) Ramboll modeling of all of the named sources that meets EPA data quality standards ("Ramboll Modeling" or "2017 Sensitivity Modeling"); and, (3) Ramboll Modeling for the non-EGUs among the named sources ("Ramboll Non-EGU Modeling").[104]

Ramboll's CSAPR-Approximate approach found that New York's modeling does not support the NY Petition once its modeling errors are corrected. With the NY Petition's ozone contribution metric corrected, the named sources in eight of the nine states do not contribute 1 percent of the NAAQS or more to the ozone at the NYMA receptors based on the 2008 NAAQS.[105] Thus, revising New York's modeling using the corrected ozone contribution metric demonstrates that New York's Petition fails Step Two, as nearly all the named sources are not linked (using a 1 percent threshold) to ozone issues in the NYMA.

Second, Ramboll conducted 2017 Sensitivity Modeling, using the same peer-reviewed modeling methods followed by EPA.[106] In contrast to New York's modeling, this 2017 Sensitivity Modeling meets EPA's data quality standards. Ramboll used modeling inputs and approaches that reflect EPA's regulations and guidance, which have been subjected to public notice and comment, and judicial review. This modeling shows that the named sources in seven states contribute less than 1 percent to ozone at all of the three NYMA receptors that are showing

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[102] EPA Modeling Guidance at 62.

[103] Additionally, New York assumes (i) a source or group of sources that contribute at least 1 percent of the relevant NAAQS is a sufficient contribution to "link" to a downwind receptor's attainment problems and (ii) that Section 126 authorizes a petitioner to arbitrarily set an emission level for an undifferentiated group of sources, rather than focus on a major source or a group of stationary sources. As detailed further below, ASC disagrees with those assumptions.

[104] Ramboll Technical Report at 34-44.

[105] *See* Ramboll Technical Report at 35-36.

[106] *See* Ramboll Technical Report at 37-41. Ramboll used the proper average contribution metric, correctly set the significance threshold set at 76 ppb (2008 standard) and 71 ppb (2015 standard) consistent with EPA regulations on defining NAAQS attainment, the 2017 source apportionment modeling approach used by EPA in CSAPR and the CSAPR Update, and an emissions inventory based on sources' up-to-date almost-actual emissions reported to EPA.

nonattainment with the 2008 ozone NAAQS, with only the combined named sources in Pennsylvania contributing above 1 ppb at a single NYMA receptor.[107]

Third, Ramboll assessed the contributions from the non-EGUs named in the NY Petition.[108] The Ramboll Non-EGU modeling recognizes that EGUs are already subject to the CSAPR Update NOx budgets and have implemented operational and technological controls to meet those requirements at the cost-effectiveness threshold set by EPA. Additionally, EPA's proposed determination that additional controls for EGUs are not needed to meet the named states' good neighbor obligations for the 2008 ozone NAAQS underscores that EGUs cannot be further controlled under Section 126.[109] Thus, Ramboll assessed the contributions from the non-EGU named sources. The results of the Ramboll Non-EGU modeling demonstrate that the named non-EGU sources in eight of the states identified by New York contribute less than 1 percent of the 2008 ozone NAAQS to receptors in the NYMA.[110]

Assuming New York has asserted a proper "group" of sources, an assertion ASC urges EPA to reject,[111] Ramboll's results suggest a single link to one monitor could remain under the NY Petition, but even this apparent link is not actionable. In all events, even for the potentially linked Pennsylvania sources, the NY Petition fails to meet the remaining steps of the Transport Framework as addressed in more detail below. Additionally, as discussed earlier in this response, New York must take other appropriate actions to address attainment measurements at this monitor, such as accounting for emissions resulting from international transport and exceptional events.

3. EPA should use a threshold for evaluating significant contribution claims in a Section 126 petition at a level above 1 percent of the NAAQS.

In evaluating the NY Petition, EPA should not apply a 1 percent concentration threshold to determine whether an upwind source or group of sources contributes sufficiently to downwind air quality problems to merit additional analysis under Section 126. Specifically, in determining the appropriate significant contribution screening threshold, EPA should (i) consider recent agency analyses of what emissions contribution is statistically significant and (ii) account fully for improving air quality and the increasing share presented by cross-border emissions and other background sources when determining whether a state is linked to downwind air quality issues.

Section 126 does not define the extent of upwind emissions required to determine that a source "emits or would emit" in violation of the good neighbor provision in Section 110, which prohibits a source from emitting in "amounts which will . . . contribute significantly to nonattainment" or "interfere with maintenance" of attainment in the downwind state.[112] Section

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[107] *See* Section I.C.3., *infra*.

[108] Ramboll Technical Report at 42.

[109] See *id.*

[110] Ramboll Technical Report at 42-43.

[111] *See* Section III, *infra*.

[112] 42 U.S.C. §§ 7410(a)(2)(D)(i)(I), 7426(b).

110 likewise does not define what it means to "contribute significantly" or "interfere" with downwind air quality.

In evaluating other Section 126 petitions, EPA has undertaken a two-tiered, source-specific analysis under Step Two to determine whether a major source or a group of stationary sources merits additional analysis for the extraordinary relief provided under Section 126. First, EPA evaluates current air quality modeling to assess whether the upwind state emissions exceeded a screening threshold as a way to preliminarily determine if there was a link between the upwind states and the downwind petitioner. Second, EPA evaluates an individual source's current or reasonably anticipated operating conditions and emissions levels to determine whether the source or group "emits or would emit" in violation of the good neighbor provision.

ASC supports this two-tiered approach, but urges EPA to assess how it sets the contribution significance screening threshold for determining if an upwind major source or a group of stationary sources contribute to downwind nonattainment issues. On prior occasions, EPA has chosen a 1 percent screening threshold, although EPA has flexibility to determine an appropriate Step Two screening threshold on a case-by-case basis.[113] Yet, if EPA were to always apply a 1 percent threshold as part of a Step Two evaluation, that would mean that, as EPA has adopted more stringent NAAQS levels, ever-smaller contributions from upwind states could be subject to increasingly costly regulation under the Section 126 process. Precedent, policy, and practicality support setting the contribution threshold at a higher level for the extraordinary relief demanded under Section 126.

For one, setting a threshold above 1 percent would be consistent with early agency practice in Section 126 proceedings. EPA denied a Section 126 petition where the named source was alleged to contribute 3 percent of the NAAQS toward the petitioning state's nonattainment,[114] as well as where the alleged nonattainment contributions from upwind sources were 20 percent of the ozone NAAQS.[115] In both instances, the courts of appeals upheld EPA's approach as fully within the Agency's discretion.

Applying a significant contribution threshold above 1 percent also would be consistent with the Administration's policy of seeking to reduce regulatory burdens that do not provide added benefits.[116] EPA is legally prohibited from controlling emissions in excess of the amounts constituting "significant contribution," and EPA must avoid a threshold set so low that wide swaths of the economy could be subject to requirements to shut down or install expensive control

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[113] *See* Peter Tsirigotis 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 at 2 (Aug. 31, 2018), https://www.epa.gov/sites/production/files/2018-09/documents/contrib_thresholds_transport_sip_subm_2015_ozone_memo_08_31_18.pdf ("August 2018 Tsirigotis Memo") (explaining that EPA can identify on a case-by-case basis an appropriate significance threshold specifically applicable to the NAAQS being considered)

[114] *Air Pollution Control District v. EPA*, 739 F.2d 1071 (6th Cir. 1984) (upholding EPA denial).

[115] *New York v. EPA*, 852 F.2d at 580-81 (upholding EPA denial).

[116] Executive Order 13771, "Reducing Regulation and Controlling Regulatory Costs" (Jan. 30, 2017); Executive Order 13777, "Enforcing the Regulatory Reform Agenda" (Feb. 24, 2017); Executive Order 13783, "Promoting Energy Independence and Economic Growth" (Mar. 28, 2017).

technologies without a downwind petitioner demonstrating a meaningful benefit to air quality. EPA should exercise its discretion to interpret "significant contribution" under a Section 126 petition to refer to one that is well above 1 percent.

ASC suggests two options for EPA to use in identifying the threshold that will trigger further analysis to determine whether significant contributions exist:

1. Threshold floor at or above statistical significance. EPA should consider setting a significance threshold floor consistent with its recent, related guidance.[117] In 2018 guidance, EPA set an ozone significant impact level (SIL) of 1 ppb to determine when a source has an insignificant (*de minimis*) contribution to the ozone NAAQS. EPA's assessment revealed that values below 1 ppb are not statistically significant.[118] Thus, at a minimum, EPA should not determine there is a link at Step Two unless EPA finds that there is a statistically significant contribution—which EPA's SIL analysis has found must be at least 1 ppb.[119]

2. Threshold for addressing controllable emissions. EPA should also consider basing its Step Two significance threshold for a Section 126 petition on the existing NAAQS—while focusing on the actual share of emissions from controllable domestic sources. The reason is straightforward. In recent years, EPA has reduced the ozone NAAQS standard, resulting in increased control of domestic sources of ozone-forming pollutants, such as NOx. At the same time, natural background ozone, ozone due to emissions from exceptional events, and ozone from international sources reflect an ever-increasing share of ozone levels that EPA has acknowledged "can substantially influence" monitored ozone concentrations.[120] The result is that the actual amount of controllable emissions—*i.e.*, emissions that are not due to background, exceptional events, or international sources—has decreased.

   If EPA uses a fixed percentage, the universe of potential targets for Section 126 petitions could increase with each successive reduction in the NAAQS, without considering the effect of cross-border emissions or other non-controllable sources. Changing how EPA defines what it means for an upwind state to "contribute significantly" under Section 126 to account for these realities would be a reasonable step for EPA to take.

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[117] Peter Tsirigotis Memorandum, Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program at 15-16 (Apr. 17, 2018), https://www.epa.gov/sites/production/files/2018-04/documents/sils_policy_guidance_document_final_signed_4-17-18.pdf ("SIL Guidance"); *see also* Ramboll Technical Report at 55.

[118] SIL Guidance at 12-13.

[119] *See* Ramboll Technical Report at 56. Using a 1 ppb threshold is also fully consistent with EPA's recent guidance indicating that 1 ppb is an appropriate significance threshold for states to evaluate contributions when preparing SIP submissions to address the 2015 ozone NAAQS. August 2018 Tsirigotis Memo at 2.

[120] National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292, 65,300 (Oct. 25, 2015) ("[O]bservational and modeling analyses have concluded that O_3 concentrations in some locations in the U.S. on some days can be substantially influenced by sources that cannot be addressed by domestic control measures.").

Hence, ASC suggests that EPA instead set the significant contribution threshold using the following formula:

$$Significant\ Contribution\ Threshold\ (ppb)\ = .01NAAQS\ (ppb) \times \frac{NAAQS\ (ppb)}{Controllable\ emissions\ (ppb)}$$

Where

$$Controllable\ emissions\ (ppb) = \ NAAQS\ (ppb) - background\ ozone\ concentration\ (ppb)$$

By accounting for the effect of both decreasing the NAAQS and for background levels, EPA can identify at Step Two whether a named major source or group of stationary sources merits the additional analysis of available cost-effective controls under Step Three of the Transport Framework. A petitioning state's air quality problems that are not significantly related to an upwind major source or a group of stationary sources does not merit controls under Section 126.

Applying this formula results in significant contribution thresholds calibrated for each receptor identified in the NY Petition.[121] These show that under each of the three modeling approaches implemented by Ramboll, only one potential link for the named sources in one state remains for further analysis with respect to the 2008 ozone NAAQS under Step Three. As discussed below, this potential link does not lead to a significant contribution finding under Step Three.

D. The NY Petition's requested relief is not highly cost-effective for the named sources (Step Three of the Transport Framework).

The NY Petition also fails to show that each named source or group of stationary sources could be further controlled through highly cost-effective controls as required under Step Three of the Transport Framework.[122] To satisfy Step Three, a petitioner must show the cost to implement a requested control strategy balanced against the amount of emission reductions available from that strategy (on a cost/ton basis) and the downwind reductions in ozone at identified receptors that would result. Integral to this assessment is taking into account a named source's existing and planned emission reduction efforts, as the statute looks to whether the source "emits" or "would emit" in violation of the good neighbor provision. The NY Petition does not, and cannot, establish that its requested form of relief is highly cost-effective under Step Three.

1. New York does not meet its burden to demonstrate that its requested relief is highly cost-effective for the named sources.

First, EPA should find New York has not satisfied Step Three because New York provides absolutely no analysis of whether its requested controls are highly cost-effective for any named source or group of sources. New York offers general assertions, but provides no

[121] *See* Ramboll Technical Report at Table 5-1.

[122] *See*, *e.g.*, CT Final Response, 83 Fed. Reg. at 16,070, DE & MD Denial at 44-45; CSAPR Update, 81 FR 74,504, 74,519 (Oct. 26, 2016).

technical basis for imposing a single RACT and short-term emissions averaging wholesale to 357 sources from different source categories and North American Industry Classification System (NAICS) classifications, with varying operational characteristics, and that are subject to nine different state regulatory regimes. Under EPA's regulations, RACT is by definition established for a particular source on a case-by-case basis, considering the technological and economic circumstances of that particular source.[123] The NY Petition offers no support to depart from this regulatory approach and instead promotes a one-size-fits-all framework for these diverse sources. On that basis alone, the NY Petition fails.

Second, and more specifically, nothing in the NY Petition supports New York's request that EPA impose a $5,000/ton NOx removal threshold on all sources. On a pure dollar comparison, that would be unprecedented as it is more than twice the cost per ton the Agency has imposed in its prior transport rules. For example, after detailed analyses, EPA set the cost effectiveness threshold at $2,000/ton under the NOx SIP Call, and at $1,400/ton under the 2016 CSAPR Update. New York offers no basis for departing from the range EPA has previously used. In addition to the high dollar amount, the NY Petition asks EPA to impose the same RACT cost/ton of NOx on all sectors. Even where EPA has imposed a nationwide cost/ton threshold, it has only done so for EGUs as a single category of sources, based on a comprehensive analysis of NOx controls available to EGUs. Yet, New York offers no technological and economic analysis and thus wholly fails to demonstrate why EPA should now impose a single value across various industries.

Third, New York has arbitrarily compiled a category of named sources on which it seeks short-term emissions averaging. New York does not explain how it is cost-effective to impose short-term emissions averaging on a named source that already has controls that would satisfy a $5,000/ton threshold, or on a named source that already has NOx emission rates of 0.15 lb/mmBtu. In fact, New York fails to even attempt to identify which named sources it believes should be subject to this second tier of emissions control. The NY Petition also fails to grapple with how short-term emissions averaging could be implemented or effected, considering necessary shutdowns for maintenance and the fact that New York itself does not impose such a requirement; indeed, New York's own RACT allows for site-wide emissions averaging.[124] It is already unclear how a $5,000/ton NOx threshold would address alleged contributions from some named sources. It is also unclear why New York equates a NOx emission rate of 0.15 lb/mmBtu with this dollar per ton threshold.

Indeed, New York offers no actual, hard data in support of its assumption that short-term emissions averaging would address alleged contributions from other named sources to address any alleged attainment issues. While New York has focused its attention on an arbitrary group of upwind states, the most cost-effective way to address any ozone issues in New York may be to look at the contributions from sources in New York. As EPA has already found, high ozone

[123] 40 C.F.R. § 51.100(o); *e.g.*, Anna Marie Wood, OAQPS, Memorandum on Implementing Reasonably Available Control Technology Requirements for Sources Covered by the 2016 Control Techniques Guidelines for the Oil & Gas Industry at 2 (Oct. 20, 2016).

[124] *See* Ramboll RACT Analysis at 4.

days in eastern states like New York occur on the hottest day of summer, when power demand peaks.[125]

In sum, the NY Petition leaves EPA with no reliable information in support of imposing the controls New York requests. EPA should not adopt New York's arbitrary and unprecedented approach for imposing emissions controls.

2. The NY Petition fails Step Three for several additional reasons.

Beyond New York's own failure to meet its burden, there are ample additional reasons for EPA to find the NY Petition fails to meet Step Three of EPA's Transport Framework. We discuss seven such reasons below:

First, recent EPA action already has provided New York the relief it requested, and thus EPA need not further analyze the NY Petition to deny it. New York explained it is petitioning for relief because the named states' transport obligations remained to be addressed with respect to the 2008 ozone NAAQS.[126] That is no longer the case. EPA recently further analyzed these states' good neighbor obligations in light of updated data and determined that these states have fully satisfied their good neighbor obligations with respect to the 2008 ozone NAAQS;[127] thus, the predicate for New York's Section 126 petition no longer exists. EPA has also approved the revised Kentucky SIP to address its good neighbor obligations,[128] assessed the transport obligations at issue in the Maryland and Delaware Section 126 petitions,[129] and continues to update its modeling of compliance with the 2008 and 2015 ozone NAAQS.[130] Moreover, as discussed above, EPA is actively addressing states' obligations with respect to the 2015 ozone NAAQS through the SIP process. Thus, EPA has already analyzed whether and how to require highly cost-effective technologies in these states for the 2008 ozone NAAQS, and the Agency is actively engaged in the statutory process for evaluating emissions controls to satisfy a state's obligations under the 2015 ozone NAAQS. There is simply no need to repeat these analyses under a separate Section 126 petition.

Second, EPA should not permit New York to use Section 126 as an alternative tool to expand the OTR. New York is essentially requesting that EPA impose New York's view of RACT on six other states (Maryland, Pennsylvania, and Virginia are OTR members) and that those other states also be subject to the OTR requirement that RACT be applied statewide. The OTR is limited to a group of 13 states, and New York cannot expand the OTR through Section 126 where it tried and failed to do so through another petition to EPA – New York's petition to EPA under Section 176A of the Clean Air Act.[131] Congress provided in Section 176A the

[125] CSAPR Update, 81 Fed. Reg. at 74,523.

[126] NY Petition at 6.

[127] *See generally* CSAPR Close-Out Proposal at 31,915; Page Memorandum at 1.

[128] 83 Fed. Reg. 33,730.

[129] DE & MD Denial, *supra* n. 27.

[130] *See e.g.*, Page Memorandum at 6-7.

[131] 82 Fed. Reg. 51,238 (Nov. 3, 2017).

avenue through which a state can petition EPA to add or remove a state or portion of a state to the OTR. *See* 42 U.S.C. § 7506a. New York effectively seeks a second bite at that already-denied apple. In denying New York's petition to expand the OTR, EPA explained:

> In light of existing control requirements both within and outside the OTR, the agency's ongoing implementation of the "good neighbor" provision (CAA section 110(a)(2)(D)(i)(I)) through updates to the Cross State Air Pollution Rule (CSAPR), and the emission reductions achieved pursuant to federal and state programs promulgated pursuant to these and other CAA authorities, which have improved, and will continue to improve, air quality in the OTR and throughout the United States (U.S.), the EPA denies the section 176A petition to add states to the OTR for the purpose of addressing interstate transport of the 2008 ozone NAAQS.[132]

This rationale held true for EPA's decision that the OTR should not be expanded, and it holds true here.

Third, the Act does not authorize New York's attempt to impose its RACT standards on 357 sources in nine states. Nothing in Section 126 authorizes New York's law to be imposed upon another state—and New York proffers no statutory basis for doing so. On the contrary, RACT is a state-by-state, case-by-case determination.[133] Thus, a RACT set at $5,000/ton of NOx removed in one state is not necessarily RACT for a disparate set of sources in another state, and imposing such a standard would interfere with that state's own determination of RACT. States design their RACT to incorporate various factors that are not interchangeable with other states' RACT. ASC provides in the attached RACT analysis from Ramboll a state-by-state comparison of the considerations undertaken at the named states and New York.[134] The table illustrates how New York's requested relief grossly oversimplifies the considerations necessary to address emissions within each state. EPA must base its decision in response to a Section 126 petition on relevant factors and a robust analysis, which New York has not provided.

Fourth, EPA has already evaluated the control technologies available to EGUs and non-EGUs in finalizing the CSAPR Update.[135] There, EPA concluded that NOx emission allowance trading was the most highly cost-effective control technology for addressing NOx emissions from EGUs.[136] Additionally, EPA's most recent analysis demonstrates that these existing trading programs would fully satisfy the states' good neighbor obligations because they would

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[132] 82 Fed. Reg. at 51,239.

[133] Ramboll RACT Analysis at 3.

[134] Ramboll RACT Analysis, Table 1.

[135] EPA, Final Technical Support Document for the Cross-State Air Pollution Rule for the 2008 Ozone NAAQS, Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD (Aug. 2016), https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2018-0225-0009&contentType=pdf ("Non-EGU TSD").

[136] CSAPR Update at 31,937.

result in no nonattainment or maintenance problems in downwind states.[137] EPA also explicitly assessed in the CSAPR Update whether it should impose controls on non-EGUs. EPA estimated the emission reductions and costs associated with future year control strategies, and then generated emission inventories that result from the control strategies.[138] EPA recognized that its modeling could not account for corrections for inapplicable controls, sources already controlled by state rules, sources with permit emission limits, sources that have controls in place, and sources subject to future NOx emission limits.[139] EPA there determined that it could not identify with certainty any meaningful, cost-effective control technologies applicable to non-EGUs that would address states' good neighbor obligations.[140]

Fifth, due to existing federal and state regulations, operating permits, consent decrees, and voluntary capital investments, the named sources likely already actively implement highly cost-effective controls. ASC has not itself collected data from every source covered by the NY Petition—that is New York's burden of proof. However, consistent with the results of EPA's analyses and other modeling, there is ample information for EPA to deny the NY Petition.

- *Federal regulatory programs*: Many of the named sources have either implemented the best available control technology ("BACT") determined for their specific facilities under EPA's PSD program or the lowest achievable emission rate ("LAER") as required under EPA's nonattainment NSR program.[141] Additionally, sources subject to regulation under EPA's regional haze program must implement Best Available Retrofit Technology ("BART").[142] Each of these regulatory programs requires emissions controls that are equal to or more stringent than a state's RACT requirements.[143]

- *State and regional regulatory requirements*: At the regional and state level, as Ramboll has summarized, the named sources are each subject to their respective state's RACT requirements.[144] For example, named sources in Ohio are subject to Ohio's presumptive RACT level of $5,000/ton of NOx removed if in a nonattainment area. Importantly, in Pennsylvania, any named sources must have demonstrated compliance with the updated statewide RACT measures as of January 1, 2017.[145] This requirement applies to sources across the state, because

[137] Page Memorandum at 1.

[138] Non-EGU TSD at 8.

[139] Non-EGU TSD at 8.

[140] *See* CSAPR Update at 74,508; *see also* CSAPR Close-Out Proposal at 31,931 (significant uncertainty that any meaningful NOx control technologies for non-EGUs could be implemented before 2023).

[141] EPA, Prevention of Significant Deterioration Basic Information, https://www.epa.gov/nsr/prevention-significant-deterioration-basic-information (describing BACT); EPA, Nonattainment NSR Basic Information, https://www.epa.gov/nsr/nonattainment-nsr-basic-information (describing LAER requirements).

[142] *See, e.g.*, Illinois Regional Haze SIP Approval, 82 Fed. Reg. 48,431. 48,432 (Oct. 18, 2017) (describing NOx controls required of EGUs and refineries, including named sources).

[143] *See Utility Air Reg. Grp. v. EPA*, 885 F.3d 714 (D.C. Cir. 2018) (upholding EPA determination that CSAPR trading system created NOx emission controls that are "better-than-BART").

[144] *See* Ramboll RACT Analysis, Table 1.

[145] *See* Section I.D.3., *infra.*

Pennsylvania is already in the OTR.[146] Hence, in Pennsylvania, these are new requirements from 2017 that are not factored into New York's petition, which principally relies on projections of 2017 emissions using 2011 data. New York has not shown that these or any other existing RACT regulations in the relevant states will be insufficient, which is its burden as the petitioner. Take the cement industry, as just one example. As a result of permitting actions or regulatory requirements, approximately 67 percent of the active cement kilns in the United States have been equipped with SNCR,[147] resulting in reductions of NOx emissions at some sources of up to 90 percent.[148]

- *Consent decrees*: Further, named sources have undertaken NOx emission reduction investments as part of consent decrees. For example, 13 portland cement manufacturing plants, four of which are located in the states identified in the NY Petition, implemented NOx controls on certain cement kilns and/or shut down several others as part of a consent decree with EPA and several states.[149] New York was a signatory to this consent decree, in which it also agreed that additional controls were not needed on top of existing BACT determinations. The named sources worked with EPA, New York, and others to design the consent decree to lead to a reduction of over 9,900 tons of NOx.[150] Further, EPA entered into agreements with 112 refineries in the United States under the national Petroleum Refinery Initiative. Under these agreements, refineries invested more than $7 billion in control technologies that address NOx and other emissions.[151] These agreements led to annual emissions reductions of 95,000 tons of NOx, resulting in a 75 percent decrease in NOx emissions from the refineries.[152] In just one example, an ASC member operates four refineries in states named in the NY Petition. Through a combination of voluntary NOx control projects and NOx control projects completed under a Petroleum Refinery Initiative consent decree, between 2000 and 2017 annual NOx emissions from these four refineries decreased by a combined 6,695 tons, representing a NOx emissions decrease of 68 percent over this period.[153] In another example, an ASC member upgraded its Hagerstown, Maryland facility to convert its long dry kiln to a preheater/precalciner kiln as part

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[146] *See* Ramboll RACT Analysis at 4-5.

[147] EPA, Air Pollution & Control Cost Manual ("Control Cost Manual"), Section 4 – NOx Controls, Chapter 1 – SNCR Response to Comments Document at 15, https://www3.epa.gov/ttn/ecas/docs/SNCR_CostManual_7thEd_RTC.pdf ("Control Cost Manual – SNCR RTC").

[148] Control Cost Manual, Section 4 – NOx Controls, Chapter 1 – Selective Noncatalytic Reduction at 1-4 (Dec. 8, 2017), https://www.epa.gov/sites/production/files/2017-12/documents/sncrcostmanualchapter7thedition20162017revisions.pdf ("Control Cost Manual – SNCR").

[149] Consent Decree, *United States v. LaFarge N. Am., Inc., et al.*, Docket 3:10-cv-00044, ECF No. 45 (D. Ill. Mar. 18, 2010), https://www.epa.gov/sites/production/files/documents/lafarge-cd.pdf.

[150] *See* EPA, Lafarge North America, Inc. Clean Air Act Settlement, Pollution Reductions, https://www.epa.gov/enforcement/lafarge-north-america-inc-clean-air-act-settlement#pollutant (Jan. 21, 2010).

[151] *See* EPA, Petroleum Refinery National Case Results, https://www.epa.gov/enforcement/petroleum-refinery-national-case-results.

[152] *See id.*

[153] *See, e.g.*, Consent Decree, First Amendment, *United States v. Marathon Petroleum Company LP et al.*, No. 2:12-cv-11544 (E.D. Mich. Sept. 15, 2016); First Revised Consent Decree, *United States v. Marathon Ashland Petroleum, LLC*, No. 4:01-CV-40119 (S.D. Mich. Nov. 17, 2005).

of compliance with a consent decree.[154] This resulted in 2017 annual NOx emissions of 379 tpy (less than a quarter of the 1522 tpy New York assumed for the facility in its Petition).[155]

- *Voluntary measures*: Named sources have also undertaken significant voluntary capital investments resulting in drastically reduced NOx emissions. In Indiana, for example, SABIC invested $216 million to complete construction and place into service a natural gas-fired cogeneration unit, and by 2017 permanently shut down three 249 mmBtu/hr coal-fired boilers to generate steam.[156] The implementation of this project accounts for the majority of the difference in the 2017 NOx emissions values between the petition level (1,690.3 tons) and the level of actual emissions reported to the State of Indiana earlier this year (464 tons). By relying principally on 2011 data to project 2017 emissions, the NY Petition does not consider these types of investments.

Sixth, the control technologies that the NY Petition suggests be imposed—SCR and SNCR—have not been proven to be highly cost-effective across the universe of diverse named sources. SCR has primarily been used for utility boilers, but its application is much more limited for other source types.[157] SCR effectiveness depends on reaching the needed catalyst temperature and residence time.[158] Thus, due to the nature of the flue gas path, package boilers typically do not have a suitable location in the proper temperature range for a catalyst and ammonia injection.[159] SCR is not feasible at most cement kilns due to their high exhaust gas exit temperatures and very high dust loading that clogs the catalyst.[160] Additionally, other site-specific factors such as facility design and site-specific raw material chemistry, especially the presence of pyritic sulfur which renders low temperature SCR inoperable, reduces NOx control efficiencies at cement kilns.[161] Units such as chemical recovery furnaces, biomass boilers, and other boilers that have high sodium, potassium, phosphorous, or calcium content in fly ash render catalysts ineffective.[162] Industrial boilers experience frequent and dramatic load swings, causing temperature fluctuations along the flue gas path, which means that an SCR cannot be properly located to consistently be effective in reducing emissions.[163]

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[154] *See* Consent Decree, *United States v. Holcim (US) Inc. et al.*, No. 1:11-cv-01119 (D. Md. July 11, 2013).

[155] *See* NY Petition at Appendix B.

[156] *See* Jamie Grabert, "SABIC celebrates CoGen completion," Mount Vernon Democrat (May 2, 2017, 10:45AM), https://www.mvdemocrat.com/content/sabic-celebrates-cogen-completion.

[157] Control Cost Manual, Section 4 – NOx Controls, Chapter 2 – SCR Response to Comments Document at 9, https://www3.epa.gov/ttn/ecas/docs/SCR_CostManual_7thEd_RTC.pdf ("Control Cost Manual – SCR RTC").

[158] Control Cost Manual – SCR RTC at 5.

[159] Control Cost Manual – SCR RTC at 9.

[160] Control Cost Manual – SCR RTC at 9-11.

[161] Control Cost Manual – SCR RTC at 9-11.

[162] Control Cost Manual – SCR RTC at 9.

[163] Control Cost Manual – SCR RTC at 9.

Similarly, SNCR is only effective in a narrow range of high temperatures, depending on boiler design and operating conditions, and therefore is not suitable for all applications.[164] Many types of industrial process heaters cannot accommodate SNCR due to the lack of suitable temperate zone for reagent injection and fluctuating operation.[165] For cement kilns, while many sources have installed SNCR, kiln type, design, and operating conditions impact the degree and difficulty (and cost-effectiveness) of installing and implementing SNCR injection systems.[166] Moreover, independent studies identified no additional highly cost-effective controls for petroleum refineries, and noted that petroleum refineries' NOx emissions are already controlled through consent decrees.[167] The studies also concluded that additional controls are inappropriate and are not cost-effective for non-EGU sources where a permit, state regulation, or consent decree already requires a source to control NOx emissions.[168]

Seventh, the NY Petition's request for short-term averaging is likewise unsupported. New York suggests short-term averaging is needed because the named sources are turning off control technologies and buying allowances, but it has not documented this assertion across the 357 sources named in the petition. That certainly is not the case in Pennsylvania. There, a regulated entity cannot buy NOx emission reduction credits to comply with RACT and cannot generate such credits by complying with RACT unless the reductions are generated from that source's over-control of NOx or VOC emissions.[169] Moreover, as EPA has explained, its seasonal approach to addressing NOx emissions remains effective, and the seasonal approach is consistent with its past transport regulations.[170] There is simply no indication that short-term averaging is a highly cost-effective control to impose on the named sources, thus EPA must deny this request.

3. Pennsylvania does not contribute significantly to New York air quality problems.

As noted above, named sources in Pennsylvania are the only ones where additional analysis under Step Three is potentially warranted. However, Pennsylvania has already implemented a rigorous RACT program calibrated to address emissions from stationary sources

[164] Control Cost Manual – SNCR at 1-7–1-8.

[165] Control Cost Manual – SNCR RTC at 9.

[166] Control Cost Manual – SNCR at 1-7–1-8.

[167] Non-EGU TSD at Appendix B, 4.

[168] *See* Non-EGU TSD at Appendix B, 2-4. EPA noted that even these studies were limited in that they failed to account for recent emission control regulations, such as Pennsylvania's RACT regulations. *Id.* at 8-9.

[169] Penn. Dep't of Envtl. Protection, Air Quality Permit Information, Responses to Frequently Asked Questions on RACT II Implementation at 2 (Oct. 20, 2016) http://files.dep.state.pa.us/Air/AirQuality/AQPortalFiles/Permits/RACT/RACT%20Final%20FAQ%2010-20-2016.docx.

[170] CSAPR Update at 74,523.

in the state, beyond those just named in the NY Petition ("RACT II").[171] New York has identified no highly cost-effective controls that Pennsylvania's RACT II determinations failed to address, and thus, the NY Petition fails to meet its burden under Step Three to demonstrate that highly cost-effective controls could be implemented to address emission contributions above the significance threshold.

Pennsylvania's RACT II illustrates the comprehensive regulations that the state already has in place to address its sources' NOx emissions. Pennsylvania requires that all sources, regardless of whether the source is located in an attainment or nonattainment area, comply with RACT II. Pennsylvania has determined to set emissions limitations based on assessment of various unit types, size, and geographic location.[172] Additionally, Pennsylvania RACT sets mass-based limits as opposed to concentration limits.[173] The RACT II final-form regulation includes three compliance options: (1) compliance with presumptive RACT requirements and/or emission limitations[174]; (2) facility-wide or system-wide averaging for compliance with presumptive NOx emission limitations; and (3) RACT requirements determined on a case-by-case basis and approved by EPA for sources that either do not have an applicable presumptive requirement or emission limitation or cannot comply with the applicable presumptive RACT requirement.[175]

This state-specific set of requirements calibrated based on numerous factors and with a federal approval component cannot be arbitrarily replaced with New York's preferred one-size-fits-all approach to emissions controls. New York has failed to demonstrate that the named sources in Pennsylvania contribute emissions that could be further controlled through highly cost-effective controls as required by Step Three.

E. EPA cannot impose controls on the named sources (Step Four of the Transport Framework).

As detailed, New York fails to identify any source or group of sources in a state that contributes emissions that are above the significance threshold to downwind nonattainment or maintenance receptors (Steps One and Two) and that could be further controlled through highly cost-effective controls (Step Three). Thus, New York has failed to demonstrate that any of the named sources contributes significantly in violation of the good neighbor provision as required by Section 126, and EPA has no basis to impose controls on the named sources under Step Four. EPA must deny the NY Petition.

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[171] *See* 46 Pa. B. 2036, 25 Pa. Code Chapters 121 & 129; 83 Fed. Reg. 11,155 (Mar. 14, 2018) (EPA Proposed Approval of PA SIP, which includes PA RACT II); *see also* Penn. Dep't of Envtl. Protection, Additional RACT Requirements for Major Sources of NOx and VOCs, Fact Sheet (June 20, 2016) http://files.dep.state.pa.us/RegionalResources/NWRO/documents/RACT_II_FinalFactSheet_6_20_2016.pdf ("RACT II Fact Sheet").

[172] Ramboll RACT Analysis at 4.

[173] Ramboll RACT Analysis at 4.

[174] *See* Ramboll RACT Analysis, Table 1.

[175] *See* RACT II Fact Sheet at 2.

II. EPA Should Deny the NY Petition With Respect to the 2015 Ozone NAAQS.

EPA should also deny the NY Petition with respect to the 2015 ozone NAAQS. The upwind states and EPA are still actively engaged in the 2015 NAAQS implementation process; EPA only recently made attainment designations and the state SIPs are not yet due. Until the upwind states have had a meaningful opportunity to prepare their good neighbor SIP revisions and comply with the 2015 standards, EPA should find there is no "violation" actionable under Section 126 of the Act. As such, EPA should reject a downwind state's request for a remedy under Section 126 as premature. Regardless, New York has failed to meet its burden to establish a claim for relief under Section 126 with regard to the 2015 standard.

As outlined, the Clean Air Act provides that a state may petition EPA under Section 126 to find a source or group of sources "emits or would emit … in *violation* of the prohibition" of Section 110(a)(2)(D)(i).[176] Thus, "a condition precedent for action under CAA Section 126(b)" is a violation of Section 110(a)(2)(D) requirements.[177] Moreover, courts agree that these two provisions must work together—for a petitioner to have an actionable Section 126 petition, there must be a violation of the good neighbor SIP requirements in Section 110.[178]

The Clean Air Act does not, however, define what is meant by a "violation of the prohibition" of Section 110(a)(2)(D)(i) that is actionable under Section 126, and leaves ambiguous how Congress intended these sections to work together under the Act.[179] As such, EPA has room to interpret these provisions consistent with the Act and the principles of cooperative federalism that are central to the Clean Air Act. Based on those principles, because Section 110(a)(2)(D) requires a SIP to "contain adequate provisions prohibiting" interstate emissions, EPA should read the "prohibition" of Section 110(a)(2)(D)(i) in Section 126 to refer only to restrictions upon emissions incorporated into state or federal implementation plans prepared pursuant to Section 110(a)(2)(D). This is because the obligation to address interstate emissions under § 110(a)(2)(D) only arises out of each state's responsibility to prepare a SIP under Section 110(a)(1). There, Congress required that a state "shall, after reasonable notice and public hearings, adopt and submit to the Administrator, within 3 years (or such shorter period as the Administrator may prescribe)" after EPA promulgates a NAAQS standard "a plan which provides for implementation, maintenance, and enforcement" for that standard.[180] "Each such plan shall" include several elements,[181] one of which is to have in place a SIP with "adequate provisions prohibiting" any of its sources "from emitting any air pollutant in amounts that will contribute significantly to nonattainment … or interfere with maintenance" by another state.

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[176] 42 U.S.C. § 7426(b) (emphasis added).

[177] CT Denial at 16,074-75; DE & MD Denial at 33-34.

[178] *See Appalachian*, 249 F.3d at 1049-50 ("Congress clearly hinged the meaning of § 126 on that of Section 110(a)(2)(D)(i).")

[179] 64 Fed. Reg. 28,250, 28,272 (May 25, 1999) ("it is not clear how Congress intended sections 110(a)(2)(D)(i) and 126 to work together under the CAA").

[180] 42 U.S.C. § 7410(a)(1).

[181] 42 U.S.C. § 7410(a)(2).

Once a state submits a plan, Congress established a timeline for EPA to assess whether the submission is complete and sufficient.[182]

Given that framework, EPA should find the NY Petition premature, as states are not in "violation" of Section 110(a)(2)(D)(i) for the 2015 ozone NAAQS. EPA did not finalize the attainment designations for the 2015 ozone NAAQS until November 16, 2017 and June 4, 2018. Thus, states are now engaged in their authorized process of developing SIP revisions to address these designations, with the initial due date of October 1, 2018 for submitting proposed SIP revisions addressing their good neighbor obligations.[183] Hence, a state cannot be in "violation" of a requirement to provide a plan to address interstate transport before the deadline for submitting the plan. Even at that point, the Clean Air Act provided an additional review process for EPA to determine if the state SIPs are complete and sufficient to address upwind contributions, if any, that may interfere significantly with downwind attainment. As this statutory process is still being "actively followed" for the 2015 ozone NAAQS,[184] and the deadlines for submitting and reviewing good neighbor SIP provisions have not yet passed, the NY Petition skips far ahead of this statutory process and is thus premature. Nothing in Section 126 commands such premature action.

At a minimum, interpreting CAA Sections 110 and 126 to allow EPA to consider the status of the 2015 ozone SIP process is not foreclosed by previous court rulings interpreting the interplay between Section 110 and 126.[185] In *Appalachian Power*, which concerned the NOx SIP Call, EPA had interpreted the Act to allow it to grant a 126 petition after EPA had found the state SIPs were inadequate and after the court had delayed the deadline for the SIP Call. The D.C. Circuit deferred to EPA's interpretation of the Act in that context, but expressly noted it was not asked to decide whether a proceeding without an inadequate SIP was actionable under Section 126.[186] Likewise, in *GenOn REMA*, the court did not compel EPA to grant a 126 petition, but only held that EPA cannot refuse to take action on a pending Section 126 petition solely because there is a relevant SIP proposal pending.[187] Indeed, if EPA were to grant a petition without considering the ongoing SIP process, it would risk imposing additional

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[182] *E.g.*, 42 U.S.C. § 7410(c), (k).

[183] Peter Tsirigotis Memorandum, 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) at 2 (Mar. 27, 2018), https://www.epa.gov/sites/production/files/2018-03/documents/transport_memo_03_27_18_1.pdf ("March 2018 Tsirigotis Memo").

[184] *Cf. Connecticut v. EPA*, 656 F.2d 902 (2d Cir. 1981) ("§ 126(b) appears to have been primarily designed as a means for resolving interstate pollution disputes in situations where an [sic] SIP is not being revised").

[185] *See GenOn REMA, LLC v. EPA*, 722 F.3d 513, 520-21 (3d Cir. 2013); *Appalachian Power Co. v. EPA*, 249 F.3d 1031 (D.C. Cir. 2001).

[186] 245 F.3d at 1045, n.4.

[187] *See GenOn REMA, LLC*, 722 F.3d at 520-21 (statute "unambiguously allows," but does not require, EPA to make Section 126 findings independently of the Section 110 SIP process); *see also Appalachian* 249 F.3d at 1047 (in *Chevron* Step Two analysis, upholding EPA interpretation as reasonable because "timetable of the NOx SIP Call" could not "suspend the §126 process" in light of § 126 timetable for taking action on a petition and, for petitions where EPA does find significant contribution, relief is not subject to State input and is subject to statutory timeframe).

requirements that would "over-control" emissions, contrary to the more recent direction from the Supreme Court.[188] Here, SIP submissions to address emissions that may impact downwind ozone formation are imminent. EPA should consider the current status of that process and deny the NY Petition as premature.

In all events, New York's claims regarding the 2015 ozone standard should be rejected because based on the Petition, EPA cannot at this point make a determination regarding whether a source or group of sources in an upwind state has made a "significant contribution" to alleged nonattainment issues with the 2015 NAAQS in New York. As discussed, EPA evaluates whether a source or group of sources make a "significant contribution" through its four-step Transport Framework. Yet, for the 2015 ozone NAAQS, only Step One—the recent attainment designations—has been met. The remaining steps have not.

Specifically, as detailed, Step Two requires modeling to show the amount of emissions that the source or group of sources emit or would emit that contribute to attainment problems. Yet, that has not been established. New York has asserted conclusions based on modeling that it has not provided to EPA. Having not provided EPA with the basis for its claim, as with the 2008 NAAQS, EPA should reject the Petition with respect to the 2015 standard for that basis alone. Further, as explained, New York's modeling is distorted and deeply flawed, and as such, it cannot be relied upon by the Agency. Moreover, regardless, New York's modeling is founded on assumptions relevant for the 2008 ozone NAAQS, not the 2015 standard. As EPA explained in March 2018, different modeling assumptions—including a different model, different ozone contribution metric, and a different significance threshold—could apply to the 2015 ozone NAAQS.[189] Therefore, New York's modeling cannot satisfy Step Two for the 2015 ozone NAAQS.

Next, under Step Three, New York must establish that there are highly cost-effective controls to address alleged attainment issues to identify which contributions are "significant." However, just as for the 2008 ozone NAAQS, New York has not provided any information on whether there are highly cost-effective control measures to address any alleged links between the claimed nonattainment issues and the identified sources, as required under Step Three.

III. The NY Petition Fails to Identify a "Group" of Stationary Sources as Properly Understood Under CAA Section 126.

Lastly, ASC also urges EPA to reject New York's petition because it has not identified a "group of stationary sources" properly subject to a Section 126 petition. As detailed, the NY Petition names over 350 sources from across multiple industry sectors with a diverse array of sources producing NOx and VOC emissions. However, Congress limited Section 126 petitions to an individual major source or a "group of stationary sources" that "emits or would emit" in

[188] *EME Homer City*, 134 S. Ct. at 1608-09.

[189] *See* March 2018 Tsirigotis Memo at 6-7, A-2; *see* 42 U.S.C. § 7410(a)(1), (a)(2), (b).

violation of the good neighbor provision.[190] Congress did not contemplate that the *ad hoc* collection of diverse sources in New York's petition would be subject to Section 126.

Congress used the term "group" of stationary sources, not just "stationary sources" or "sources." Hence, the term "group" must be given some meaning to define the scope of Section 126 petitions. Otherwise, "group" would be read out of the statute, contrary to basic principles of statutory construction. Without some limiting scope, a petitioning state could identify any sources in various upwind states to claim "significant contribution" meriting direct federal regulation. This would run afoul of the Supreme Court's admonition to EPA against discovering in a long-extant statute power to regulate wide swaths of the economy.[191]

While the CAA does not define a "group of stationary sources" in Section 126, there are common definitions that suggest a "group" would mean an assembly of related sources that have a "unifying relationship."[192] The D.C. Circuit has likewise recognized that Congress added the phrase group of stationary sources "in order to regulate facilities in upwind states as a class or category."[193] By contrast, the NY Petition cobbles together sources across different industries with no single unifying class or category of sources presented. Rather, it apparently solely identified named sources based on the fact that the source allegedly emitted at least 400 tons of NOx per year according to certain emission projections. EPA should not follow this arbitrary approach.

First, New York's use of the 400-tpy descriptor does not actually describe the named sources. The NY Petition itself shows that not all the named sources reflect emissions of at least 400 tpy.[194] Moreover, New York switches from using one set of emissions projections—the 2017 Beta 2 projection inventory, based off of seven-year old data (the 2011 NEI)—to a different set of now-four-years-old emissions data—the 2014 NEI—without providing any reasoned, documented justification for using these different data sets. Thus, even New York's identifying characteristic is not the same for all of the sources.

Second, there is no legal or technical significance to New York's asserted 400-tpy metric. New York assumes its conclusion in selecting these sources: "These high-emitting facilities are expected to have the greatest impact."[195] Following this logic, a state could choose to target sources that emit at even lower levels, and explain that controlling more sources at lower levels will likewise have a high impact. EPA should not allow petitioners to rely on this type of circular logic to support a Section 126 petition.

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[190] 42 U.S.C. § 7426(b) (emphases added).

[191] *See UARG v. EPA*, 134 S. Ct. 2427, 2444 (2014).

[192] *Group*, Merriam-Webster (Online Ed.) (a "group" is commonly understood to be "a number of . . . things that are located close together or are considered or classed together.").

[193] *Appalachian*, 249 F.3d at 1057.

[194] NY Petition, Appendix B.

[195] NY Petition at 10.

Third, the named sources do not share an industry segment or source category, as has been the case in prior Section 126 petitions that target more than one source. New York categorizes the named sources as EGUs and non-EGUs in its petition, but this is for narrative purposes only and is not reflected in its modeling or supported by any material analysis in the remedy it asserts that it is seeking.[196]

Hence, New York fails to establish a "group" of stationary sources is significantly contributing. Instead, New York asks EPA to impose emissions limitations on various targets across nine states selected by New York. This is not what Section 126 is for, and this abuse of the petition provision flouts the plain language of the statute that directs states to limit petitions to a major source or "group of stationary sources." EPA must deny the NY Petition.

CONCLUSION

For these reasons, EPA should deny the NY Petition.

[196] *See* NY Petition, Appendix B.

ATTACHMENT A

September 2018

ANALYSIS OF THE TECHNICAL BASIS FOR THE NEW YORK SECTION 126 PETITION

RAMBOLL

ANALYSIS OF THE TECHNICAL BASIS FOR THE NEW YORK SECTION 126 PETITION

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1. INTRODUCTION

On March 12, 2018, the State of New York (NY) submitted a petition under Section 126 of the Clean Air Act (NY Petition[1]) to the U.S. Environmental Protection Agency (EPA) alleging that NOx emissions from over 350 stationary sources in 9 upwind States (the Named Sources) interfere with New York's attainment or maintenance of the 2008 and 2015 National Ambient Air Quality Standards (NAAQS) for ozone (0.075 ppm and 0.070 ppm, respectively). The NY Petition is requesting that these Named Sources install the equivalent of NY's Reasonable Available Control Technology (RACT) NOx emissions control that are control technologies that can be achieved up to $5,000 per ton of NOx emissions removed. The over 350 Named Sources in the NY Petition include Electrical Generating Units (EGUs), oil and gas (Oil&Gas) sources and industrial facilities that are not EGUs (nonEGU) in Illinois, Indiana, Kentucky, Maryland, Michigan, Ohio, Pennsylvania, Virginia and West Virginia (the 9 upwind States).

1.1 Purpose

The Air Stewardship Coalition (ASC) is an organization of trade organizations and companies that its members formed to address the NY Petition, including to provide technical and legal comments to EPA on the Petition. ASC has contracted with Sidley Austin LLP to develop comments on the NY Petition who in turn have retained Ramboll to evaluate the technical basis of the NY Petition.

1.2 Section 126 Petition Requirements and Objectives

The NY Petition is requesting EPA to impose NOx emission controls under CAA Section 126(b). Section 126(b) authorizes states or political subdivision to petition the EPA Administrator to require emission controls on a specific major source or group of stationary sources who *"emits or would emit any air pollution in violation of the prohibition of section 7410(a)(2)(D)(i)"* of section 110 of the CAA. Section 7410(a)(2)(D)(i) is part of the good neighbor provision of the CAA, that prohibits a stationary source in an upwind State *"from emitting any air pollutant in amounts which will contribute significantly to or interfere with maintenance by"* a downwind State with a primary or secondary NAAQS. EPA has developed a Four Step Transport Framework for identifying when an upwind State has a significant contribution to nonattainment in a downwind State for addressing the good neighbor provision that is also applicable to evaluating the validity of a Section 126 Petition.

1.3 EPA Four Step Transport Framework

The EPA Four Step Transport Framework has been used by EPA in the latest section 7410(a)(2)(D)(i)(I) good neighbor provision transport rulemakings to reduce the contributions of transport to downwind nonattainment/maintenance by controlling emissions in upwind States. EPA has released several rules to address ozone transport under the good neighbor provision over the last two decades:

- 1998 NOx SIP Call to address nonattainment of the 1979 1-hour ozone NAAQS.[2]

[1] NY Department of Environmental Conservation, 2018. New York State Petition for a Finding Pursuant to Clean Air Act Section 126(b). https://www.dec.ny.gov/docs/air_pdf/sips126petition.pdf (NY Petition).

[2] https://www.gpo.gov/fdsys/pkg/FR-1998-10-27/pdf/98-26773.pdf

- 2005 Clean Air Interstate Rule (CAIR) to address nonattainment of the 1997 $PM_{2.5}$ and ozone NAAQS.[3]
- 2011 Cross State Air Pollution Rule (CSAPR) to address the 1997 $PM_{2.5}$ and ozone and 2006 $PM_{2.5}$ NAAQS.[4]
- 2016 CSAPR Update to address the 2008 ozone NAAQS.[5]

Most recently, EPA published a proposed rule on July 10, 2018 (the so-called CSAPR Close-Out[6]), whose comment period ends August 31, 2018, that uses the Four Step Transport Framework to determine that the 2016 CSAPR Update rule satisfies the good neighbor SIP requirements for certain states under the 2008 ozone NAAQS.

The NY Petition used a 2011 photochemical grid model (PGM) modeling platform and projected 2017 emissions to allege that the Named Sources in each of the 9 upwind states are linked to nonattainment or interference with maintenance of the ozone NAAQS at monitoring sites in the State of NY. As the 2016 CSAPR Update used a similar approach (2011 PGM modeling platform with 2017 projected emissions), details of the Four Step Transport Framework used in the CSAPR Update, and subsequent CSAPR Close-Out proposal that the CSAPR Update satisfies the good neighbor provision for the 2008 ozone NAAQS, are described below.

1.3.1 Step 1: Identify Downwind Air Quality Problems

The CSAPR Update used measured and modeled ozone DVs[7] at monitoring sites to determine which sites were nonattainment or maintenance receptors in 2017 under the 2008 ozone NAAQS. EPA used the Comprehensive Air-quality Model with extensions (CAMx[8] version 6.2 released in 2015) with a 2011 PGM modeling platform to project Average (Avg) and Maximum (Max) ozone DVs from 2011 to 2017. EPA calculated 2011 baseline Avg and Max ozone DVs using measured ozone DVs from 2009-2013 (i.e., ozone DVs for 2009-2011, 2010-2012 and 2011-2013). The 2011 Avg ozone DV is the average of the three ozone DVs from 2009-2013, whereas the 2011 Max ozone DV is the highest of the three ozone DVs from 2009-2013.

The 2011 Avg and Max ozone DVs were projected to 2017 using the CAMx 2011 base year (BY) and 2017 projected future year (FY) modeling results. The FY ozone DV projection procedures were based on EPA's latest 2014 PGM modeling guidance[9] that use the PGM modeling results in a relative fashion to scale the BY ozone DV (DV_{BY}) to obtain the FY ozone DV (DV_{FY}). The model derived scaling factors are called Relative Response Factors (RRF) and are defined as the ratio of FY to BY CAMx modeling results at a monitor averaged over the 10 days with the highest CAMx modeled BY MDA8 ozone near[10] the monitoring site:

[3] https://www.gpo.gov/fdsys/pkg/FR-2005-05-12/pdf/05-5723.pdf
[4] https://www.gpo.gov/fdsys/pkg/FR-2011-08-08/pdf/2011-17600.pdf
[5] https://www.gpo.gov/fdsys/pkg/FR-2016-10-26/pdf/2016-22240.pdf
[6] https://www.federalregister.gov/documents/2018/07/10/2018-14737/determination-regarding-good-neighbor-obligations-for-the-2008-ozone-national-ambient-air-quality
[7] An Ozone design value (DV) is defined as the three-year average of the fourth highest Maximum Daily Average 8-hour (MDA8) ozone concentration.
[8] http://www.camx.com/
[9] https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf
[10] By "near" the maximum modeled BY MDA8 ozone concentration in a 3x3 array of grid cells around the monitoring site is used with the same cell in the 3x3 also used for the FY modeling results. More recently, (2018 proposed rulemakings) EPA has also performed FY ozone DV projections using the 3xe array of cells, but not using grid cells that are over 50% covered with water, unless it is the grid cell containing the monitoring site.

$$RRF = \sum \text{CAMx MDA8 Ozone}_{FY} / \sum \text{CAMx MDA8 Ozone}_{BY}$$

$$\text{Ozone DV}_{FY} = \text{Ozone DV}_{BY} \times RRF$$

The CSAPR Update used the projected 2017 FY Avg and Max ozone DVs along with the latest measured ozone DVs at that time, which were for 2013-2015, at monitoring sites to define which monitoring sites were nonattainment, maintenance or attainment receptors under the 2008 ozone NAAQS as follows:

Nonattainment Receptors: The measured 2013-2015 and projected 2017 Avg ozone DVs are both greater than the NAAQS.

Maintenance Receptors: Monitoring sites with either: (1) the projected 2017 Avg ozone DV is above the NAAQS but the measured 2013-2015 ozone DV is below the NAAQS; or (2) the projected 2017 Avg ozone DV is below the NAAQS but the projected 2017 Max ozone DV is above the NAAQS.

Attainment Receptors: The projected 2017 Avg and Max ozone DVs are both below the NAAQS.

1.3.2 Step 2: Determine Which Upwind States Are Linked to a Downwind State Air Quality Problem

In the CSAPR Update, EPA used the CAMx Anthropogenic Precursor Culpability Assessment (APCA) source apportionment tool to estimate an upwind State's anthropogenic NOx and VOC emissions contribution to ozone DVs in downwind States. The ozone contribution metric is based on the contribution to MDA8 ozone at the receptor averaged across multiple days in which the CAMx 2017 MDA8 ozone is above the 2008 ozone NAAQS (≥76 ppb)[11], consistent with using average 2017/2011 modeling results to project 2017 ozone DVs. For this reason, we are calling this ozone contribution metric the "Average Day Contribution Metric." The CSAPR Update Air Quality Technical Support Document (AQTSD[12]) details the procedures used to calculate the upwind States anthropogenic NOx and VOC emissions contributions to a downwind State's ozone DV using the Average Day Contribution Metric, which is summarized as follows:

1. Calculate the CAMx 2017 base case modeled Maximum Daily Average 8-hour (MDA8) ozone concentrations for each day and grid cell from the hourly ozone concentrations keeping track of the 8-hour period being used.
2. Subtract an upwind State's anthropogenic NOx and VOC emissions ozone contribution from the CAMx 2017 base case hourly ozone concentrations and recalculate the MDA8 ozone concentrations for each day and grid cell using the same 8-hour period as used in the base case.
3. Extract the modeled MDA8 ozone concentrations at a monitoring site for the 2017 base case and 2017 no upwind State's emissions ozone contribution case for all days in which the CAMx 2017 base case MDA8 ozone is ≥ 76 ppb (i.e., projected 2017 days with modeled exceedances of the 2008 NAAQS). If there are fewer than five days, then extract the data for the five-top modeled MDA8 ozone days.

[11] If there are less than 5 days with CAMX 2017 MDA8 ozone greater than 76 ppb then the top five MDA8 ozone concentration days greater than 60 ppb are used, and if there are less than 5 days with MDA8 ozone greater than 60 ppb the receptor is dropped from the analysis.

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

4. Average the CAMx 2017 base case and 2017 no upwind State emissions case MDA8 ozone concentrations across all days extracted at the monitoring site (i.e., MDA8 ozone ≥ 76 ppb days) to create a Relative Contribution Factor (RCF) that is the difference between the Average CAMx Base Case minus the Average CAMx no upwind State emissions case divided by the Average CAMx Base Case:

$$RCF = [\sum MDA8\ Ozone_{Base} - \sum MDA8\ Ozone_{NoUpwindState}] / \sum MDA8\ Ozone_{Base}$$

Averaged over all days with MDA8 OzoneBase ≥ 76 ppb

5. Multiply the RCF by the 2017 ozone DV at each monitor to obtain the ozone contribution of the upwind State to the downwind ozone DV.

Upwind State Ozone Contribution = RCF x ozone DV

6. Truncate the Upwind State Ozone Contribution to two digits to the right of the decimal point.

The CSAPR Update used a significant contribution threshold of 1% of the NAAQS, which for the 2008 ozone NAAQS is 0.75 ppb. If an upwind States anthropogenic NOx and VOC emissions contributed 0.75 ppb or more to a downwind State's nonattainment receptor then the upwind State was "linked" to the downwind State nonattainment receptor. Similarly, if an upwind State contributed 0.75 ppb or more to a downwind State's maintenance receptor it was also "linked".

Note that after the September 2016 CSAPR Update, EPA slightly modified how its selects the modeling days for calculating the RCF in the Average Day Contribution Metric that can have a small effect on the resultant upwind State contribution to ozone DVs in a downwind State. The Average Day Contribution Metric calculated in the CSAPR Update procedure given above would estimate slightly different upwind State ozone contributions for the 2008 and 2015 ozone NAAQS because it is selecting more days in calculating the RCF for the 2015 (≥ 71 ppb) than 2008 (≥ 76 ppb) ozone NAAQS. EPA's new Average Day Contribution Metric follows the procedures given above for calculating the RCF but averages the modeled MDA8 ozone concentrations across the top 10 CAMx 2017 base case MDA8 ozone days. This procedure is consistent with the procedures to project future year ozone DVs (see section 1.3.1) following EPA's 2014 PGM modeling guidance and produces the same upwind State ozone Average Day Contribution Metric whether analyzing for the 2008 or 2015 ozone NAAQS. In the analysis of 2017 modeling results presented in this report when we refer to the Average Day Contribution Metric we are using EPA's new version based on the top 10 modeled 2017 MDA8 ozone days at a monitoring site.

1.3.3 Step 3: For States Linked to a Downwind Air Quality Problem, Identify Upwind Emissions on a Statewide Basis That Contribute Significantly

For upwind States "linked" to a downwind State's nonattainment or maintenance receptor, EPA considered feasible NOx control strategies and using cost-based and air quality-based criteria to evaluate regionally uniform NOx control strategies to quantify the amount of upwind State's NOx emissions (if any) that were linked to the downwind State's air quality problem.

The CSAPR Update determined that cost-effective NOx emissions controls at $1,400 per ton of NOx removed or less could be obtained from Electrical Generating Units (EGUs) at 886 coal-, oil- or gas-fired facilities in 22 upwind States. The CSAPR Update also included a trading program to meet the NOx emission budgets with controls achieved by May 2017.

1.3.4 Step 4: Implement the Necessary Emission Reductions in Upwind States Found to Have Emissions That Contribute Significantly

Under the CSAPR Update, EPA required EGUs in upwind States found to have emissions that contribute significantly to nonattainment or interfere with maintenance of the NAAQS in a downwind State to participate in the CSAPR NOx Ozone Season Group 2 Trading Program.

1.4 Overview of the State of New York Section 126 Petition

The NY Petition claimed that NOx emissions from 357 stationary sources in 9 upwind States interfered with monitors in the NY-NJ-CT New York Metropolitan Area (NYMA) in attaining the 2008 and 2015 ozone NAAQS and threaten the ability of Chautauqua County in western NY to maintain attainment of the 2008 and 2015 ozone NAAQS. The 9 upwind States identified in the NY Petition were found to contribute significantly to nonattainment or interfere with maintenance of the 2008 ozone NAAQS in the 2016 CSAPR Update rule. New York targeted the Named Sources in the 9 upwind States based on their analysis that the sources either had projected 2017 NOx emissions that exceeded 400 tons per year (tpy) in EPA's 2011 modeling platform, or had over 400 tpy of NOx emissions in the 2014 National Emissions Inventory (NEI).

The NY Petition conducted 2017 PGM modeling using the Community Multiscale Air Quality (CMAQ[13]) modeling system 2011 platform in an effort to link the group of the Named Sources in each of the 9 upwind States to the ozone at monitoring sites in the State of NY. New York performed CMAQ 2017 State-specific NOx emission zero-out runs of the Named Sources in each of the 9 upwind States and the differences in ozone concentration with the CMAQ 2017 base case simulation were attributed as the ozone contributions of the group of Named Sources in each upwind State. The NY Petition then compared the day with the highest MDA8 ozone contribution of each upwind State's Named Sources (we refer to this ozone contribution metric as the "Maximum Day Contribution Metric") with the 1% of the NAAQS threshold (i.e., 0.75 ppb for the 2008 and 0.70 ppb for the 2015 ozone NAAQS) and concluded that the group of Named Sources in each of the 9 upwind States are linked to the air quality problem in the State of NY. The NY Petition did not assess whether cost-effective control technologies were available. The NY Petition requested that EPA require each of the over 350 Named Sources to install NOx controls that meet the State of NY's Reasonably Available Control Technology (RACT) standards, which are based on a control cost efficiency of $5,000 per ton of NOx removed.

Table 1-1 presents relevant information from Table 2 from the NY Petition 2017 CMAQ zero-out modeling with their estimate of ozone contributions from upwind State Named Sources to monitors in the State of NY with shading indicating their allegations of which contributions meet the significant contribution threshold under the 2008 (orange) and 2015 only (pink) ozone NAAQS. The NY Petition also presented upwind State ozone contributions to receptors in Connecticut (CT) and New Jersey (NJ), and we present that here in Table 1-2 below.

[13] https://www.epa.gov/cmaq

Table 1-1. NY Petition ozone contributions of the Named Sources in 9 upwind States at State of NY monitoring sites, orange shaded cells have ozone contributions greater than 1% of the 2008 ozone NAAQS, (Source: NY Petition, Table 2).

	Monitoring Site	County	AQS Code	Latitude	Longitude	IL	IN	KY	MD	MI	NJ	OH	PA	VA	WV
NYMA	IS 52*	Bronx	36-005-0110	40.81618	-73.9020	0.192	0.348	0.264	0.716	0.773	0.526	1.077	4.401	0.911	2.006
	Pfizer Lab	Bronx	36-005-0133	40.86790	-73.8781	0.183	1.037	0.693	0.559	0.807	0.145	1.197	2.441	0.624	1.888
	CCNY*	New York	36-061-0135	40.81976	-73.9483	0.192	0.348	0.264	0.716	0.773	0.526	1.077	4.401	0.911	2.006
	Queens College 2	Queens	36-081-0124	40.73614	-73.8215	0.221	0.351	0.404	0.848	0.729	0.594	0.928	3.760	0.847	1.280
	Susan Wagner HS	Richmond	36-085-0067	40.59664	-74.1253	0.205	1.012	0.727	1.509	0.684	0.477	1.350	4.660	0.807	2.273
	Rockland County	Rockland	36-087-0005	41.18208	-74.0282	0.043	0.088	0.065	0.454	0.494	0.283	0.681	4.968	0.346	1.448
	Babylon	Suffolk	36-103-0002	40.74529	-73.4192	0.257	0.516	0.476	0.873	0.641	0.328	0.910	1.978	0.586	0.578
	Riverhead	Suffolk	36-103-0004	40.96078	-72.7124	0.300	0.559	0.252	1.416	0.354	0.450	0.684	1.331	0.929	0.528
	Holtsville	Suffolk	36-103-0009	40.82799	-73.0575	0.159	0.339	0.228	1.160	0.617	0.364	0.739	1.266	0.456	0.335
	White Plains	Westchester	36-119-2004	41.05192	-73.7637	0.040	0.350	0.627	0.798	0.464	0.147	1.109	3.638	0.350	1.554
Upstate	Dunkirk	Chautauqua	36-013-0006	42.49963	-79.3188	0.806	2.794	1.379	0.049	1.498	0.000	6.343	0.049	0.819	0.155
	Millbrook	Dutchess	36-02-70007	41.78555	-73.7414	0.037	0.087	0.044	0.875	0.186	0.250	1.658	3.486	0.167	0.571
	Amherst	Erie	36-029-0002	42.99328	-78.7715	0.644	4.207	1.479	0.053	1.449	0.000	4.936	0.021	0.323	0.095
	Whiteface Mt.	Essex	36-031-0002	44.36608	-73.9031	0.740	1.072	0.227	0.029	1.402	0.002	1.424	0.133	0.220	0.569
	Rochester 2	Monroe	36-055-1007	43.14618	-77.5482	0.370	1.195	0.365	0.035	1.770	0.005	2.497	0.194	0.355	0.973
	Middleport	Niagara	36-063-1006	43.22386	-78.4789	0.350	1.005	1.550	0.155	1.524	0.005	3.076	0.138	0.303	0.836
	East Syracuse	Onondaga	36-067-1015	43.05235	-76.0592	0.986	1.127	0.367	0.238	0.482	0.003	1.033	0.677	0.338	1.058
	Valley Central HS	Orange	36-071-5001	41.52375	-74.2153	0.010	0.028	0.028	0.190	0.280	0.743	1.771	3.641	0.153	0.520
	Fulton	Oswego	36-075-0003	43.28428	-76.4632	0.790	0.819	0.176	0.050	0.799	0.003	1.167	0.351	0.311	0.977
	Mt. Ninham	Putnam	36-079-0005	41.45589	-73.7098	0.040	0.082	0.046	0.847	0.340	0.169	0.627	4.223	0.320	1.148
	Williamson	Wayne	36-117-3001	43.23086	-77.1714	0.526	0.592	0.102	0.054	1.209	0.004	1.980	0.331	0.283	0.887

Table 1-2. NY Petition ozone contributions of Named Sources in 9 upwind States at CT and NJ monitoring sites, orange shaded cells have ozone contributions greater than 1% of the 2008 ozone NAAQS, (Source: NY Petition, Table 3).

	Monitoring Site	County	AQS Code	Latitude	Longitude	IL	IN	KY	MD	MI	NJ	OH	PA	VA	WV
Connecticut	Greenwich	Fairfield	09-001-0017	41.00361	-73.58500	0.211	0.579	0.431	0.670	0.906	0.385	0.833	2.086	1.282	0.669
	Danbury	Fairfield	09-001-1123	41.39917	-73.44310	0.200	0.821	0.527	1.087	0.401	0.162	0.672	3.674	0.453	1.309
	Stratford	Fairfield	09-001-3007	41.15250	-73.10310	0.196	0.535	0.323	1.693	0.513	0.448	0.631	1.660	0.636	0.587
	Westport	Fairfield	09-001-9003	41.11833	-73.33670	0.147	0.567	0.354	1.715	0.506	0.464	0.663	1.641	0.689	0.568
	Middletown	Middlesex	09-007-0007	41.55222	-72.63000	0.148	0.365	0.251	0.976	0.392	0.253	0.349	1.860	0.393	0.092
	New Haven	New Haven	09-009-0027	41.30140	-72.90290	0.183	0.455	0.226	1.732	0.551	0.340	0.649	1.643	0.575	0.594
	Madison Beach	New Haven	09-009-9002	41.26083	-72.55000	0.330	0.635	0.215	2.362	0.680	0.287	0.549	1.570	0.776	0.511
New Jersey	Leonia	Bergen	34-003-0006	40.87044	-73.99200	0.118	0.979	0.674	0.654	0.383	0.148	0.779	3.907	0.419	1.722
	Newark Firehouse	Essex	34-013-0003	40.72099	-74.19290	0.207	1.002	0.719	0.544	0.730	0.085	1.469	5.722	0.691	2.238
	Bayonne	Hudson	34-017-0006	40.67025	-74.12610	0.197	0.982	0.695	0.750	0.751	0.262	1.263	4.839	0.617	2.403
	Flemington	Hunterdon	34-019-0001	40.51526	-74.80670	0.195	0.529	0.453	0.631	0.916	0.286	1.559	5.195	0.304	2.539
	Rutgers Univ.	Middlesex	34-023-0011	40.46218	-74.42940	0.248	0.477	0.766	1.416	0.812	0.494	1.106	3.593	0.584	2.724
	Monmouth Univ.	Monmouth	34-025-0005	40.27765	-74.00510	0.247	0.622	0.700	0.732	1.006	0.340	1.594	4.439	0.248	1.596
	Chester	Morris	34-027-3001	40.78763	-74.67630	0.189	1.425	0.805	0.332	0.691	0.002	1.324	5.839	0.272	1.965
	Ramapo	Passaic	34-031-5001	41.05862	-74.25550	0.039	0.081	0.057	0.399	0.430	1.253	0.724	5.286	0.378	1.560
	Columbia WMA	Warren	34-041-0007	40.92458	-75.06780	0.183	0.330	0.003	0.156	0.746	0.650	0.954	4.777	0.197	2.433

1.5 Organization of Report

This report discusses the technical basis and deficiencies of the NY Petition including whether it complies with EPA's Four Step Transport Framework. Chapter 1 provides an introduction and discusses EPA's Four Step Transport Framework and an overview of the NY Petition. Chapter 2 reviews Step 1 of the Four Step Transport Framework to identify the 2017 nonattainment and maintenance receptors. Chapter 3 discusses the NY Petition Step 2 attempt to link the group of Named Sources in each of the 9 upwind State to the air quality problem in the State of NY, as well as CT and NJ and the deficiencies and erroneous assumptions made in the NY Petition. Chapter 4 provides revised modeling results that address the deficiencies and erroneous assumptions in the NY Petition modeling. Chapter 5 analyzes the contributions from upwind States' Named Sources to ozone in NY using alternative significant contribution thresholds that are based on objective factors.

2. IDENTIFICATION OF OZONE NONATTAINMENT AND MAINTENACE RECEPTORS (STEP 1)

The first step in EPA's Four-Step Transport Framework is to identify which monitoring sites are nonattainment or maintenance receptors. Clearly, for the NY Petition to have any validity that upwind State sources are interfering with attainment or maintenance of the ozone NAAQS, the significant ozone contributions must occur at monitoring sites that have an ozone nonattainment or maintenance problems. In this section we use both observed and projected modeled ozone design values (DVs) to determine ozone nonattainment and maintenance receptors in a similar fashion as used in the CSAPR Update (see section 1.3.1), only updated with more recent information (i.e., observed 2017 ozone DVs).[14]

2.1 2017 Ozone Nonattainment and Maintenance Receptors

The 2017 year is used to identify which monitoring sites are nonattainment and maintenance receptors to be consistent with the NY Petition and EPA's September 2016 CSAPR Update rulemaking. We are defining nonattainment and maintenance receptors the same way as in the CSAPR Update as described earlier in section 1.3.1, with one important difference. Instead of using the measured 2013-2015 ozone DVs, which were the latest ozone DVs available at the time of the CSAPR Update analysis, we use the actual measured 2017 (2015-2017) ozone DVs, along with the same projected 2017 Avg and Max ozone DVs from the CSAPR Update. Because we are using the actual measured 2017 ozone DVs, rather than measured DVs from earlier years (2013-2015), we added a third criterion for a nonattainment/maintenance receptor for when the measured 2017 ozone DV was above the NAAQS, but the projected Average and Max ozone DV was below the NAAQS.

Based on the 2017 measured and modeled ozone DVs, only three monitoring sites in NYMA would be considered nonattainment or maintenance receptors in 2017 under the 2008 ozone NAAQS as shown in the highlighted monitors in Table 2-1.

Table 2-2 shows the measured and projected Avg and Max 2017 ozone DVs for monitoring sites in Connecticut and New Jersey. All sites in Connecticut and one site in New Jersey would be considered nonattainment/maintenance receptors under the 2008 ozone NAAQS.

[14] The NY Petition alleges that the Named Sources in 9 upwind States are contributing to, or interfering with maintenance of, ozone attainment at sites in NY under both the 2008 and 2015 ozone NAAQS. SIPs addressing the good neighbor provision for the 2015 ozone NAAQS are under development, and EPA has found no State in violation of the good neighbor provision with respect to the 2015 ozone NAAQS. Thus, we only address the 2008 ozone NAAQS in this report.

Table 2-1. 2017 Measured and CSAPR Update Projected ozone DVs at monitoring sites in the New York Metropolitan Area (NYMA) and in Upstate New York. Orange shaded sites would be nonattainment/maintenance receptors under the 2008 ozone NAAQS.

	Monitoring Site	County	AQS Code	Measured 2015-2017 Ozone DV	CSAPR Projected 2017 Avg Ozone DV	CSAPR Projected 2017 Max Ozone DV
NYMA	IS 52*	Bronx	36-005-0110	67.0	-	-
	Pfizer Lab	Bronx	36-005-0133	70.3	71.6	73.5
	CCNY*	New York	36-061-0135	70.7	69.3	71.8
	Queens College 2	Queens	36-081-0124	74.3	73.8	75.7
	Susan Wagner HS	Richmond	36-085-0067	76.0	75.8	77.4
	Rockland County	Rockland	36-087-0005	72.0	67.5	68.4
	Babylon	Suffolk	36-103-0002	76.0	76.8	78.4
	Riverhead	Suffolk	36-103-0004	76.7	70.6	72.5
	Holtsville	Suffolk	36-103-0009	69.0	72.9	74.1
	White Plains	Westchester	36-119-2004	73.3	71.5	72.1
Upstate NY	Dunkirk	Chautauqua	36-013-0006	68.7	64.9	67.3
	Millbrook	Dutchess	36-02-70007	67.0	62.7	64.4
	Amherst	Erie	36-029-0002	70.3	63.6	65.1
	Whiteface Mt.	Essex	36-031-0002	64.3	62.0	64.4
	Rochester 2	Monroe	36-055-1007	66.3	-	-
	Middleport	Niagara	36-063-1006	66.3	65.8	68.2
	East Syracuse	Onondaga	36-067-1015	64.7	62.1	64.5
	Valley Central HS	Orange	36-071-5001	65.0	59.6	61.4
	Fulton	Oswego	36-075-0003	61.3	60.2	62.0
	Mt. Ninham	Putnam	36-079-0005	70.0	61.3	62.2
	Williamson	Wayne	36-117-3001	64.3	57.7	59.5

Table 2-2. 2017 Measured and CSAPR Update Projected ozone DVs at monitoring sites in Connecticut and New Jersey. Orange shaded sites would be nonattainment or maintenance receptors under the 2008 ozone NAAQS.

	Monitoring Site	County	AQS Code	Measured 2015-2017 Ozone DV	CSAPR Projected 2017 Avg Ozone DV	CSAPR Projected 2017 Max Ozone DV
Connecticut	Greenwich	Fairfield	09-001-0017	79.0	74.1	76.6
	Danbury	Fairfield	09-001-1123	77.3	71.6	73.1
	Stratford	Fairfield	09-001-3007	83.3	75.5	79.7
	Westport	Fairfield	09-001-9003	83.0	76.5	79.5
	Middletown	Middlesex	09-007-0007	79.0	69.5	70.9
	New Haven	New Haven	09-009-0027	77.0	66.8	70.1
	Madison Beach	New Haven	09-009-9002	82.3	76.2	79.2
New Jersey	Leonia	Bergen	34-003-0006	74.3	68.3	69.2
	Newark Firehouse	Essex	34-013-0003	67.7	68.5	72.0
	Bayonne	Hudson	34-017-0006	70.7	68.9	69.8
	Flemington	Hunterdon	34-019-0001	71.7	67.2	68.9
	Rutgers Univ.	Middlesex	34-023-0011	75.7	70.7	73.9
	Monmouth Univ.	Monmouth	34-025-0005	67.0	70.4	73.0
	Chester	Morris	34-027-3001	69.0	66.9	68.4
	Ramapo	Passaic	34-031-5001	68.3	65.9	67.5
	Columbia WMA	Warren	34-041-0007	64.7	56.2	56.2

2.1.1 Chautauqua County Ozone Attainment

The NY Petition claims that upwind sources interfere with the ability of the New York Metropolitan Area (NYMA) to attain the 2008 and 2015 ozone NAAQS and "*threaten the ability of Chautauqua County in western New York to maintain attainment of the 2008 and 2015 ozone NAAQS*." (NY Petition, p. 1). The Petition further states that "*Chautauqua County was designated as nonattainment for the 2008 ozone NAAQS, though it currently monitors attainment. Significant levels of transported ozone will interfere with the area's ability to continue monitoring attainment and will negatively impact the area's ability to continue monitoring attainment and will negatively impact the area's future chances of being redesignated to attainment*." (NY Petition, p. 1). Because Chautauqua County is the furthest western county in NY, it is more highly influenced by upwind State ozone transport than monitoring sites in the NYMA that lies on the eastern edge of NY much farther away from most upwind States. EPA initially designated Chautauqua County as a Marginal ozone nonattainment area (NAA) under the 2008 ozone NAAQS based on a measured 2008-2010 ozone DV of 0.077 ppm (77 ppb) at the Dunkirk monitoring site. However, since then there has been a steady decline in regional NOx emissions and corresponding regional ozone concentrations and ozone transport such that today Chautauqua County is attaining the 2008 (and 2015) ozone NAAQS. Appendix A discusses in more detail how Chautauqua County has been attaining the ozone NAAQS for several years and is projected to continue to attain the ozone NAAQS into the future. Figure 2-1 is reproduced from Appendix A and shows how the observed ozone DVs in Chautauqua County have been reduced over the last 11 years attaining the 2008 ozone NAAQS starting in 2013 and attaining the 2015 ozone NAAQS starting in 2015. The most current (2015-2017) ozone DV in Chautauqua County (68 ppb) is well below the 2008 ozone NAAQS, and EPA's projected 2023 ozone DVs in Chautauqua County (Average, 59/Max, 61

ppb) show further decline such that by 2023 ozone DVs are projected to be over 10 ppb below the more stringent 2015 ozone NAAQS. EPA designated Chautauqua County as attainment/unclassifiable under the 2015 ozone NAAQS and has proposed to re-designate the area as in attainment under the 2008 ozone NAAQS. Thus, no ozone problem currently exists in Chautauqua County and the county is projected to not be in danger of future nonattainment, so there can be no upwind State linked to maintenance of the ozone NAAQS in Chautauqua County.

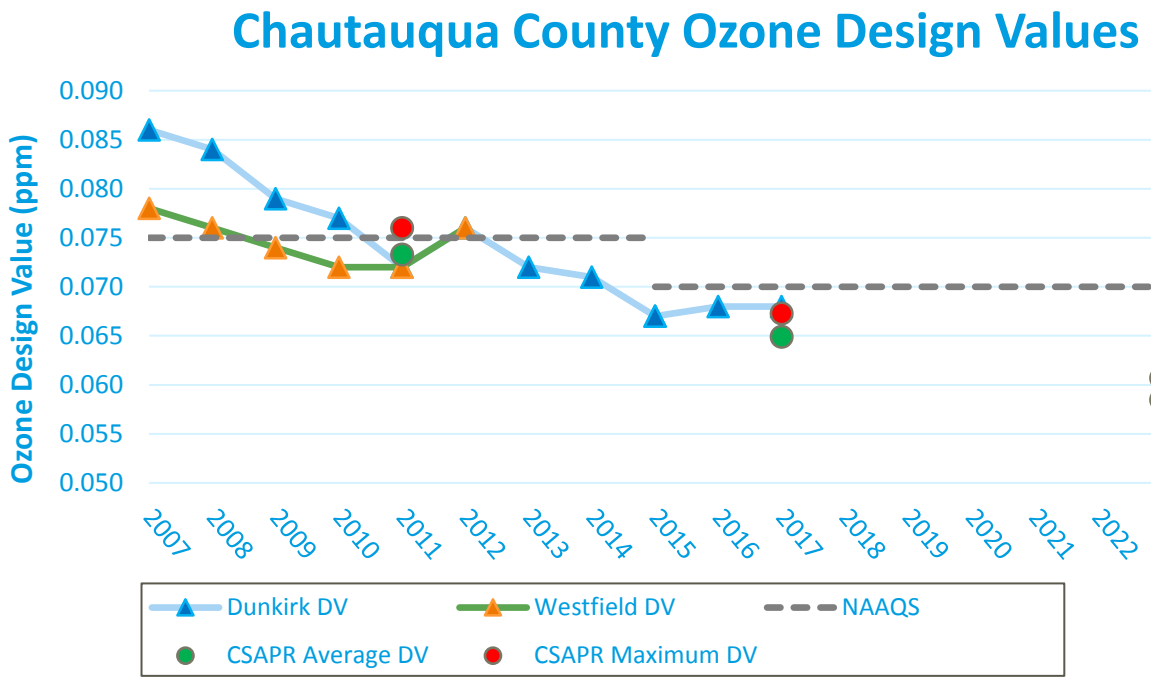


Figure 2-1. Trends in observational 8-hour ozone design values (ppm) for monitoring sites in Chautauqua County from 2007-2017. Also shown is the 2008 and 2015 ozone NAAQS for reference, and CSAPR projected 2017 and 2023 Average and Maximum ozone DVs at the Dunkirk monitor.

2.2 2023 Ozone Nonattainment and Maintenance Receptors

Tables 2-3 and 2-4 are analogues to Tables 2-1 and 2-2 above only for the projected 2023 future year ozone DVs. These projected ozone DVs are from EPA's recent (July 10, 2018) proposed CSAPR Close-Out Rule[15] that proposes to find the 2016 CSAPR Update controls satisfy the CAA Section 110 good neighbor SIP provision under the 2008 ozone NAAQS for most of the eastern States. The AQTSD[16] for the CSAPR Close-Out lists projected 2023 Avg and Max ozone DVs using (i) ozone projections derived from modeling results that use the standard 3x3 array of grid cells around the monitor as provided in EPA's 2014 PGM modeling guidance, (ii) as well as an approach where the grid cells in the 3x3 array that are dominated (>50%) by water are not used, unless it is the center grid cell containing the monitoring site. In the Tables below, 2023 ozone DV projections are based on the standard 3x3 array of cells as recommended in EPA's 2014 PGM modeling guidance.[9]

[15] https://www.gpo.gov/fdsys/pkg/FR-2018-07-10/pdf/2018-14737.pdf

[16] https://www.epa.gov/sites/production/files/2018-06/documents/aq_modelingtsd_updated_2023_modeling_o3_dvs.pdf

No sites in New York are projected to be nonattainment/maintenance receptors in 2023 under the 2008 ozone NAAQS (Table 2-3). There are also no sites in CT or NJ projected to be nonattainment/maintenance receptors in 2023 under the 2008 ozone NAAQS (Table 2-4).

Table 2-3. Measured 2017 and Projected 2023 ozone DVs at monitoring sites in the New York Metropolitan Area (NYMA) and in Upstate New York.

	Monitoring Site	County	AQS Code	Measured 2013-2017 Ozone DV	Projected 2023 Avg Ozone DV	Projected 2023 Max Ozone DV
NYMA	IS 52*	Bronx	36-005-0110	67.0	NA	NA
	Pfizer Lab	Bronx	36-005-0133	70.3	68.0	69.9
	CCNY*	New York	36-061-0135	70.7	65.3	67.8
	Rockland County	Rockland	36-087-0005	72.0	62.0	62.8
	Holtsville	Suffolk	36-103-0009	69.0	68.5	69.7
	White Plains	Westchester	36-119-2004	73.3	NA	NA
Upstate NY	Dunkirk	Chautauqua	36-013-0006	68.7	59.6	61.7
	Millbrook	Dutchess	36-02-70007	67.0	58.6	60.2
	Amherst	Erie	36-029-0002	70.3	58.3	59.7
	Whiteface Mt.	Essex	36-031-0002	64.3	57.5	59.8
	Rochester 2	Monroe	36-055-1007	66.3	NA	NA
	Middleport	Niagara	36-063-1006	66.3	60.5	62.8
	East Syracuse	Onondaga	36-067-1015	64.7	57.8	60.1
	Valley Central HS	Orange	36-071-5001	65.0	55.3	56.9
	Fulton	Oswego	36-075-0003	61.3	55.7	57.4
	Mt. Ninham	Putnam	36-079-0005	70.0	58.4	59.2
	Williamson	Wayne	36-117-3001	64.3	53.4	55.0

Table 2-4. Measured 2017 and Projected 2023 ozone DVs at monitoring sites in Connecticut and New Jersey.

	Monitoring Site	County	AQS Code	Measured 2013-2017 Ozone DV	Projected 2023 Avg Ozone DV	CSAPR Projected 2023 Max Ozone DV
Connecticut	Leonia	Fairfield	09-001-0017	79.0	74.1	76.6
	Danbury	Fairfield	09-001-1123	77.3	66.4	67.8
	Middletown	Middlesex	09-007-0007	79.0	64.7	66.1
	New Haven	New Haven	09-009-0027	77.0	62.3	65.4
	Madison Beach	New Haven	09-009-9002	82.3	76.2	79.2
New Jersey	Leonia	Bergen	34-003-0006	74.3	64.1	65.0
	Newark Firehouse	Essex	34-013-0003	67.7	64.3	67.6
	Bayonne	Hudson	34-017-0006	70.7	65.4	66.3
	Flemington	Hunterdon	34-019-0001	71.7	62.0	63.6
	Rutgers Univ.	Middlesex	34-023-0011	75.7	65.0	68.0
	Monmouth Univ.	Monmouth	34-025-0005	67.0	65.4	67.8
	Chester	Morris	34-027-3001	69.0	62.4	63.8
	Ramapo	Passaic	34-031-5001	68.3	61.3	62.7
	Columbia WMA	Warren	34-041-0007	64.7	54.0	54.0

2.3 Effects of Exceptional Events on Ozone Attainment

Exceptional Events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable using techniques that States or other agencies may implement to attain and maintain attainment of the NAAQS. Exceptional Events include wildfires, stratospheric ozone intrusions and volcanic and seismic activities. In September 2016, EPA finalized revisions to their Exceptional Events Rule[17] and Guidance[18] that exclude observed ozone concentrations from consideration in an attainment/nonattainment determination where the ozone contributions are due to Exceptional Events.

During 2016, wildfires in Canada influenced air quality in the Northeast States and elsewhere. In response, neighboring States to NY have properly invoked the Exceptional Events Rule to exclude observed ozone exceedances caused by emissions from those wildfires, including Connecticut[19], New Jersey[20], Massachusetts[21], Maryland[22] and Rhode Island.[23] The State of NY, however, has elected not to pursue an Exceptional Events exemption to eliminate high ozone observations due to emissions from Canadian wildfires in 2016 from their nonattainment/attainment consideration. As the Midwest Ozone Group (MOG) correctly argues,[24] had the State of NY conducted a similar Exceptional Events demonstration on the influence of the 2016 Canadian wildfires on observed ozone concentrations in NY, the 2015-2017 ozone DVs at all monitoring sites in the State of NY would be attaining the 2008 ozone NAAQS. The three monitors in the NYMA whose 2015-2017 ozone DVs were 76 ppb (see Table 2-1) would have 2015-2017 ozone DVs of 74 ppb thereby attaining the 2008 ozone NAAQS.[24]

The State of NY should implement all available techniques for ozone attainment locally before reaching out to demand an upwind State obtain emission reductions in a Section 126 Petition. If NY had conducted an Exceptional Events demonstration for the 2016 Canadian wildfire days, its receptors would show attainment of the 2008 ozone NAAQS. Essentially, the NY Petition is requesting EPA require over 350 industrial facilities to install emission controls to mitigate the effects of emissions from wildfires in Canada on ozone concentrations in NY.

2.4 International Emissions Contributions

Section 179B[25] of the CAA allows States to show compliance with a NAAQS if they can demonstrate they would have attained the NAAQS *"but for"* contributions of *"emissions emanating from outside of the United States."* The phrase *"emissions emanating from outside the United States"* is not explicitly defined by the CAA. EPA is currently revising guidance on how to conduct a section 179B "but for" attainment demonstration. Below we discuss two recent activities that examine this issue that included monitoring sites in the State of NY and that suggest but for emissions emanating from outside the U.S. the State of NY would be attaining the ozone NAAQS. EPA should consider and rely on these data in evaluating the NY Petition.

[17] https://www.epa.gov/sites/production/files/2016-09/documents/exceptional_events_rule_revisions_2060-as02_final.pdf
[18] https://www.epa.gov/air-quality-analysis/exceptional-events-rule-and-guidance
[19] https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-connecticut
[20] https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-new-jersey
[21] https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-massachusetts
[22] http://www.mde.state.md.us/programs/Air/AirQualityMonitoring/Documents/MDE_JUL_21_22_2016_EE_demo.pdf
[23] https://www.epa.gov/air-quality-analysis/exceptional-events-documents-ozone-rhode-island
[24] http://midwestozonegroup.com/files/Midwest_Ozone_Group_Initial_Comments_on_NY_126_Petition_5.31.18.pdf
[25] https://www.gpo.gov/fdsys/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart1-sec7509a.htm

2.4.1 MOG Analysis of the Contributions of International Emissions on Ozone Attainment in New York Using EPA's CSAPR Data

In MOG's comments on the NY Petition, they estimate 2017 and 2023 ozone DVs in NY in the absence of contributions from international sources using EPA's CAMx ozone source apportionment modeling results. EPA's source apportionment modeling includes separate contributions due to combined anthropogenic emissions from Canada and Mexico as well as contributions from Boundary Conditions (BCs) that are concentrations defined around the boundaries of the 12 km Continental United States (CONUS2) modeling domain. The BCs include ozone and precursors from international anthropogenic and natural emissions, U.S. anthropogenic and natural emission sources that leave the 12-km CONUS2 domain but recirculate back into the domain (e.g., flow reversals or circulation around the globe), and stratospheric ozone.

In MOG's analysis of international emissions contributions on NY ozone DVs, they examined the effects of international emissions contributions on 2017 and 2023 ozone DVs in the NYMA two ways: (1) removing just the contributions from Canada and Mexico anthropogenic emissions that are within the 12-km CONUS2 domain; and (2) removing the Canada/Mexico contributions plus the contributions from the BCs. The results from MOG's international emissions contribution analysis are reproduced in Table 2-5. MOG found that removing the contributions of just the Canada and Mexico anthropogenic emissions within the CONUS2 domain reduced the 2017 and 2023 ozone DVs in the NYMA by 1.0-1.4 ppb and 1.0-1.8 ppb, respectively. In 2017, the elimination of Canada and Mexico anthropogenic emissions was sufficient to reduce the ozone DVs in the NYMA to below the 2008 ozone NAAQS (maximums of 69-75 ppb). In 2023, the elimination of ozone due to Canada and Mexico anthropogenic emissions reduces the NYMA ozone DVs to below both the 2008 and 2015 ozone NAAQS (maximums of 63-69 ppb). When both the CONUS2 Canada and Mexico anthropogenic emissions and BC contributions are eliminated then ozone DVs in the NYMA are below both the 2008 and 2015 ozone NAAQS in both the 2017 and 2023 years.

Table 2-5. Results of MOG's analysis removing the contributions of anthropogenic emissions from Mexico and Canada alone plus also with contributions from Boundary Conditions (BCs) through the CONUS2 modeling domain on 2017 and 2023 ozone DVs at the three key monitoring sites in the NYMA (Source: MOG NY Petition Comments page 26[26]).

			2017 Average MDA8 Ozone Design Value (ppb)				
Monitor ID	Local Site Name	2009-2013 Average Design Value	2017 Average Base Case	Canada & Mexico Contribution	2017 Base Case w/o Can/Mex	Initial & Boundary Condition Contribution	2017 Base Case w/o BC and Can/Mex
360850067	Susan Wagner HS	81.3	75.8	1.40	74.40	17.14	57.26
361030002	Babylon	83.3	76.8	1.25	75.55	15.67	59.88
361030004	Riverhead	78.0	70.6	0.99	69.61	12.69	56.92

			2023 Average MDA8 Ozone Design Value (ppb)				
Monitor ID	Local Site Name	2009-2013 Average Design Value	2023 Average Base Case	Canada & Mexico Contribution	2023 Base Case w/o Can/Mex	Initial & Boundary Condition Contribution	2023 Base Case w/o BC and Can/Mex
360850067	Susan Wagner HS	81.3	71.2	1.82	69.38	16.83	52.55
361030002	Babylon	83.3	71.3	1.78	69.52	17.17	52.35
361030004	Riverhead	78.0	64.9	0.97	63.93	12.56	51.37

2.4.2 2011 Analysis of the Contributions of Non-U.S. International Anthropogenic Emissions to Ozone DV

The Denver Regional Air Quality Council (RAQC) conducted global and regional photochemical modeling of the 2011 ozone season to determine whether a section 179B "but for" attainment demonstration was feasible. The results of the 2011 international emissions contribution analysis to ozone DVs[27] were documented at a November 2, 2018 Denver Ozone Modeling Forum[28]. Although the objective of the RAQC 179B feasibility analysis was to determine the international contributions to ozone DVs in the Denver region, results were obtained for the entire continental U.S. In this analysis, the GEOS-Chem global chemistry model and the CAMx regional PGM were run for two 2011 scenarios: (1) a 2011 base case of all emissions; and (2) 2011 case where non-U.S. anthropogenic (international) emissions were eliminated (zero-out). CAMx was run with a 36-km resolution CONUS and 12-km WESTUS domains using two-way grid nesting. For the 2011 international emissions zero-out case, BCs for the CAMx 36-km CONUS domain were based on the GEOS-Chem no international emissions scenario output. This approach will isolate the contributions of non-U.S. anthropogenic emissions and does not suffer some of the uncertainties and limitations when eliminating the BC contribution in EPA's CSAPR source apportionment analysis discussed above (e.g., eliminate the influences of natural international emissions, stratospheric ozone and U.S. anthropogenic emissions that reenter the CONUS domain through either flow reversals or circulating the globe). It also includes the effect of eliminating all international anthropogenic emissions, rather than just those in the Canada and Mexico portion of the CONUS domain.

[26] http://midwestozonegroup.com/files/Midwest_Ozone_Group_Initial_Comments_on_NY_126_Petition_5.31.18.pdf

[27] https://raqc.egnyte.com/dl/wFaUQgiGQx/II.b_2017_Denver_Mod-Forum_International_2017-11-02v2.pdf_

[28] http://raqc.org/documents/modeling-emissions-inventories/

The elimination of international anthropogenic emissions reduces the 2011 ozone DVs in the NYMA by 2.5-3.2 ppb. This is higher than the Canada and Mexico anthropogenic emissions contribution found in the EPA's 2017 (1.0-1.4 ppb) and 2023 (1.0-1.8 ppb) CAMx source apportionment modeling as reported by MOG and discussed above (see Table 2-5). The 2011 RAQC analysis demonstrates an even higher contribution from international sources, because the 2011 analysis also included eliminating Canada and Mexico anthropogenic emissions outside of the CONUS2 domain as well as in other countries (e.g., China).

Assuming that international emissions contributions would be the same in 2017 and 2023 as it was in 2011, then the effects of removing the contributions of international emissions on ozone DVs at key monitoring sites in the NYMA are shown in Table 2-6 and Table 2-7. In 2017, the removal of international anthropogenic emissions results in all the ozone DVs (measured 2013-2017 and projected Avg and Max from the CSAPR Update) to be below the 2008 ozone NAAQS (Table 2-6). These results suggest that NY would have been in attainment of the 2008 ozone NAAQS in 2017 but for anthropogenic emissions emanating from outside the U.S. so would satisfy the requirements of a Section 179B "but for" SIP attainment demonstration.

The 2023 projected ozone DVs for the key NYMA monitoring sites were obtained from EPA's CSAPR Close-Out analysis AQTSD[29]. In 2023 all the projected ozone DVs are below the 2008 ozone NAAQS. The projected 2023 Avg ozone DVs without the contributions of non-U.S. anthropogenic emissions are also below the 2015 ozone NAAQS, suggesting that NYMA would satisfy the 179B "but for" attainment demonstration in 2023 (Table 2-7).

Table 2-6. Effect of eliminating the 2011 international (non-U.S.) anthropogenic emissions contribution from the 2017 measured and projected Avg and Max ozone DVs in the NYMA (ppb).

Monitoring Site	2017 DV with International Contribution			2011 Intl Cont	2017 DV without International Contribution		
	Measured 2013-2017 Ozone DV	CSAPR 2017 Avg Ozone DV	CSAPR 2017 Max Ozone DV		Measured 2013-2017 Ozone DV	CSAPR 2017 Avg Ozone DV	CSAPR 2017 Max Ozone DV
Queens College 2	74.3	70.1	71.9	2.7	71.6	67.5	69.2
Susan Wagner HS	76	75.8	77.4	2.5	73.5	73.3	74.9
Babylon	76	76.8	78.4	3.2	72.8	73.6	75.2
Riverhead	76.7	70.6	72.5	2.6	74.1	68	69.9

[29] https://www.epa.gov/sites/production/files/2018-06/documents/aq_modelingtsd_updated_2023_modeling_o3_dvs.pdf

Table 2-7. Effect of eliminating the 2011 international (non-U.S.) anthropogenic emissions contribution from the 2023 projected Avg and Max ozone DVs in the NYMA (ppb).

Monitoring Site	2023 DV with International Contribution		2011 Intl Cont	2023 DV without International Contribution	
	EPA Mar 2018 2023 Avg Ozone DV	EPA Mar 2018 2017 Max Ozone DV		EPA Mar 2018 2023 Avg Ozone DV	EPA Mar 2018 2017 Max Ozone DV
Using 3x3 12 km Cells w/o Accounting for water					
Queens College 2	70.1	71.9	2.7	67.4	69.2
Susan Wagner HS	71.9	73.4	2.5	69.4	70.9
Babylon	72.5	74.0	3.2	69.3	70.8
Riverhead	66.3	68.0	2.6	63.7	65.4
Using 3x3 12 km Cells Accounting for water					
Queens College 2	70.2	72.0	2.7	67.5	69.3
Susan Wagner HS	67.1	68.5	2.5	64.6	66.0
Babylon	74.0	75.5	3.2	70.8	72.3
Riverhead	65.2	66.9	2.6	62.6	64.3

2.5 Conclusions Regarding the Ozone Nonattainment/Maintenance Issues in NY

Based on 2017 measured and projected ozone air quality, ozone nonattainment of the 2008 ozone NAAQS in the State of NY is limited to just three monitoring sites in the NYMA. All monitoring sites in upstate NY attain the 2008 NAAQS (as well as the 2015 ozone NAAQS). This includes Chautauqua County that EPA designated as nonattainment with the 2008 ozone NAAQS in the past (2008-2010 data), but has since designated the county as attainment/unclassifiable for the 2015 ozone NAAQS. Furthermore, EPA has proposed redesignating Chautauqua County as attainment of the 2008 ozone NAAQS due to a clean data finding. By 2023, sites in the NYMA are projected to attain the 2008 ozone NAAQS, which is part of the basis of the CSAPR Close-Out proposed rulemaking that the CSAPR Update controls satisfy the good neighbor provision of the 2008 ozone NAAQS. Moreover, EPA should consider carefully the contribution to ozone levels in New York due to Exceptional Events (wildfires) and international contributions.

3. DETERMINATION OF WHICH UPWIND STATES ARE LINKED TO A DOWNWIND STATE AIR QUALITY PROBLEM (STEP 2)

In this Chapter we discuss the NY Petition's attempts to "link" the NOx emissions from the over 350 Named Sources in the 9 upwind States to the ozone air quality problem in the State of NY. The NY Petition used photochemical grid model (PGM) modeling to allege that the Named Sources in each of the 9 upwind States were linked to the ozone problem in NY. However, as explained below, rather than use the CSAPR Update modeling database and approach, the NY Petition used an approach that has not been vetted or peer-reviewed and is based on an inappropriate and inferior ozone contribution modeling approach. Furthermore, the NY DEC did not make their NY Petition PGM modeling files readily available and Ramboll had to submit a state Freedom of Information (FOI) request to obtain them. Ramboll's analysis of the DEC's PGM modeling found numerous deficiencies and short-comings in the NY Petition approach and modeling results that make their assessment of which upwind State's Named Sources are linked to NY (and CT/NJ) nonattainment or maintenance receptors inaccurate and unreliable. Lastly, Ramboll used the data from the CSAPR Update rule to approximate the ozone contributions at sites in NY due to the Named Sources NOx emissions in the 9 upwind States.

3.1 Deficiencies in NY Petition Analysis of Significant Ozone Contributions

The NY Petition performed 2017 PGM modeling of the Named Sources in each of the 9 upwind States to determine their contributions to ozone concentrations at monitoring sites in the State of NY. However, rather than using the EPA's CSAPR Update 2017 CAMx PGM modeling platform and procedures, the NY Petition elected to use the Community Multiscale Air Quality (CMAQ) PGM modeling system. Moreover, instead of using ozone source apportionment to obtain the State-specific Named Sources' ozone contributions as used in CSAPR, NY conducted CMAQ zero-out modeling.

The NY Petition 2017 CMAQ State-specific Named Sources zero-out modeling used the MARAMA 2011/2017 Beta 2 emissions and modeling platform.[30] The MARAMA 2011 and 2017 emissions were based on Version 6.3 of EPA's modeling platform[31] and EPA's 2011ek and 2017ek emissions.[32] The MARAMA 2017 Beta emissions were developed starting with the EPA 2011 Version 6.3 2017ek emissions and updated the emissions for the northeast States, as described in the MARAMA 2011/2017 Beta emissions Technical Support Document (TSD[33]). Thus, the 2017 emissions used in the NY Petition ozone contribution modeling were based exclusively on projections from 2011 emissions. Yet, New York could have used more recent emissions data. Since the NY Petition was published in 2018, New York could have used estimates of actual emissions (e.g., measured hourly continuous emissions monitoring (CEM) data for EGUs that is available from EPA's CAMD website.[34])

[30] http://www.marama.org/technical-center/emissions-inventory/2011-2017-beta-regional-emissions-inventory

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

[32] https://www.epa.gov/air-emissions-modeling/2011-version-63-technical-support-document

[33] http://www.marama.org/images/stories/documents/TSD%20BETA%20Northeast%20Emission%20Inventory%20for%202011%202017%2020170712%20FINAL.pdf

[34] https://www.epa.gov/airmarkets

Although the NY Petition states that their *"CMAQ modeling analysis generally followed the methodology described for ozone contribution modeling in EPA's Technical Support Document for the CSAPR Update, with some adjustments"* (NY Petition p. 11), these were not minor "adjustments." Rather, the NY Petition used a completely different model and ozone contribution modeling approach, and relied on a metric for calculating the contributions to ozone DVs that is inconsistent with the form of the ozone DV and EPA's modeling guidance for making ozone DV projections, leading to erroneous ozone contribution calculations. The procedures used by the NY DEC for conducting the ozone contribution analysis in the NY Petition are summarized as follows:

1. Use CMAQ Version 5.0.2 and the MARAMA 2011 and 2017 Beta 2 modeling platform and emissions (described above) for the May 18 through July 30, 2011 period.
2. Conduct CMAQ 2017 base case simulation of all emissions.
3. Conduct CMAQ 2017 State-specific Named Sources zero-out NOx emissions modeling for the 9 upwind States and New Jersey.
4. Extract Maximum Daily Average 8-hour (MDA8) ozone concentrations from the CMAQ 2017 base case and each CMAQ 2017 State-specific Named Sources zero-out case at each monitoring site for all days in which the CMAQ 2017 base case MDA8 ozone is greater than or equal to 71 ppb[35].
5. The NY Petition defined the ozone contribution of each upwind State's Named Sources to ozone at a downwind monitoring site as the maximum difference in MDA8 ozone at the site between the 2017 CMAQ base and State-specific Named Sources zero-out case across the days with CMAQ 2017 base case MDA8 ozone greater than 71 ppb (we refer to this ozone contribution metric as the Maximum Day Contribution Metric).
6. The NY Petition then used the same CSAPR 1% of the ozone NAAQS significant contribution threshold to infer which upwind States were linked to ozone DVs at receptors in NY.

The results of the NY Petition ozone contribution analysis in the 6 steps above for NY monitors were displayed in Table 2 of the NY Petition whose data were reproduced in Table 1-1 presented previously in this report (results for CT and NJ were presented in Table 1-2). Using the CMAQ modeling results provided by the New York DEC under the FOI request, we were able to post-process the NY Petition CMAQ modeling results using the NY Petition Maximum Day Contribution Metric and reproduce the NY Petition Table 2, with our postprocessed modeling results shown as Table 3-1 for monitoring sites in NY that matched the table in the NY Petition (tabular results for CT and NJ are provided in Appendix B).

[35] If there were less than five days with CMAQ 2017 base case was at least 71 ppb then days with MDA8 ozone of at least 60 ppb were examined.

Table 3-1. Post-processing of New York DEC CMAQ modeling results to re-produce Table 2 (see Table 1-1) from the NY Petition.

	Monitoring Site	County	AQS Code	Latitude	Longitude	IL	IN	KY	MD	MI	NJ	OH	PA	VA	WV
NYMA	IS 52*	Bronx	36-005-0110	40.81618	-73.9020	0.192	0.348	0.264	0.716	0.773	0.526	1.077	4.401	0.911	2.006
	Pfizer Lab	Bronx	36-005-0133	40.86790	-73.8781	0.183	1.037	0.693	0.559	0.807	0.145	1.197	2.441	0.624	1.888
	CCNY*	New York	36-061-0135	40.81976	-73.9483	0.192	0.348	0.264	0.716	0.773	0.526	1.077	4.401	0.911	2.006
	Queens College 2	Queens	36-081-0124	40.73614	-73.8215	0.221	0.351	0.404	0.848	0.729	0.594	0.928	3.760	0.847	1.280
	Susan Wagner HS	Richmond	36-085-0067	40.59664	-74.1253	0.205	1.012	0.727	1.509	0.684	0.477	1.350	4.660	0.807	2.273
	Rockland County	Rockland	36-087-0005	41.18208	-74.0282	0.043	0.088	0.065	0.454	0.494	0.283	0.681	4.968	0.346	1.448
	Babylon	Suffolk	36-103-0002	40.74529	-73.4192	0.257	0.516	0.476	0.873	0.641	0.328	0.910	1.978	0.586	0.578
	Riverhead	Suffolk	36-103-0004	40.96078	-72.7124	0.300	0.559	0.252	1.416	0.354	0.450	0.684	1.331	0.929	0.528
	Holtsville	Suffolk	36-103-0009	40.82799	-73.0575	0.159	0.339	0.228	1.160	0.617	0.364	0.739	1.266	0.456	0.335
	White Plains	Westchester	36-119-2004	41.05192	-73.7637	0.040	0.350	0.627	0.798	0.464	0.147	1.109	3.638	0.350	1.554
Upstate	Dunkirk	Chautauqua	36-013-0006	42.49963	-79.3188	0.806	2.794	1.379	0.049	1.498	0.000	6.343	0.049	0.819	0.155
	Millbrook	Dutchess	36-02-70007	41.78555	-73.7414	0.037	0.087	0.044	0.875	0.186	0.250	1.658	3.486	0.167	0.571
	Amherst	Erie	36-029-0002	42.99328	-78.7715	0.644	4.207	1.479	0.053	1.449	0.000	4.936	0.021	0.323	0.095
	Whiteface Mt.	Essex	36-031-0002	44.36608	-73.9031	0.740	1.072	0.227	0.029	1.402	0.002	1.424	0.133	0.220	0.569
	Rochester 2	Monroe	36-055-1007	43.14618	-77.5482	0.370	1.195	0.365	0.035	1.770	0.005	2.497	0.194	0.355	0.973
	Middleport	Niagara	36-063-1006	43.22386	-78.4789	0.350	1.005	1.550	0.155	1.524	0.005	3.076	0.138	0.303	0.836
	East Syracuse	Onondaga	36-067-1015	43.05235	-76.0592	0.986	1.127	0.367	0.238	0.482	0.003	1.033	0.677	0.338	1.058
	Valley Central HS	Orange	36-071-5001	41.52375	-74.2153	0.010	0.028	0.028	0.190	0.280	0.743	1.771	3.641	0.153	0.520
	Fulton	Oswego	36-075-0003	43.28428	-76.4632	0.790	0.819	0.176	0.050	0.799	0.003	1.167	0.351	0.311	0.977
	Mt. Ninham	Putnam	36-079-0005	41.45589	-73.7098	0.040	0.082	0.046	0.847	0.340	0.169	0.627	4.223	0.320	1.148
	Williamson	Wayne	36-117-3001	43.23086	-77.1714	0.526	0.592	0.102	0.054	1.209	0.004	1.980	0.331	0.283	0.887

There are numerous deficiencies and inconsistencies in New York's modeling that make the results inaccurate and unreliable as discussed below.

3.1.1 NY Petition Used an Incomplete Modeling Period

Elevated ozone concentrations in the northeast U.S. tend to occur during the hot summer months (i.e., the ozone season). Thus, the CSAPR modeled the May 1 through September 30, 2011 (153 days) to encompass the complete historical ozone season. However, the NY Petition significant ozone contribution modeling elected to model just a portion of the ozone season and stated as follows:

> *"DEC chose to model a period of May 18 through July 30; while resource constraints prevented DEC from performing a complete ozone-season or annual analysis for each significantly contributing state, this scenario provides an adequate approximation of ozone impacts by capturing the majority of ozone exceedance days at the monitors of interest"* (NY Petition p. 11).

Thus, the NY Petition significance modeling only modeled approximately half (74 days) as many days as the CSAPR significance modeling (153 days) that they claim was due to *"resource constraints."* The NY Petition does not explain the reason New York took this short-cut in its ozone contribution modeling.

3.1.2 NY Petition Used an Inappropriate Technique to Obtain Ozone Contributions

The NY Petition used CMAQ 2017 NOx emissions zero-out modeling to obtain the ozone contributions of each upwind State's Named Sources; this is an inferior, inappropriate and incorrect technique for assessing links to downwind attainment issues.

For one, the zero-out approach is a sensitivity method that a regulator may use to provide guidance on narrow "what if" types of questions, which in this case is what would be the ozone levels in 2017 if none of the Named Sources within an upwind State emitted any NOx emissions. However, this is a different question than the question at issue on the NY Petition - what is the contribution of the NOx emissions from the Named Sources within an upwind State to ozone

concentrations in 2017. To assess ozone contributions in 2017, a Source Apportionment Method is required to estimate an upwind State's Named Sources' NOx emissions contribution to ozone DVs at ozone monitoring sites in NY under 2017 atmospheric chemistry conditions.

Moreover, the NY Petition zero-out approach estimates the ozone reduction at NY monitoring sites if all the NOx emissions at each of the Named Sources in an upwind State were eliminated. In this way, the zero-out approach alters the 2017 atmospheric chemistry conditions and so can be very different from what the Named Sources contributed to ozone concentrations in 2017. The zero-out NOx emissions approach is also not a physically realistic scenario as it models a scenario where the NOx emissions for each of the Named Sources facilities are eliminated, but the facilities' other ozone pre-cursor emissions (e.g., VOC and CO) are still present—an impossible situation. In fact, the Named Sources zero-out NOx emissions scenario is not even being considered in the NY Petition; the NY Petition is requesting these facilities have NOx emissions limits at their level of NOx RACT ($5,000 per ton), not a complete shut-down of the facility.

Further, the CMAQ/zero-out method can only compare the differences in ozone concentrations between a base case (all emissions) and a State's zero-out anthropogenic emissions sensitivity modeling case. Yet, adding up all the source contributions from all the separate zero-out sensitivity simulations from all sources does not equal the total ozone concentration in the base case. By contrast, the CAMx source apportionment tool is ideally suited for estimating the contributions of sources to 2017 ozone concentrations, because the sum of all sources contributions equals the total ozone. As discussed in more detail in Chapter 5, for the initial transport rules (e.g., 1998 NOx SIP Call) EPA used zero-out modeling to assess State's contributions on downwind ozone and $PM_{2.5}$ concentrations. However, that was 20 years ago. The more recent transport rules (e.g., 2011 CSAPR and 2016 CSAPR Update) used source apportionment modeling as it provides a more appropriate and accurate assessment of the State's contributions for the year being modeled.

3.1.3 NY Petition Used Inaccurate Projected 2017 Emissions That Overstate Actual 2017 Emissions

The NY Petition CMAQ 2017 modeling was based on 2017 emissions projected from the 2011 National Emissions Inventory (NEI[36]). Although NY submitted its Petition in 2018, when estimates of some actual 2017 emissions were available, the NY Petition relied on outdated, projected 2017 emissions. Table 3-2 compares the 2017 EGU NOx emissions in the 9 upwind States and NJ from the NY Petition that was used in their 2017 CMAQ zero-out modeling with the estimated actual 2017 EGU NOx emissions based on measured hourly NOx emissions from Continuous Emission Monitor (CEM) measurement devices that are readily available from the EPA CAMD website[37]. The estimated actual 2017 EGU NOx emissions in the upwind States for the Named EGU sources are from 7% to 62% lower than the 2017 projected EGU emissions used in the NY Petition. The actual 2017 EGU NOx emissions from the Named Sources across the 9 upwind States plus NJ are 27% lower than the projected 2017 EGU emissions used in the NY Petition. Thus, the actual amount of controls and NOx emissions reductions achieved at the EGU sources named the NY Petition are much greater than assumed in the NY Petition. The NY Petition used overstated NOx

[36] https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data

[37] https://www.epa.gov/airmarkets

emissions for the Named Sources, resulting in inaccurate, unreliable and overstated ozone contributions.

Table 3-2. Comparison of the projected 2017 State-wide NOx emissions in the NY Petition Named Sources EGUs (NY Petition Appendix B) with the estimated actual 2017 EGU NOx emissions from the measured CEM data (tons per year).

State	NY Petition Named Sources (from Appendix B)	2017 Estimated Actual from EPA/CAMD CEM Data	Percent Difference
IL	33,514	28,000	-16%
IN	88,748	60,975	-31%
KY	64,683	45,156	-30%
MD	15,573	5,898	-62%
MI	44,703	32,614	-27%
NJ	3,266	1,719	-47%
OH	65,876	54,242	-18%
PA	53,339	31,682	-41%
VA	17,440	12,743	-27%
WV	45,243	42,171	-7%
Total	**432,385**	**315,201**	-27%

3.1.4 Failure of the NY Petition to Follow the First Step of the Four Step Transport Framework

The NY Petition ozone contribution Table 2 (Tables 1-1 and Table 3-1) implies that the 9 upwind States are linked to nonattainment or interference with maintenance of the 2008 ozone NAAQS at every ozone monitoring site in the State of NY. However, the NY Petition fails to follow properly Step 1 of EPA's Four Step Transport Framework, which requires that a monitoring site must be a nonattainment or maintenance receptor before an upwind State can potentially be linked to an ozone problem at a downwind State receptor. As discussed in Chapter 2, there are only 3 ozone monitoring sites in the State of NY that can be considered a nonattainment or maintenance receptor under the 2008 ozone NAAQS in 2017. Using the NY Petition's own Maximum Day Contribution Metric, Table 3-3 highlights in orange those upwind States that have a 1% or greater contribution to a NY nonattainment or maintenance receptor under the 2008 ozone NAAQS. As Table 3-3 demonstrates, the Named Sources in three of the upwind States (IL, KY and MI) do not have an ozone contribution of at least 1% of the 2008 ozone NAAQS at a nonattainment/maintenance receptor even using the NY Petition's overstated Maximum Daily Contribution Metric.

Thus, the NY Petition greatly overstates the amount of potentially significant ozone contribution (Table 3-1) than when the first step is considered properly (Table 3-3).

Table 3-3. NY Petition Maximum Day Contribution Metric using NY DEC 2017 CMAQ zero-out modeling results with ozone contributions of at least 1% of the NAAQS shaded orange at nonattainment/maintenance receptors under the 2008 ozone NAAQS.

	Monitoring Site	County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	IS 52*	Bronx	36-005-0110	67.0	-	-	0.192	0.348	0.264	0.716	0.773	1.077	4.401	0.911	2.006
NYMA	Pfizer Lab	Bronx	36-005-0133	70.3	71.6	73.5	0.183	1.037	0.693	0.559	0.807	1.197	2.441	0.624	1.888
NYMA	CCNY*	New York	36-061-0135	70.7	69.3	71.8	0.192	0.348	0.264	0.716	0.773	1.077	4.401	0.911	2.006
NYMA	Queens College 2	Queens	36-081-0124	74.3	73.8	75.7	0.221	0.351	0.404	0.848	0.729	0.928	3.760	0.847	1.280
NYMA	Susan Wagner HS	Richmond	36-085-0067	76.0	75.8	77.4	0.205	1.012	0.727	1.509	0.684	1.350	4.660	0.807	2.273
NYMA	Rockland County	Rockland	36-087-0005	72.0	67.5	68.4	0.043	0.088	0.065	0.454	0.494	0.681	4.968	0.346	1.448
NYMA	Babylon	Suffolk	36-103-0002	76.0	76.8	78.4	0.257	0.516	0.476	0.873	0.641	0.910	1.978	0.586	0.578
NYMA	Riverhead	Suffolk	36-103-0004	76.7	70.6	72.5	0.300	0.559	0.252	1.416	0.354	0.684	1.331	0.929	0.528
NYMA	Holtsville	Suffolk	36-103-0009	69.0	72.9	74.1	0.159	0.339	0.228	1.160	0.617	0.739	1.266	0.456	0.335
NYMA	White Plains	Westchester	36-119-2004	73.3	71.5	72.1	0.040	0.350	0.627	0.798	0.464	1.109	3.638	0.350	1.554
Upstate	Dunkirk	Chautauqua	36-013-0006	68.7	64.9	67.3	0.806	2.794	1.379	0.049	1.498	6.343	0.049	0.819	0.155
Upstate	Millbrook	Dutchess	36-02-70007	67.0	62.7	64.4	0.037	0.087	0.044	0.875	0.186	1.658	3.486	0.167	0.571
Upstate	Amherst	Erie	36-029-0002	70.3	63.6	65.1	0.644	4.207	1.479	0.053	1.449	4.936	0.021	0.323	0.095
Upstate	Whiteface Mt.	Essex	36-031-0002	64.3	62.0	64.4	0.740	1.072	0.227	0.029	1.402	1.424	0.133	0.220	0.569
Upstate	Rochester 2	Monroe	36-055-1007	66.3	-	-	0.370	1.195	0.365	0.035	1.770	2.497	0.194	0.355	0.973
Upstate	Middleport	Niagara	36-063-1006	66.3	65.8	68.2	0.350	1.005	1.550	0.155	1.524	3.076	0.138	0.303	0.836
Upstate	East Syracuse	Onondaga	36-067-1015	64.7	62.1	64.5	0.986	1.127	0.367	0.238	0.482	1.033	0.677	0.338	1.058
Upstate	Valley Central HS	Orange	36-071-5001	65.0	59.6	61.4	0.010	0.028	0.028	0.190	0.280	1.771	3.641	0.153	0.520
Upstate	Fulton	Oswego	36-075-0003	61.3	60.2	62.0	0.790	0.819	0.176	0.050	0.799	1.167	0.351	0.311	0.977
Upstate	Mt. Ninham	Putnam	36-079-0005	70.0	61.3	62.2	0.040	0.082	0.046	0.847	0.340	0.627	4.223	0.320	1.148
Upstate	Williamson	Wayne	36-117-3001	64.3	57.7	59.5	0.526	0.592	0.102	0.054	1.209	1.980	0.331	0.283	0.887

Significant contribution under 2008 NAAQS (> 0.76 ppb)

*Shared grid cell for IS52 and CCNY results in identical concentrations

3.1.5 NY Petition Used an Inappropriate Maximum Day Contribution Metric

The NY Petition use a Maximum Day Contribution Metric to estimate upwind State Named Sources' contributions to downwind 2017 ozone DVs that is inconsistent with the form of the ozone DV, EPA's modeling guidance for projecting ozone DVs and the procedures used in the CSAPR Update to define upwind State's ozone contributions (i.e., the Average Day Contribution Metric).

3.1.5.1 NY Maximum Day Contribution Metric is Inconsistent with the Form of the Ozone DV

By regulation, EPA defines an ozone DV as the three-year average of the fourth highest MDA8 ozone at a monitoring site. Thus, the ozone DV is not calculated based on a single day with the maximum MDA8 ozone at a monitor, and even the second and third highest day MDA8 ozone is not used to calculate the ozone DV. The NY Petition's use of the Maximum Day Contribution Metric that defines an upwind State's ozone contribution based on a single day with the highest upwind State ozone contribution on high ozone days is inconsistent with the form of the ozone DV.

3.1.5.2 NY Maximum Day Contribution Metric is Inconsistent with the Procedures Used to Project Future Year Ozone DVs

The procedure for making future year ozone DV projections (discussed in section 1.3.1), uses the ratio of average base year (BY) and future year (FY) MDA8 ozone modeling results (i.e., the RRF) for the top ten modeled BY MDA8 ozone near the monitoring site to scale the BY ozone DV to obtain the FY ozone DV (i.e., Ozone DV_{FY} = RRF x Ozone DV_{BY}). These procedures are described in EPA's 2007[38] and draft 2014[39] PGM modeling guidance. EPA argues that using the relative

[38] https://www3.epa.gov/ttn/scram/guidance/guide/final-03-pm-rh-guidance.pdf

[39] https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

change in the modeling results (i.e., the RRF) to scale the BY ozone DV is more reliable than using the absolute modeling results because: (1) the FY ozone DV calculation is based on the actual observed BY ozone DV rather than a modeled result; and (2) the use of the RRF will factor out any under- or over-prediction bias in the model because such bias will be in both the BY and FY modeling results and cancel out when taking their ratios.

NY's use of the Maximum Day Contribution Metric is inconsistent with EPA's PGM guidance for making future year ozone DV projections as it is based on just the day with the highest upwind State ozone contribution, rather than the 10 highest modeled MDA8 ozone days. Furthermore, the NY Petition Maximum Day Contribution Metric uses the absolute model predictions that EPA guidance states is less reliable than using the relative change in the modeling results as EPA does when calculating their Average Day Contribution Metric that uses the Relative Contribution Factor (RCF; see section 1.3.2).

3.1.5.3 CSAPR Average Day Contribution Metric is Consistent with Ozone DVs and EPA's Modeling Guidance

EPA's CSAPR Update, and subsequent EPA ozone transport analysis, used an Average Day Contribution Metric to develop a relative change in the upwind States ozone contribution (the RFC) that is applied to the 2017 FY ozone DV to obtain the upwind states ozone contribution (described earlier in section 1.3.2). Thus, the CSAPR Average Day Contribution Metric complies with EPA's 2007 and 2014 PGM modeling guidance by using the relative change in the modeling results averaged over 10 high modeled MDA8 ozone days applied to the projected 2017 ozone DV and is more consistent with the form of the ozone DV as it does not use just one day of modeling results. We used EPA's latest Average Day Contribution Metric applied to the NY Petition CMAQ zero-out Named Sources modeling results to obtain a more reliable estimate of an upwind State's Named Sources contribution to downwind 2017 ozone DVs that is consistent with EPA's 2007 and 2014 modeling guidance. EPA used the Average Day Contribution Metric starting in the 2010 proposed CSAPR rule that used ozone contributions averaged over multiple days as "*EPA believes this to be a robust metric compared to previous metrics which might have relied on the maximum contribution on a single day.*"[40] Table 3-4 shows the results of applying EPA's CSAPR Average Day Contribution Metric calculation to NY DEC's CMAQ zero-out modeling results and shows that 8 of the 9 upwind States have ozone contributions that are below the CSAPR 1% of the NAAQS threshold for the 2008 ozone NAAQS. When using the CSAPR Average Day Contribution Metric with the NY CMAQ zero-out modeling results, 8 of the 9 upwind States that the NY Petition stated had ozone contributions greater than 1% of the NAAQS have ozone contributions that are less than 1% of the NAAQS at all NY ozone monitoring sites.

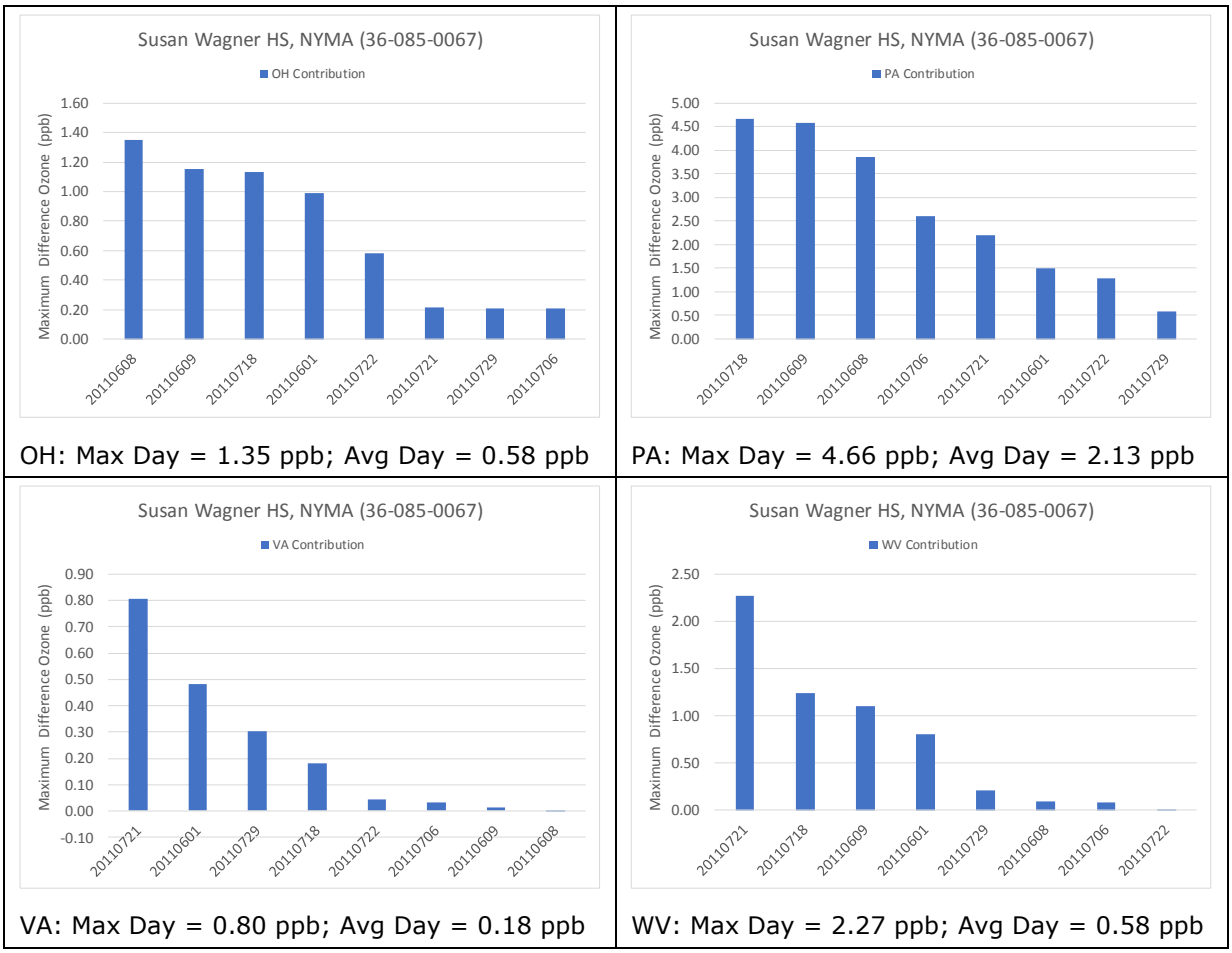
[40] https://www.epa.gov/sites/production/files/2017-06/documents/2010-17007_0.pdf

Table 3-4. CSAPR Average Day Contribution Metric using NY DEC 2017 CMAQ zero-out modeling results with ozone contributions of at least 1% of the NAAQS shaded orange at nonattainment/maintenance receptors under the 2008 ozone NAAQS.

Monitoring Site		County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	IS 52*	Bronx	6-005-011	67.0	-	-	-	-	-	-	-	-	-	-	-
	Pfizer Lab	Bronx	6-005-013	70.3	71.6	73.5	0.063	0.229	0.242	0.398	0.321	0.509	1.548	0.143	0.429
	CCNY*	New York	6-061-013	70.7	69.3	71.8	0.063	0.202	0.187	0.480	0.339	0.520	1.965	0.322	0.481
	Queens C	Queens	6-081-012	74.3	73.8	75.7	0.057	0.096	0.071	0.320	0.251	0.384	1.272	0.229	0.292
	Susan Wa	Richmond	6-085-006	76.0	75.8	77.4	0.058	0.199	0.178	0.435	0.232	0.588	2.138	0.188	0.583
	Rockland	Rockland	6-087-000	72.0	67.5	68.4	0.051	0.255	0.173	0.154	0.234	0.440	1.173	0.153	0.332
	Babylon	Suffolk	6-103-000	76.0	76.8	78.4	0.068	0.142	0.088	0.316	0.179	0.320	0.930	0.224	0.180
	Riverhead	Suffolk	6-103-000	76.7	70.6	72.5	0.043	0.082	0.037	0.392	0.099	0.153	0.623	0.363	0.122
	Holtsville	Suffolk	6-103-000	69.0	72.9	74.1	0.036	0.069	0.038	0.204	0.123	0.178	0.516	0.136	0.106
	White Pla	Westches	6-119-200	73.3	71.5	72.1	0.061	0.221	0.166	0.224	0.217	0.473	0.946	0.154	0.334
Upstate	Dunkirk	Chautauq	6-013-000	68.7	64.9	67.3	0.229	0.801	0.249	0.112	0.873	1.917	0.007	0.094	0.023
	Millbrook	Dutchess	6-02-7000	67.0	62.7	64.4	0.042	0.205	0.112	0.188	0.077	0.394	0.735	0.066	0.161
	Amherst	Erie	6-029-000	70.3	63.6	65.1	0.173	1.007	0.571	0.097	0.745	1.628	0.042	0.060	0.053
	Whiteface	Essex	6-031-000	64.3	62.0	64.4	0.349	0.560	0.084	0.011	0.660	0.718	0.044	0.055	0.116
	Rocheste	Monroe	6-055-100	66.3	-	-	-	-	-	-	-	-	-	-	-
	Middlepor	Niagara	6-063-100	66.3	65.8	68.2	0.196	0.757	0.406	0.049	0.802	1.261	0.036	0.047	0.166
	East Syra	Onondag	6-067-101	64.7	62.1	64.5	0.376	0.432	0.120	0.052	0.492	0.376	0.128	0.083	0.175
	Valley Ce	Orange	6-071-500	65.0	59.6	61.4	0.009	0.020	0.007	0.092	0.078	0.302	0.712	0.101	0.192
	Fulton	Oswego	6-075-000	61.3	60.2	62.0	0.324	0.365	0.055	0.010	0.533	0.478	0.076	0.055	0.142
	Mt. Ninha	Putnam	6-079-000	70.0	61.3	62.2	0.035	0.185	0.140	0.237	0.106	0.287	0.930	0.140	0.255
	Williamsc	Wayne	6-117-300	64.3	57.7	59.5	0.234	0.321	0.042	0.015	0.649	0.576	0.098	0.080	0.134
	Significant contribution under 2008 NAAC														
*Shared grid cell for IS52 and CCNY results in identical concentrations															

3.1.6 NY Petition Maximum Day Contribution Metric Focuses on Single Days with Atypical Upwind State Ozone Contributions

Figure 3-1 displays example ozone contributions from four Upwind States to the NYMA Susan Wagner HS ozone monitor from the NY Petition CMAQ modeled 2017 high (≥ 71 ppb) MDA8 ozone days that were used in the Maximum Day Contribution Metric. The value for the CSAPR Average Day Contribution Metric is also shown in Figure 3-1. When the CMAQ 2017 MDA8 ozone concentrations are above 71 ppb, there is a range of ozone contributions from the upwind State Named Sources to 2017 ozone concentrations at NY monitoring sites. The NY Petition selection of the day with the very highest upwind State ozone contribution focuses on a day with an atypically high upwind State ozone contribution that introduces an overestimation bias in the NY Petition's contribution analysis. For example, the WV Named Sources highest contribution to MDA8 ozone above 71 ppb at the Susan Wagner HS monitor is 2.27 ppb. This is almost 2 times (1.85x) higher than the day with the second highest contribution (1.23 ppb) and almost 4 times higher (3.9x) than the CSAPR Average Day Contribution Metric that is more consistent with the form of the ozone DV and EPA guidance for making ozone DV projections. Using the NY Petition CMAQ zero-out modeling results, across the four example upwind States in Figure 3-1, the NY Petition Maximum Day Contribution Metric is 2.2 to 4.4 times higher (i.e. 120% to 340% higher) than the CSAPR Average Day Contribution Metric. Clearly, the NY Petition Maximum Day Contribution Metric overstates upwind State contributions to ozone DVs so is not an accurate or reliable basis on which to base contribution calculations.



OH: Max Day = 1.35 ppb; Avg Day = 0.58 ppb

PA: Max Day = 4.66 ppb; Avg Day = 2.13 ppb

VA: Max Day = 0.80 ppb; Avg Day = 0.18 ppb

WV: Max Day = 2.27 ppb; Avg Day = 0.58 ppb

Figure 3-1. NY DEC CMAQ zero-out modeling upwind State 2017 Maximum (Max) and Average (Avg) Days Ozone Contribution Metric at Susan Wagner HS monitor on days with CMAQ 2017 MDA8 ozone ≥ 71 ppb.

3.1.7 Conclusions on the Effects of the Deficiencies of NY Petition Ozone Contribution Analysis

Ramboll has identified numerous deficiencies in the 2017 CMAQ zero-out modeling procedures used in the NY Petition:

- Use of an incomplete modeling period that only models approximately half of the ozone season.
- Use of an inappropriate modeling approach (zero-out) to obtain source contributions to ozone concentrations at ozone monitors in the State of NY.
- Use of inaccurate projected 2017 emissions that overstate actual 2017 emissions.
- Failure to follow the first step of EPA's Four Step Transport Framework by not identifying which monitoring sites are nonattainment/maintenance receptors and inferring that upwind States are linked to downwind nonattainment/maintenance at monitoring sites that in fact attain the ozone NAAQS.

- Use of the Maximum Day Contribution Metric that is inconsistent with the form of the ozone DV and inconsistent with EPA's guidance for PGM modeling, resulting in overstated ozone contributions from upwind States.

These deficiencies in the procedures used by the NY Petition render its estimates of the contributions of Named Sources in the 9 upwind States inaccurate and unreliable.

3.2 CSAPR-Approximate Calculation of Ozone Contributions

As an initial independent assessment of the NY Petition's ozone contribution calculations, we developed the CSAPR-Approximate approach for estimating downwind ozone contributions using the CSAPR Update modeling results. In the CSAPR-Approximate ozone contribution approach, we scale the CSAPR Update upwind State's ozone contribution to a downwind ozone DV by the ratio of the Named Sources NOx emissions in an upwind State to the upwind State's total 2017 NOx emissions used in the CSAPR Update ozone contribution assessment. Table 3-5 displays the upwind State total NOx emissions from the NY Petition Named Sources, the state-wide total NOx emissions from the CSAPR Update and their ratio. The ratio (last column in Table 3-5) is what is used to scale the CSAPR Update whole upwind State anthropogenic NOx and VOC emissions contributions to obtain the CSAPR-Approximate ozone contribution due to just the upwind State's Named Sources. For example, in the CSAPR Update the 2017 total anthropogenic NOx and VOC emissions from Ohio contributed 2.41 ppb to downwind nonattainment at the Susan Wagner HS monitor in the NYMA. As the NY Petition Named Sources in Ohio represents 26% of the Ohio state-wide NOx emissions (Table 3-5), the CSAPR-Approximate approach scales the CSAPR Update ozone contribution by a factor of 0.26 to obtain an Ohio Named Sources ozone contribution of 0.62 ppb (0.62 = 2.41 x 0.26). Because ozone formation is nonlinear, and the spatial distribution of the Named Sources NOx emissions are different than the total State-wide NOx emissions (which include mobile sources of NOx), the CSAPR-Approximate approach that scaled the CSAPR Update State-specific ozone contributions are slightly different from explicit source apportionment modeling of the Named Sources NOx emissions using the CSAPR modeling approach. The CSAPR Update also modeled the state-wide contributions of total anthropogenic NOx and VOC emissions, whereas the NY Petition has only identified and modeled the Named Sources NOx emissions.

Table 3-5. Total NOx emissions in each upwind State from for the NY Petition Named Sources compared with total NOx emissions for each upwind State from the CSAPR Update 2017 modeling.[41]

State	NOx Emissions from 400 Ton-per-Year Stationary				2017	400tpy
	EGUs	Non-EGUs	Oil & Gas Sector	Total	CSAPR	%CSAPR
IL	33,514.3	21,353.0	11,105.2	65,972.5	358,286	18%
IN	88,748.1	52,762.0	6,895.2	148,405.3	326,059	46%
KY	64,682.7	10,543.6	2,672.2	77,898.5	251,174	31%
MD	15,573.4	8,918.0	1,206.0	25,697.4	111,618	23%
MI	44,702.8	30,300.6	4,537.6	79,541.0	316,933	25%
NJ	3,265.9	2,968.6	0.0	6,234.5	134,868	5%
OH	65,876.0	29,255.6	4,634.7	99,766.3	384,429	26%
PA	53,339.2	28,934.6	1,173.4	83,447.2	424,900	20%
VA	17,439.8	20,081.2	3,060.8	40,581.8	214,366	19%
WV	45,242.8	9,318.6	7,091.6	61,653.0	157,946	39%

Table 3-6 displays the results of the CSAPR-Approximate upwind State Average Day Ozone Contributions to downwind nonattainment/maintenance at monitoring sites in the State of NY. Although there are numerous differences, the CSAPR-Approximate (Table 3-6) and post-processing of the NY DEC CMAQ zero-out modeling results to generate the Average Day Contribution Metric (Table 3-4) identify Pennsylvania as the only one of the 9 upwind States that contributes more than 1% of the 2008 ozone NAAQS to 2017 nonattainment/maintenance receptors.

Table 3-6. CSAPR-Approximate estimate of the ozone contributions of the NY Petition Named Sources using scaling of the CSAPR Update total upwind State Average Day Contribution Metric.

	Monitoring Site	County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	IS 52*	Bronx	36-005-0110	67.0	-	-	-	-	-	-	-	-	-	-	-
NYMA	Pfizer Lab	Bronx	36-005-0133	70.3	71.6	73.5	0.149	0.528	0.254	0.437	0.168	0.599	2.394	0.371	0.554
NYMA	CCNY*	New York	36-061-0135	70.7	69.3	71.8	0.118	0.296	0.205	0.608	0.156	0.490	2.469	0.456	0.570
NYMA	Queens College 2	Queens	36-081-0124	74.3	73.8	75.7	0.168	0.373	0.099	0.419	0.484	0.592	1.573	0.375	0.308
NYMA	Susan Wagner HS	Richmond	36-085-0067	76.0	75.8	77.4	0.125	0.428	0.319	0.573	0.166	0.625	2.869	0.437	0.749
NYMA	Rockland County	Rockland	36-087-0005	72.0	67.5	68.4	0.074	0.146	0.043	0.329	0.166	0.361	1.123	0.254	0.386
NYMA	Babylon	Suffolk	36-103-0002	76.0	76.8	78.4	0.140	0.460	0.202	0.327	0.319	0.607	1.722	0.290	0.383
NYMA	Riverhead	Suffolk	36-103-0004	76.7	70.6	72.5	0.094	0.296	0.133	0.403	0.198	0.405	1.377	0.263	0.308
NYMA	Holtsville	Suffolk	36-103-0009	69.0	72.9	74.1	0.114	0.328	0.143	0.387	0.299	0.454	1.332	0.244	0.250
NYMA	White Plains	Westchester	36-119-2004	73.3	71.5	72.1	0.116	0.551	0.310	0.578	0.141	0.561	1.942	0.352	0.593
Upstate	Dunkirk	Chautauqua	36-013-0006	68.7	64.9	67.3	0.446	1.406	0.419	0.000	0.868	3.908	0.699	0.004	0.101
Upstate	Millbrook	Dutchess	36-02-70007	67.0	62.7	64.4	0.072	0.196	0.071	0.580	0.201	0.418	1.335	0.367	0.336
Upstate	Amherst	Erie	36-029-0002	70.3	63.6	65.1	0.376	1.548	0.456	0.002	0.590	2.292	0.373	0.006	0.129
Upstate	Whiteface Mt.	Essex	36-031-0002	64.3	62.0	64.4	0.460	1.425	0.205	0.014	0.893	1.609	0.251	0.059	0.246
Upstate	Rochester 2	Monroe	36-055-1007	66.3	-	-	--	--	--	--	--	--	--	--	--
Upstate	Middleport	Niagara	36-063-1006	66.3	65.8	68.2	0.350	1.174	0.273	0.014	0.876	2.107	0.326	0.076	0.351
Upstate	East Syracuse	Onondaga	36-067-1015	64.7	62.1	64.5	0.390	1.074	0.161	0.025	0.552	1.002	0.371	0.081	0.324
Upstate	Valley Central HS	Orange	36-071-5001	65.0	59.6	61.4	0.042	0.086	0.037	0.191	0.113	0.254	0.988	0.187	0.265
Upstate	Fulton	Oswego	36-075-0003	61.3	60.2	62.0	0.354	0.951	0.121	0.030	0.655	1.404	0.854	0.121	0.656
Upstate	Mt. Ninham	Putnam	36-079-0005	70.0	61.3	62.2	0.053	0.123	0.050	0.412	0.198	0.278	0.990	0.240	0.304
Upstate	Williamson	Wayne	36-117-3001	64.3	57.7	59.5	0.320	0.956	0.136	0.018	0.602	1.157	0.326	0.074	0.312

[41] The 400 Ton-per-Year Stationary Named Sources NOx emissions came from Appendix B of the NY Petition while the CSAPR Update 2017 State total NOx emissions were from the EPA V6.3 2017ek emissions inventory documentation: https://www.epa.gov/air-emissions-modeling/2011-version-63-platform

3.3 Conclusions Regarding the NY Petition Ozone Significance Modeling

The CSAPR-Approximate approach uses the Average Day Contribution Metric and accounts for which NY monitors are nonattainment/maintenance receptors. It shows that ozone contributions from the Named Sources in 8 of the 9 upwind States contribute less than 1% of the 2008 ozone NAAQS to ozone DVs in NY (Table 3-6). This is consistent with the post-processing of the NY Petition CMAQ upwind State Named Sources zero-out modeling using EPA's Average Day Contribution Metric that also showed that Named Sources in 8 of the 9 upwind States do not contribute ozone concentrations at a NYMA nonattainment/maintenance receptor of over 1% of the 2008 ozone NAAQS (Table 3-4).

3.4 Contributions to Receptors in Connecticut and New Jersey

Although the focus of this report is on the NY Petition and its allegations that the Named Sources in 9 upwind States contribute significantly to ozone nonattainment/maintenance in the State of NY, the NY Petition presents ozone contributions to monitoring sites in CT and NJ (NY Petition Table 3, re-procedures as Table 1-2). Appendix B presents the results of the contribution analysis for sites in CT and NJ as discussed above for sites in NY.

4. SENSITIVITY MODELING OF THE NAMED SOURCES OZONE CONTRIBUTIONS

Sensitivity modeling was conducted of the Named Sources in the 9 upwind States using the CSAPR Update 2017 modeling approach and database to estimate ozone contributions at downwind State monitoring sites (2017 Sensitivity Modeling). The 2017 Sensitivity Modeling used basically the same modeling approach as used in the CSAPR Update only with some of the projected 2017 emissions updated to almost actual 2017 emissions for sources where such information was currently readily available.

4.1 2017 Sensitivity Modeling Database

The 2017 Sensitivity modeling was built off the CSAPR Update 2017 modeling database with the following updates:

- Use of the 2017 MARAMA Beta 2 2017 projected emissions.
- Use of a smaller 12-km modeling domain that focuses on the eastern U.S.
- Update of the 2017 projected emissions with estimates of 2017 actual emissions for sources for which information was readily available.
- Use of the latest (April 2018) released version (v6.5) of CAMx.

4.1.1 2017 MARAMA Beta 2 Emissions

The 2017 Sensitivity Modeling started with the 2017 MARAMA Beta 2 emissions, which were the same 2017 emissions as used in the NY Petition 2017 CMAQ zero-out modeling. The MARAMA 2017 Beta 2 emissions in turn were based on the EPA 2011 v6.3 modeling platform 2017ek emissions, which were essentially the same 2017 emissions as used in the CSAPR Update modeling. MARAMA updated the EPA 2017ek emissions for the northeast States, thus the MARAMA 2017 Beta emissions for the 9 upwind States were essentially the same as used in the CSAPR Update (i.e., EPA v6.3 platform 2017ek).

As discussed in section 4.1.3, the MARAMA Beta 2 Emissions dataset was further updated to use 2017 CAMD NOx data for EGUs and actual 2017 emissions data for a few other industrial facilities.

4.1.2 Eastern U.S. 12-km Modeling Domain Update

The CSAPR Update used a 12-km grid resolution continental U.S. (CONUS2) modeling domain that covered the lower 48 contiguous States plus portions of southern Canada and northern Mexico (Figure 4-1, outer domain). Because prevailing winds tend to transport pollutants from west to east and the farthest west of the 9 upwind States is Illinois, then most of the CONUS2 domain is not needed for this assessment of the 9 upwind State contributions to ozone in NY. Thus, for the 2017 Sensitivity Modeling we used the same NYS - OTC 12 km domain, which is the same as the MARAMA northeast States 12-km domain, that includes all 9 upwind States, with a buffer, plus all the northeast States (Figure 4-1, inner domain). This is the same NYS - OTC 12-km modeling domain that the NY Petition used in their 2017 CMAQ zero-out modeling. A separate CAMx 2017 base case 12-km CONUS2 domain simulation was performed that output three-dimensional hourly average concentrations that were processed to obtain 2017 hourly Boundary Conditions (BCs) for the 12-km NYS - OTC northeast States domain for the 2017 Sensitivity Modeling.

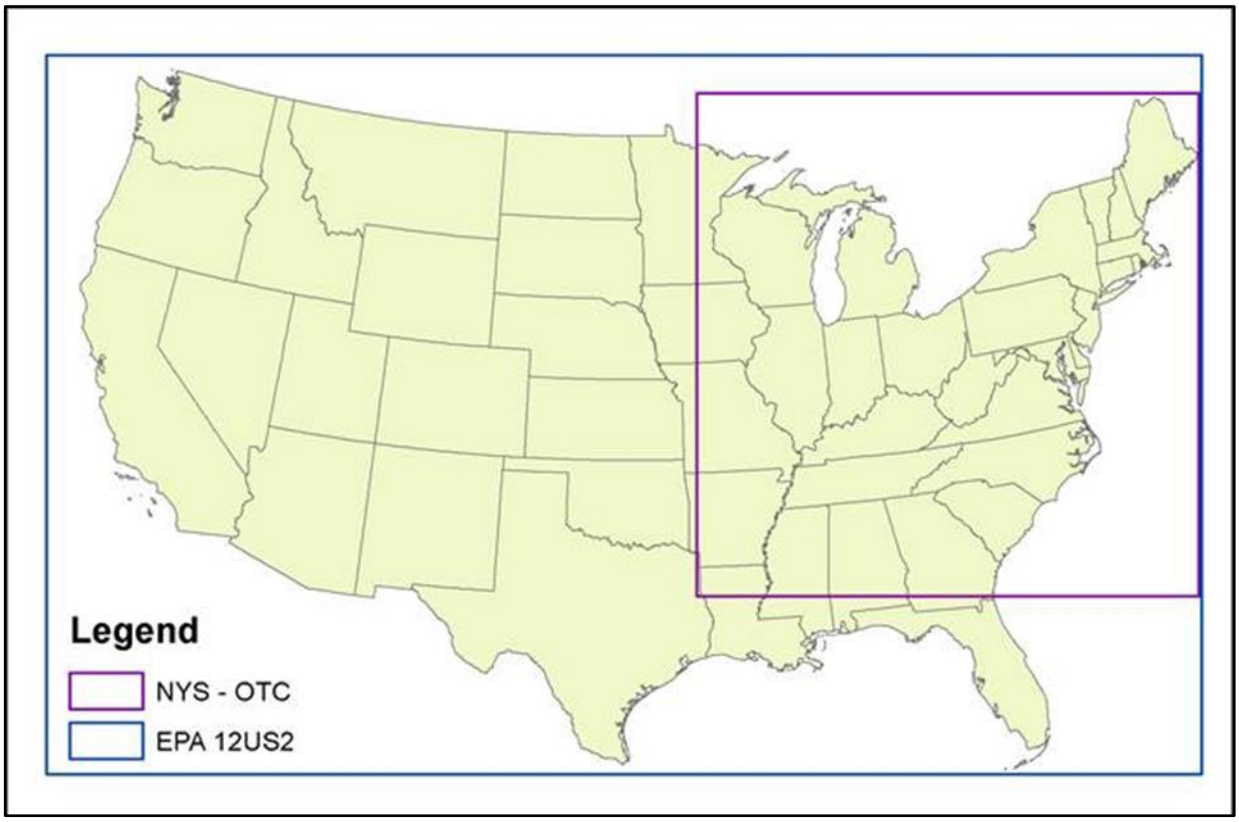


Figure 4-1. CAMx 12-km grid resolution CONUS2 modeling domain used in the CSAPR Update CAMx 2017 ozone source apportionment modeling (see CSAPR Update AQTSD[42]) and NYS - OTC northeast States 12-km grid resolution domain used in the 2017 Sensitivity Modeling.

4.1.3 2017 Emission Updates

The 2017 MARAMA Beta 2 emissions were updated to included estimates of actual emissions for source categories for which 2017 actual emissions information was readily available. The EPA Clean Air Markets Division (CAMD) website provides 2017 hourly SO_2 and NOx emissions and heat input data from Continuous Emissions Monitors (CEM) for major (> 25 MW) Electrical Generating Units (EGUs) in a form that can easily be incorporated in the modeling files by cross referencing through unique ORIS code identifiers. When hourly CEM data are missing, EGU sources must follow missing data substitution routines outlined in 40 CFR 75; this may result in conservatively high (up to maximum potential) emission rates being reported to CAMD. To provide more realistic emissions inputs for modeling, we use a processor that replaces the emissions for hours flagged in CAMD as having missing data with typical average hourly emissions from previous days for that hour of the day. The processed EPA CAMD 2017 hourly emissions were used in place of the 2017 projected emissions in the 2017 Sensitivity Modeling for large EGU sources.

The EPA CAMD website also has some 2017 CEM reporting for industrial facilities as part of the Part 75 reporting to demonstrate compliance with the NOx SIP call. However, these data did not

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

have unique identifiers that could cross-reference with the 2017 modeling emissions files so could not be incorporated into the 2017 Sensitivity modeling.

However, for a few industrial facilities we did obtain estimates of 2017 actual emissions that were used in the 2017 Sensitivity Modeling.

Table 4-1 displays the upwind State's Named Sources NOx emissions by upwind State and by the three major source types (EGU, nonEGU and Oil&Gas) as reported in the NY Petition (NY Petition, Appendix B). The total 2017 NOx emissions from the Named Sources across the 9 upwind States plus NJ are 124,085 tpy, which is 18% lower than what was assumed in the NY Petition. Most (~94%) of the emission differences in the 2017 emission estimates we used compared to those used by the NY Petition were from the EGU source sector whose 2017 actual emissions were readily available; the actual EGU 2017 NOx emissions were much lower than the projected 2017 EGU emissions used in the NY Petition. The other source sectors almost actual emissions may have also been much lower, but the information was not currently readily available for incorporation in the 2017 Sensitivity Modeling database.

Table 4-1. Comparison of the Named Sources NOx emissions by upwind State from the projected Named Sources as in the NY Petition Appendix B (EPA v6.3 2017ek and MARAMA Beta 2017 emission Projections) and the projected 2017 emissions updated with estimates of 2017 actual emissions for some sources.

Source Type	State	Projected 2017 NOx Emissions (from NY Petition Appendix B)	Updated 2017 NOx Emissions (MARAMA 2017 Beta with Updated 2017 Actual)	Percent Difference
EGU	IL	33,514	28,000	-16%
	IN	88,748	60,975	-31%
	KY	64,683	45,156	-30%
	MD	15,573	5,898	-62%
	MI	44,703	32,614	-27%
	OH	65,876	54,242	-18%
	PA	53,339	31,682	-41%
	VA	17,440	12,743	-27%
	WV	45,243	42,171	-7%
EGU Total		429,119	313,481	-27%
nonEGU	IL	21,353	20,819	-3%
	IN	52,762	51,536	-2%
	KY	10,544	10,622	1%
	MD	8,918	8,918	0%
	MI	30,301	30,341	0%
	OH	29,256	28,993	-1%
	PA	28,935	28,934	0%
	VA	20,081	20,081	0%
	WV	9,319	9,319	0%
nonEGU Total		211,467	209,563	-1%
Oil&Gas	IL	11,105	11,037	-1%
	IN	6,895	4,990	-28%
	KY	2,672	2,232	-16%
	MD	1,206	1,206	0%
	MI	4,538	4,357	-4%
	OH	4,635	4,405	-5%
	PA	1,173	1,173	0%
	VA	3,061	3,061	0%
	WV	7,092	4,921	-31%
Oil&Gas Total		42,377	37,381	-12%
Named Srcs	IL	65,973	59,855	-9%
	IN	148,405	117,501	-21%
	KY	77,899	58,010	-26%
	MD	25,697	16,022	-38%
	MI	79,541	67,311	-15%
	OH	99,766	87,640	-12%
	PA	83,447	61,790	-26%
	VA	40,582	35,885	-12%
	WV	61,653	56,410	-9%
Total Named Srcs		682,963	560,425	-18%

4.1.4 CAMx 2017 Sensitivity Source Apportionment Modeling

The CAMx 2017 Named Sources Sensitivity modeling used the same approach as the CSAPR Update 2017 modeling, only with the smaller eastern U.S. 12 km domain (Figure 4-1) and 2017 emissions updated with almost actuals estimates as described above. The 2017 Sensitivity Modeling also used CAMx version 6.5 (v6.5) released in April 2018, rather than CAMx v6.2 released in March 2015 that was used in the CSAPR Update modeling. CAMx v6.5 has several updates, but should not substantially change ozone concentrations or upwind State ozone contributions. The same Named Sources as listed in NY Petition Appendix B were tagged to obtain separate Named Source ozone contributions for each of the 9 upwind States and NJ. Results were post-processed using EPA's current Average Day Contribution Metric approach to obtain upwind State-specific Named Sources ozone contributions to ozone DVs in NY and other states.

4.2 Results of the Updated 2017 Named Sources Sensitivity Modeling

Table 4-2 displays the 9 upwind State Named Sources NOx emissions ozone contributions to 2017 ozone DVs in the State of New York from the 2017 Sensitivity Modeling using the Average Day Contribution Metric. The Named Sources upwind State ozone contributions to NY 2017 ozone DVs are slightly higher in the 2017 Sensitivity Modeling (Table 4-1) than in the CSAPR-Approximate (Table 3-6) or processing of the NY Petition CMAQ zero-out modeling (Table 3-4). All three ozone contribution modeling approaches (2017 Sensitivity, CSAPR Approximate and NY Petition CMAQ zero-out) estimate that 7 of the 9 states have ozone contributions that are below the 1% of the NAAQS threshold at all 2017 nonattainment/maintenance receptors in NY. Pennsylvania is the only State showing a Named Sources ozone contribution of greater than 1% of the NAAQS at nonattainment/maintenance receptors in the State of NY. However, the 2017 Sensitivity Modeling estimates that the WV Named Sources will have a greater than 1% of the 2008 ozone NAAQS contribution to the NYMA Susan Wagner HS receptor (0.89 ppb), while the CSAPR-approximate (0.74 ppb) and NY Petition CMAQ zero-out modeling approach (0.58 ppb) estimate WV ozone contributions to Susan Wagner HS NYMA receptors that are below 1% of the ozone NAAQS threshold.

Table 4-2. Upwind State Named Sources ozone contributions to 2017 ozone DVs in the State of NY using the Average Day Contribution Metric and the 2017 Sensitivity Modeling with updated 2017 emissions.

Monitoring Site		County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	IS 52*	Bronx	6-005-011	67.0	-	-	-	-	-	-	-	-	-	-	-
	Pfizer Lab	Bronx	6-005-013	70.3	71.6	73.5	0.176	0.390	0.328	0.277	0.323	0.669	1.706	0.231	0.645
	CCNY*	New York	6-061-013	70.7	69.3	71.8	0.139	0.300	0.288	0.283	0.242	0.597	1.742	0.267	0.665
	Queens C	Queens	6-081-012	74.3	73.8	75.7	0.163	0.342	0.290	0.279	0.353	0.637	1.625	0.284	0.636
	Susan Wa	Richmond	6-085-006	76.0	75.8	77.4	0.174	0.376	0.365	0.354	0.266	0.739	2.381	0.372	0.889
	Rockland	Rockland	6-087-000	72.0	67.5	68.4	0.060	0.155	0.152	0.245	0.176	0.368	1.428	0.227	0.471
	Babylon	Suffolk	6-103-000	76.0	76.8	78.4	0.135	0.252	0.197	0.282	0.210	0.403	1.308	0.319	0.416
	Riverhead	Suffolk	6-103-000	76.7	70.6	72.5	0.088	0.169	0.122	0.149	0.167	0.268	0.882	0.124	0.238
	Holtsville	Suffolk	6-103-000	69.0	72.9	74.1	0.131	0.252	0.188	0.210	0.322	0.453	1.202	0.215	0.361
	White Pla	Westches	6-119-200	73.3	71.5	72.1	0.091	0.227	0.218	0.288	0.171	0.408	1.359	0.239	0.483
Upstate	Dunkirk	Chautauq	6-013-000	68.7	64.9	67.3	0.324	0.703	0.597	0.033	0.529	1.461	0.219	0.058	0.200
	Millbrook	Dutchess	6-02-7000	67.0	62.7	64.4	0.044	0.095	0.062	0.177	0.181	0.281	1.116	0.180	0.275
	Amherst	Erie	6-029-000	70.3	63.6	65.1	0.349	0.841	0.809	0.009	0.949	1.580	0.113	0.083	0.375
	Whiteface	Essex	6-031-000	64.3	62.0	64.4	-	-	-	-	-	-	-	-	-
	Rocheste	Monroe	6-055-100	66.3	-	-	-	-	-	-	-	-	-	-	-
	Middlepor	Niagara	6-063-100	66.3	65.8	68.2	0.303	0.631	0.392	0.046	0.838	0.846	0.262	0.106	0.243
	East Syra	Onondag	6-067-101	64.7	62.1	64.5	0.359	0.619	0.245	0.027	0.593	0.815	0.342	0.123	0.364
	Valley Ce	Orange	6-071-500	65.0	59.6	61.4	0.033	0.058	0.032	0.096	0.150	0.197	0.778	0.137	0.232
	Fulton	Oswego	6-075-000	61.3	60.2	62.0	0.335	0.516	0.177	0.026	0.878	0.749	0.260	0.145	0.404
	Mt. Ninha	Putnam	6-079-000	70.0	61.3	62.2	0.087	0.182	0.191	0.196	0.179	0.335	1.191	0.143	0.371
	Williamsc	Wayne	6-117-300	64.3	57.7	59.5	0.274	0.436	0.202	0.036	0.628	0.681	0.240	0.098	0.250

4.3 2017 Sensitivity Modeling for Named Sources that are not Electrical Generating Units

A second CAMx 2017 source apportionment sensitivity simulation was performed that analyzed the ozone contributions of the Named Sources that were not EGUs (i.e., the nonEGU plus Oil&Gas Named Sources). The reason for conducting this second 2017 sensitivity simulations is that the CSAPR Update required NOx controls on EGUs to meet State-specific NOx emission budgets in 22 eastern States and the CSAPR Close-Out has proposed that the CSAPR Update EGU NOx controls satisfy the CAA Section 110 good neighbor provision under the 2008 ozone NAAQS for the upwind States.[43] Therefore, the Named EGU sources are already subject to NOx controls under the good neighbor provision to reduce upwind States ozone contributions to downwind ozone nonattainment/maintenance issues in NY. However, the sources named in the NY Petition that are non-EGUs or Oil & Gas sources were not subject to the CSAPR Update controls, so the other ozone contributions were examined in a second 2017 CAMx source apportionment sensitivity test.

Table 4-1 displays NOx emissions from the named nonEGU and Oil&Gas sources used in the second 2017 sensitivity test. The percent contribution of the non-EGU and Oil & Gas sources to the total Named Sources' NOx emissions by upwind State is shown in Table 4-3 below. The non-EGU and Oil & Gas sources contribute from 22% (KY) to 64% (VA) of the total State-wide Named Sources NOx emissions.

The resulting upwind State ozone contributions to monitoring sites in NY using the second 2017 CAMx sensitivity simulation and the Average Day Contribution Metric are shown in Table 4-4. Only one upwind State to downwind NYMA monitor has an ozone contribution greater than 1% of

[43] Note that the CSAPR Close-Out addressed the good neighbor provision for 8 of the 9 upwind States. KY is being addressed by direction action of EPA approval of their SIP.

the 2008 ozone NAAQS with 8 of the 9 upwind States having ozone contributions at all NY monitoring sites that are below 1% of the NAAQS.

Table 4-3. Percent of the NOx emissions due to non-EGU plus Oil & Gas sources to the total State-wide Named Sources NOx emissions.

State	Percent
IL	53%
IN	48%
KY	22%
MD	63%
MI	52%
OH	38%
PA	49%
VA	64%
WV	25%
Total	44%

Table 4-4. Upwind State nonEGU plus Oil&Gas Named Sources ozone contributions to 2017 ozone DVs in the State of NY using the Average Day Contribution Metric and the 2017 Sensitivity Modeling with updated 2017 emissions.

Monitoring Site		County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	IS 52*	Bronx	36-005-0110	67.0	-	-	-	-	-	-	-	-	-	-	-
	Pfizer Lab	Bronx	36-005-0133	70.3	71.6	73.5	0.080	0.178	0.065	0.143	0.117	0.229	0.770	0.111	0.147
	CCNY*	New York	36-061-0135	70.7	69.3	71.8	0.063	0.137	0.061	0.148	0.086	0.194	0.820	0.128	0.147
	Queens College 2	Queens	36-081-0124	74.3	73.8	75.7	0.073	0.159	0.060	0.148	0.123	0.228	0.756	0.133	0.139
	Susan Wagner HS	Richmond	36-085-0067	76.0	75.8	77.4	0.078	0.169	0.079	0.187	0.099	0.231	1.187	0.178	0.191
	Rockland County	Rockland	36-087-0005	72.0	67.5	68.4	0.027	0.070	0.031	0.142	0.070	0.120	0.621	0.114	0.103
	Babylon	Suffolk	36-103-0002	76.0	76.8	78.4	0.062	0.115	0.038	0.133	0.082	0.141	0.608	0.147	0.104
	Riverhead	Suffolk	36-103-0004	76.7	70.6	72.5	0.041	0.076	0.024	0.072	0.065	0.104	0.466	0.062	0.063
	Holtsville	Suffolk	36-103-0009	69.0	72.9	74.1	0.061	0.118	0.037	0.111	0.113	0.191	0.589	0.107	0.098
	White Plains	Westchester	36-119-2004	73.3	71.5	72.1	0.045	0.096	0.044	0.152	0.066	0.129	0.598	0.114	0.111
Upstate	Dunkirk	Chautauqua	36-013-0006	68.7	64.9	67.3	0.152	0.320	0.079	0.024	0.158	0.855	0.094	0.031	0.046
	Millbrook	Dutchess	36-02-70007	67.0	62.7	64.4	0.020	0.048	0.012	0.092	0.075	0.091	0.455	0.094	0.066
	Amherst	Erie	36-029-0002	70.3	63.6	65.1	0.155	0.370	0.124	0.006	0.236	0.894	0.065	0.054	0.102
	Whiteface Mt.	Essex	36-031-0002	64.3	62.0	64.4	-	-	-	-	-	-	-	-	-
	Rochester 2	Monroe	36-055-1007	66.3	-	-	-	-	-	-	-	-	-	-	-
	Middleport	Niagara	36-063-1006	66.3	65.8	68.2	0.141	0.308	0.051	0.027	0.246	0.540	0.098	0.059	0.071
	East Syracuse	Onondaga	36-067-1015	64.7	62.1	64.5	0.198	0.308	0.036	0.019	0.186	0.435	0.122	0.076	0.089
	Valley Central HS	Orange	36-071-5001	65.0	59.6	61.4	0.015	0.032	0.007	0.058	0.061	0.069	0.329	0.073	0.051
	Fulton	Oswego	36-075-0003	61.3	60.2	62.0	0.178	0.283	0.028	0.018	0.248	0.408	0.111	0.091	0.100
	Mt. Ninham	Putnam	36-079-0005	70.0	61.3	62.2	0.042	0.080	0.044	0.106	0.077	0.094	0.488	0.074	0.086
	Williamson	Wayne	36-117-3001	64.3	57.7	59.5	0.129	0.223	0.031	0.021	0.177	0.385	0.106	0.057	0.071

5. EFFECTS OF ALTERNATIVE SIGNIFICANT CONTRIBUTION THRESHOLDS

In Chapters 2 and 3 we used the one percent (1%) of the NAAQS contribution threshold to illustrate which upwind State Named Sources' NOx emissions may be linked to a NY nonattainment and/or maintenance receptor. In the 2012 CSAPR and 2016 CSAPR Update rules, EPA used 1% of the NAAQS as a significant contribution threshold to determine whether an upwind State was linked significantly to a downwind receptor as part of Step 2 of the Four Step Transport Framework. However, other significant contribution thresholds may also be valid and are explored in this Chapter.

5.1 Development of Significant Contribution Metrics Used in EPA's Transport Rules

EPA's definition of a significant contribution threshold and how to determine when an upwind State ozone contribution to a downwind nonattainment/maintenance receptor represents a significant contribution to nonattainment has evolved over the last 20 years.

5.1.1 1998 NOx SIP Call

The 1998 NOx SIP Call[44] estimated the contributions of upwind State contributions to downwind ozone nonattainment using state-wide NOx and VOC anthropogenic emissions zero-out modeling. Contribution metrics were developed that characterized the frequency and magnitude of the upwind State's emissions contributions to downwind ozone concentrations that EPA analyzed to identify which linkages they believed were significant contributions. There was no "bright line" used to define a significant contribution, as used in more recent transport rules.

5.1.2 2005 CAIR

The proposed 2004 Clean Air Interstate Rule (CAIR) and final 2005 CAIR assessed upwind State contributions to downwind nonattainment/maintenance using both zero-out and source apportionment modeling.[45,46] Several contribution metrics were calculated to estimate the frequency, magnitude and relative amount of the contribution of the upwind State's emissions to a downwind State's nonattainment/maintenance problem in order to establish a link between upwind and downwind States. CAIR used a four-step process to determine which linkages merited additional analysis for significant contribution: (1) initial screening of linkages that have small contributions so were eliminated from further consideration; (2) evaluation of the zero-out contribution metrics; (3) evaluation of the source apportionment contributions metrics; and (4) a determination by EPA of which linkages merited additional analysis by an overall assessment of the contribution metrics evaluated in Steps 2 and 3.

5.1.3 2011 CSAPR TO PRESENT

For the proposed (2010) and final (2011) Cross State Air Pollution Rule (CSAPR), ozone source apportionment modeling was used to estimate upwind State contributions to downwind State nonattainment/maintenance. The proposed and final CSAPR transport rules were the first time EPA used the 1% of the NAAQS significant contribution threshold as a bright line to determine

[44] https://archive.epa.gov/ttn/ozone/web/html/related-3.html
[45] https://archive.epa.gov/airmarkets/programs/cair/web/pdf/tsd0162.pdf
[46] https://archive.epa.gov/airmarkets/programs/cair/web/pdf/finaltech02.pdf

which linkages were significant.[47] The proposed CSAPR justifies the use of the 1% of the NAAQS significance threshold with their Average Day Contribution Metric as follows:

> *"The proposed approach uses a single 'bright line' threshold for ozone that is one percent of the 1997 8-hour ozone standard of 0.08 ppm. As described later in section IV.C, the 1 percent threshold is averaged over multiple model days. EPA believes this to be a robust metric compared to previous metrics which might have relied on the maximum contribution on a single day."* (FR Vol. 75, No. 147, Monday August 2, 2010 p. 45237[48])

EPA adopted this approach in the final 2011 CSAPR and conducted sensitivity analysis using a 5% and 0.5% of the NAAQS significance threshold and found the 5% threshold would not capture sufficient emissions, while a 0.5% threshold was not justified.

EPA continued this approach in the CSAPR Update, finding that changing the threshold was not desirable at that time.[49] In reaching this conclusion, EPA again analyzed alternative significant contribution thresholds of 0.5%, 1.0% and 5% of the NAAQS that is described in the CSAPR Update AQTSD.[50], EPA relied on the 1% of the NAAQS threshold in subsequent actions, such as the 2017 NODA containing contribution analyses for the 2015 ozone NAAQS.[51]

5.1.4 Summary of Transport Rule Significant Contribution Thresholds

However, EPA's technical justification for the 1% of the NAAQS significant contribution threshold is not definitive and did not rely on robust technical considerations, such as the questionable statistical validity of increasingly lower concentration thresholds depending on which NAAQS is being addressed (i.e., 0.8, 0.75 and 0.70 ppb). Nor has EPA considered fully how to integrate the effects of international background emissions in determining whether to find a link with a domestic source. Thus, other significant contribution thresholds could be substantiated.

In fact, more recently (August 31, 2018) EPA released a Memorandum in which they state *"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"* in State's good neighbor SIPs addressing the 2015 ozone NAAQS.[52]

5.2 Air Quality Variability Analysis to Justify a 1 ppb Significant Contribution Threshold

For one, EPA could have established a significance threshold based on the agency's analysis of a concentration level at which a change in DV is not statistically significant. Specifically, EPA has conducted an Air Quality Variability Analysis[53] to determine a change in concentrations such that two Design Values (DVs) are not statistically significantly different from each other. The Air Quality Variability Analysis was conducted for ozone and annual and 24-hour $PM_{2.5}$ DVs, and EPA determined that differences in ozone DVs that of less than 1.0 ppb were statistically insignificant.

[47] https://www.epa.gov/sites/production/files/2017-06/documents/epa-hq-oar-2009-0491-0047.pdf
[48] https://www.epa.gov/sites/production/files/2017-06/documents/2010-17007_0.pdf
[49] https://www.gpo.gov/fdsys/pkg/FR-2016-10-26/pdf/2016-22240.pdf
[50] https://www.epa.gov/sites/production/files/2017-05/documents/aq_modeling_tsd_final_csapr_update.pdf
[51] https://www.gpo.gov/fdsys/pkg/FR-2017-01-06/pdf/2017-00058.pdf
[52] https://www.epa.gov/sites/production/files/2018-09/documents/contrib_thresholds_transport_sip_subm_2015_ozone_memo_08_31_18.pdf
[53] https://www.epa.gov/sites/production/files/2018-04/documents/ozone_pm2.5_sils_technical_document_final_4-17-18.pdf

EPA analyzed 17 years of ozone and $PM_{2.5}$ air quality observations and used powerful statistical techniques in their analysis.

The initial purpose of EPA's Air Quality Variability Analysis was to develop Significant Impact Levels (SILs) for ozone and fine particulate matter ($PM_{2.5}$).[54] The ozone and $PM_{2.5}$ SILs were developed to determine when an ozone and/or $PM_{2.5}$ concentration impact of a single source can be considered to have a *de minimis* or insignificant contribution to the NAAQS so a cumulative source NAAQS assessment is not needed as part of the PSD permitting process. It is important to recognize that the statistical analysis used to develop the SIL thresholds are independent of PSD permitting and in fact EPA's Air Quality Variability Analysis document, which is the technical basis of the SILs, is open to using the thresholds they developed for other uses:

> *"The statistical methods and analysis detailed in this report focus on using the conceptual framework of statistical significance to calculate levels of change in air quality concentrations that have a "significant impact" or an "insignificant impact" on air quality degradation. Statistical significance is a well-established concept with a basis in commonly accepted scientific and mathematical theory. This analysis examines statistical significance for a range of values measured by air quality monitors.* ***The statistical methods and data reflected in this analysis may be applicable for multiple regulatory applications where EPA and state agencies seek to quantify a level of impact on air quality that they consider to be either 'significant' or 'not significant'."*** [57]

EPA's Air Quality Variability Analysis document further states that:

> *"The EPA has decided that an "insignificant impact" level of change in ambient air quality can be characterized by the observed variability of ambient air quality levels. Since the cause or contribute test is applied to the NAAQS in the PSD program, this analysis has been designed to take into account the ambient data used to determine DVs and the form of the relevant NAAQS. The EPA's technical approach, referred to as the "Air Quality Variability" approach, relies upon the fact that there is inherent variability in the observed ambient data, which is in part due to the intrinsic variability of the emissions and meteorology controlling transport and formation of pollutants, and uses statistical theory and methods to model that intrinsic variability in order to facilitate identification of a level of change in DVs that is acceptably similar to the original DV, thereby representing a change in air quality that is not significant."*[57]

The 1.0 ppb ozone threshold developed in EPA's Air Quality Variability Analysis would be an appropriate minimum threshold for assessing whether upwind State contributions to ozone DVs at a downwind State nonattainment/maintenance receptor represent a significant contribution as ozone DV changes below this level are deemed *"insignificant or not meaningful"* [57] and not *"statistically significant."*[57] The Air Quality Variability Analysis provides a technical justification for the 1.0 ppb significance threshold.

[54] https://www.epa.gov/nsr/significant-impact-levels-ozone-and-fine-particles

5.3 Alternative Threshold Based on Controllable Emissions

An alternative significant contribution threshold that varies based on the level of the ozone NAAQS and the amount of controllable emissions ozone concentration (i.e., U.S. anthropogenic emissions contribution) has been suggested as follows:

$$Significant\ Contribution\ Threshold\ (ppb) = .01NAAQS\ (ppb) \times \frac{NAAQS\ (ppb)}{Controllable\ emissions\ (ppb)}$$

Where,

$$Controllable\ emissions\ (ppb) = NAAQS\ (ppb) - background\ ozone\ concentration\ (ppb)$$

By focusing on controllable emissions, EPA looks to the statutory direction to only impose requirements on upwind states that contribute significantly. In making this assessment, EPA should logically consider that in context of all emissions, rather than only domestic sources.

To test this alternative significant contribution threshold based on controllable emissions, we used a definition of site-specific background ozone concentrations from the CSAPR Update source apportionment modeling. More specifically, we used the "Data File with Ozone Design Values and Ozone Contributions"[55] from the CSAPR Update website[56] and summed up all the 2017 ozone contributions that were not due to U.S. anthropogenic emissions (i.e., Canada & Mexico, Offshore, Fires, Initial and Boundary Conditions and Biogenics, columns BG through BK). Note that this definition of background ozone is based in EPA's CSAPR Update 2017 APCA ozone source apportionment simulation, which is different than a background ozone level that would be obtained through a simulation that eliminated (zero-out) all the U.S. anthropogenic emissions, which is referred to as United States Background (USB[57]). Table 5-1 displays the CSAPR Update 2017 background ozone values for sites in NY, CT and NJ that range from 19.5 to 31.4 ppb, with values at the key NYMA monitoring sites around 24-25 ppb. EPA and others have extensively studied the level of ozone background[58] and have found a range of USB ozone depending on the technique and assumptions used. For example, EPA's ozone background white paper[59] reports in Table 1 that the mean summer USB ozone concentrations for the Northeast is 24±7 ppb (i.e., 17-31 ppb), which is comparable to the range obtained from EPA's CSAPR Update 2017 source apportionment modeling (Table 5-1).

The alternative significant contribution thresholds based on controllable emissions average 1.09 ppb and range from 1.01 to 1.29 ppb for the 75 ppb NAAQS threshold, with similar but slightly lower numbers by a few hundredth of a ppb seen for the 70 ppb ozone NAAQS level (average of 1.05 ppb and ranging from 0.97 to 1.27 ppb). Setting the controllable emissions significant contributions threshold (here, 1.0-1.3 ppb) provides an avenue for accounting for a decreasing NAAQS and changing levels of controllable emissions.

[55] This is an Excel spreadsheet that can be found on the CSAPR Update website in the link below: final_csapr_update_ozone_design_values_contributions_all_sites.xlsx

[56] https://www.epa.gov/airmarkets/final-cross-state-air-pollution-rule-update

[57] In previous ozone NAAQS development efforts USB has been also called Policy Relevant Background (PRB).

[58] https://www.epa.gov/ozone-pollution/background-ozone-workshop-and-information

[59] https://www.epa.gov/sites/production/files/2016-03/documents/whitepaper-bgo3-final.pdf

Table 5-1. Calculation of alternative significant contribution thresholds using the controllable emissions approach, back ground ozone concentrations from the CSAPR Update 2017 source apportionment modeling and the 75 and 70 ppb ozone NAAQS.

	Monitoring Site	County	AQS Code	CSAPR Update Background	Alternative Threshold 75 ppb	Alternative Threshold 70 ppb
NYMA	Dunkirk	Bronx	36-005-0133	23.9	1.10	1.06
	CCNY*	New York	36-061-0135	23.9	1.10	1.06
	Queens College 2	Queens	36-081-0124	24.7	1.12	1.08
	Susan Wagner HS	Richmond	36-085-0067	24.5	1.11	1.08
	Rockland County	Rockland	36-087-0005	22.4	1.07	1.03
	Babylon	Suffolk	36-103-0002	23.3	1.09	1.05
	Riverhead	Suffolk	36-103-0004	21.2	1.05	1.00
	Holtsville	Suffolk	36-103-0009	22.0	1.06	1.02
	White Plains	Westchester	36-119-2004	21.4	1.05	1.01
Upstate	Dunkirk	Chautauqua	36-013-0006	25.2	1.13	1.09
	Amherst	Erie	36-029-0002	25.9	1.15	1.11
	Whiteface Mt.	Essex	36-031-0002	31.0	1.28	1.26
	Middleport	Niagara	36-063-1006	31.4	1.29	1.27
	East Syracuse	Onondaga	36-067-1015	28.6	1.21	1.18
	Valley Central HS	Orange	36-071-5001	20.9	1.04	1.00
	Fulton	Oswego	36-075-0003	27.0	1.17	1.14
	Mt. Ninham	Putnam	36-079-0005	20.0	1.02	0.98
	Williamson	Wayne	36-117-3001	27.2	1.18	1.14
Connecticut	Greenwich	Fairfield	09-001-0017	20.8	1.04	1.00
	Danbury	Fairfield	09-001-1123	21.5	1.05	1.01
	Stratford	Fairfield	09-001-3007	23.0	1.08	1.04
	Westport	Fairfield	09-001-9003	22.7	1.07	1.04
	Middletown	Middlesex	09-007-0007	22.1	1.06	1.02
	New Haven	New Haven	09-009-0027	20.4	1.03	0.99
	Madison Beach	New Haven	09-009-9002	24.4	1.11	1.08
New Jersey	Leonia	Bergen	34-003-0006	21.1	1.04	1.00
	Newark Firehouse	Essex	34-013-0003	22.1	1.06	1.02
	Bayonne	Hudson	34-017-0006	22.5	1.07	1.03
	Flemington	Hunterdon	34-019-0001	21.2	1.05	1.00
	Rutgers Univ.	Middlesex	34-023-0011	21.5	1.05	1.01
	Monmouth Univ.	Monmouth	34-025-0005	22.0	1.06	1.02
	Chester	Morris	34-027-3001	21.9	1.06	1.02
	Ramapo	Passaic	34-031-5001	21.6	1.05	1.01
	Columbia WMA	Warren	34-041-0007	19.5	1.01	0.97

5.4 Effects of the Alternative Significant Contribution Thresholds

To analyze the effects of the alternative significant contribution threshold on the upwind State Named Sources contributions to ozone DVs in NY we used three estimates of the upwind State's Named Sources ozone contributions all using EPA's latest Average Day Contribution Metric:

- The NY Petition 2017 CMAQ zero-out modeling (Table 5-2);
- The 2017 CSAPR-Approximate approach (Table 5-3);
- The 2017 CAMx Sensitivity Modeling from Chapter 4 (Table 5-4); and
- The 2017 CAMx nonEGU plus Oil&Gas Sensitivity Modeling from Chapter 4 (Table 5-5).

In each case, the only upwind State with ozone contributions from their total Named Sources NOx emissions greater than 1 ppb is Pennsylvania (Tables 5-2, 5-3 and 5-4). The number of nonattainment/maintenance receptors where the Pennsylvania Named Sources exceeded 1 ppb ranged from one to three. Note that since any time the Pennsylvania Named Sources exceeded the 1 ppb Air Quality Variability Analysis significance threshold it was high enough (e.g., > 1.30 ppb) that it also exceeded the controllable emissions significance threshold discussed in section 5.3 above. At least for the 2017 upwind State Named Sources modeling and the NYMA nonattainment/maintenance receptors, the 1 ppb Air Quality Variability Analysis significant contribution threshold provides the same results as the controllable emissions significant contribution threshold.

For the upwind State nonEGU plus Oil&Gas Named Sources ozone contribution, Pennsylvania is the only upwind State with a contribution above 1% of the NAAQS with a value of 1.18 ppb at Susan Wagner HS in the NYMA. This ozone contribution is also slightly higher than the controllable emissions significant contribution threshold for this monitoring site (1.11 ppb, see Table 5-1).

Table 5-2. Upwind State Named Sources ozone contributions using the 2017 CMAQ zero-out modeling from the NY Petition, the Average Day Contribution Metric and a 1 ppb significant contribution threshold based on the Air Quality Variability Analysis.

Monitoring Site		County	AQS Code	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	Pfizer Lab	Bronx	36-005-0133	0.063	0.229	0.242	0.398	0.321	0.509	1.548	0.143	0.429
	CCNY*	New York	36-061-0135	0.063	0.202	0.187	0.480	0.339	0.520	1.965	0.322	0.481
	Queens College	Queens	36-081-0124	0.057	0.096	0.071	0.320	0.251	0.384	1.272	0.229	0.292
	Susan Wagner	Richmond	36-085-0067	0.058	0.199	0.178	0.435	0.232	0.588	2.138	0.188	0.583
	Rockland	Rockland	36-087-0005	0.051	0.255	0.173	0.154	0.234	0.440	1.173	0.153	0.332
	Babylon	Suffolk	36-103-0002	0.068	0.142	0.088	0.316	0.179	0.320	0.930	0.224	0.180
	Riverhead	Suffolk	36-103-0004	0.043	0.082	0.037	0.392	0.099	0.153	0.623	0.363	0.122
	Holtsville	Suffolk	36-103-0009	0.036	0.069	0.038	0.204	0.123	0.178	0.516	0.136	0.106
	White Plains	Westchester	36-119-2004	0.061	0.221	0.166	0.224	0.217	0.473	0.946	0.154	0.334
Upstate	Dunkirk	Chautauqua	36-013-0006	0.229	0.801	0.249	0.112	0.873	1.917	0.007	0.094	0.023
	Millbrook	Dutchess	36-02-70007	0.042	0.205	0.112	0.188	0.077	0.394	0.735	0.066	0.161
	Amherst	Erie	36-029-0002	0.173	1.007	0.571	0.097	0.745	1.628	0.042	0.060	0.053
	Middleport	Niagara	36-063-1006	0.196	0.757	0.406	0.049	0.802	1.261	0.036	0.047	0.166
	East Syracuse	Onondaga	36-067-1015	0.376	0.432	0.120	0.052	0.492	0.376	0.128	0.083	0.175
	Valley Central	Orange	36-071-5001	0.009	0.020	0.007	0.092	0.078	0.302	0.712	0.101	0.192
	Fulton	Oswego	36-075-0003	0.324	0.365	0.055	0.010	0.533	0.478	0.076	0.055	0.142
	Mt. Ninham	Putnam	36-079-0005	0.035	0.185	0.140	0.237	0.106	0.287	0.930	0.140	0.255
	Williamson	Wayne	36-117-3001	0.234	0.321	0.042	0.015	0.649	0.576	0.098	0.080	0.134

Table 5-3. Upwind State Named Sources ozone contributions using the 2017 CSAPR-Approximate approach, the Average Day Contribution Metric and a 1 ppb significant contribution threshold based on the Air Quality Variability Analysis.

Monitoring Site		County	AQS Code	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	Pfizer Lab	Bronx	36-005-0133	0.149	0.528	0.254	0.437	0.168	0.599	2.394	0.371	0.554
	CCNY*	New York	36-061-0135	0.118	0.296	0.205	0.608	0.156	0.490	2.469	0.456	0.570
	Queens College	Queens	36-081-0124	0.168	0.373	0.099	0.419	0.484	0.592	1.573	0.375	0.308
	Susan Wagner	Richmond	36-085-0067	0.125	0.428	0.319	0.573	0.166	0.625	2.869	0.437	0.749
	Rockland	Rockland	36-087-0005	0.074	0.146	0.043	0.329	0.166	0.361	1.123	0.254	0.386
	Babylon	Suffolk	36-103-0002	0.140	0.460	0.202	0.327	0.319	0.607	1.722	0.290	0.383
	Riverhead	Suffolk	36-103-0004	0.094	0.296	0.133	0.403	0.198	0.405	1.377	0.263	0.308
	Holtsville	Suffolk	36-103-0009	0.114	0.328	0.143	0.387	0.299	0.454	1.332	0.244	0.250
	White Plains	Westchester	36-119-2004	0.116	0.551	0.310	0.578	0.141	0.561	1.942	0.352	0.593
Upstate	Dunkirk	Chautauqua	36-013-0006	0.446	1.406	0.419	0.000	0.868	3.908	0.699	0.004	0.101
	Millbrook	Dutchess	36-02-70007	0.072	0.196	0.071	0.580	0.201	0.418	1.335	0.367	0.336
	Amherst	Erie	36-029-0002	0.376	1.548	0.456	0.002	0.590	2.292	0.373	0.006	0.129
	Middleport	Niagara	36-063-1006	0.350	1.174	0.273	0.014	0.876	2.107	0.326	0.076	0.351
	East Syracuse	Onondaga	36-067-1015	0.390	1.074	0.161	0.025	0.552	1.002	0.371	0.081	0.324
	Valley Central	Orange	36-071-5001	0.042	0.086	0.037	0.191	0.113	0.254	0.988	0.187	0.265
	Fulton	Oswego	36-075-0003	0.354	0.951	0.121	0.030	0.655	1.404	0.854	0.121	0.656
	Mt. Ninham	Putnam	36-079-0005	0.053	0.123	0.050	0.412	0.198	0.278	0.990	0.240	0.304
	Williamson	Wayne	36-117-3001	0.320	0.956	0.136	0.018	0.602	1.157	0.326	0.074	0.312

Table 5-4. Upwind State Named Sources ozone contributions using the 2017 Sensitivity Modeling from Chapter 4, the Average Day Contribution Metric and a 1 ppb significant contribution threshold based on the Air Quality Variability Analysis.

Monitoring Site		County	AQS Code	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	Pfizer Lab	Bronx	36-005-0133	0.178	0.393	0.329	0.280	0.325	0.673	1.720	0.232	0.648
	CCNY*	New York	36-061-0135	0.140	0.302	0.290	0.286	0.243	0.601	1.756	0.268	0.668
	Queens College	Queens	36-081-0124	0.165	0.345	0.292	0.281	0.355	0.641	1.635	0.285	0.640
	Susan Wagner	Richmond	36-085-0067	0.175	0.378	0.367	0.357	0.267	0.743	2.398	0.373	0.893
	Rockland	Rockland	36-087-0005	0.060	0.156	0.152	0.247	0.176	0.370	1.440	0.227	0.473
	Babylon	Suffolk	36-103-0002	0.137	0.254	0.198	0.284	0.211	0.405	1.319	0.320	0.419
	Riverhead	Suffolk	36-103-0004	0.089	0.170	0.122	0.150	0.168	0.270	0.892	0.124	0.240
	Holtsville	Suffolk	36-103-0009	0.132	0.254	0.189	0.211	0.324	0.456	1.211	0.216	0.364
	White Plains	Westchester	36-119-2004	0.092	0.229	0.219	0.290	0.172	0.410	1.372	0.240	0.486
Upstate	Dunkirk	Chautauqua	36-013-0006	0.328	0.709	0.600	0.033	0.534	1.478	0.221	0.058	0.202
	Millbrook	Dutchess	36-02-70007	0.045	0.096	0.062	0.179	0.182	0.283	1.131	0.182	0.277
	Amherst	Erie	36-029-0002	0.351	0.845	0.811	0.009	0.957	1.590	0.114	0.083	0.377
	Middleport	Niagara	36-063-1006	0.306	0.635	0.394	0.046	0.845	0.854	0.264	0.107	0.244
	East Syracuse	Onondaga	36-067-1015	0.361	0.622	0.245	0.027	0.597	0.822	0.344	0.123	0.366
	Valley Central	Orange	36-071-5001	0.033	0.058	0.032	0.096	0.151	0.198	0.784	0.137	0.233
	Fulton	Oswego	36-075-0003	0.337	0.519	0.178	0.026	0.889	0.756	0.262	0.146	0.406
	Mt. Ninham	Putnam	36-079-0005	0.089	0.183	0.192	0.198	0.180	0.337	1.205	0.144	0.373
	Williamson	Wayne	36-117-3001	0.276	0.440	0.203	0.036	0.635	0.688	0.242	0.098	0.252

Table 5-5.. Upwind State nonEGU plus Oil&Gas Named Sources ozone contributions using the 2017 Sensitivity Modeling from Chapter 4, the Average Day Contribution Metric and a 1 ppb significant contribution threshold based on the Air Quality Variability Analysis.

Monitoring Site		County	AQS Code	IL	IN	KY	MD	MI	OH	PA	VA	WV
NYMA	Pfizer Lab	Bronx	36-005-0133	0.080	0.178	0.065	0.143	0.117	0.229	0.770	0.111	0.147
	CCNY*	New York	36-061-0135	0.063	0.137	0.061	0.148	0.086	0.194	0.820	0.128	0.147
	Queens College	Queens	36-081-0124	0.073	0.159	0.060	0.148	0.123	0.228	0.756	0.133	0.139
	Susan Wagner	Richmond	36-085-0067	0.078	0.169	0.079	0.187	0.099	0.231	1.187	0.178	0.191
	Rockland	Rockland	36-087-0005	0.027	0.070	0.031	0.142	0.070	0.120	0.621	0.114	0.103
	Babylon	Suffolk	36-103-0002	0.062	0.115	0.038	0.133	0.082	0.141	0.608	0.147	0.104
	Riverhead	Suffolk	36-103-0004	0.041	0.076	0.024	0.072	0.065	0.104	0.466	0.062	0.063
	Holtsville	Suffolk	36-103-0009	0.061	0.118	0.037	0.111	0.113	0.191	0.589	0.107	0.098
	White Plains	Westchester	36-119-2004	0.045	0.096	0.044	0.152	0.066	0.129	0.598	0.114	0.111
Upstate	Dunkirk	Chautauqua	36-013-0006	0.152	0.320	0.079	0.024	0.158	0.855	0.094	0.031	0.046
	Millbrook	Dutchess	36-02-70007	0.020	0.048	0.012	0.092	0.075	0.091	0.455	0.094	0.066
	Amherst	Erie	36-029-0002	0.155	0.370	0.124	0.006	0.236	0.894	0.065	0.054	0.102
	Middleport	Niagara	36-063-1006	0.141	0.308	0.051	0.027	0.246	0.540	0.098	0.059	0.071
	East Syracuse	Onondaga	36-067-1015	0.198	0.308	0.036	0.019	0.186	0.435	0.122	0.076	0.089
	Valley Central	Orange	36-071-5001	0.015	0.032	0.007	0.058	0.061	0.069	0.329	0.073	0.051
	Fulton	Oswego	36-075-0003	0.178	0.283	0.028	0.018	0.248	0.408	0.111	0.091	0.100
	Mt. Ninham	Putnam	36-079-0005	0.042	0.080	0.044	0.106	0.077	0.094	0.488	0.074	0.086
	Williamson	Wayne	36-117-3001	0.129	0.223	0.031	0.021	0.177	0.385	0.106	0.057	0.071

APPENDIX 1
OZONE ATTAINMENT ISSUES IN WESTERN NEW YORK

July 31, 2018

MEMORANDUM

To: Air Stewardship Coalition (ASC)
From: Ross Beardsley, Kaitlyn Lieschke and Ralph Morris
Subject: Ozone Attainment Issues in Western New York

INTRODUCTION

On March 12, 2018, the State of New York submitted a Section 126 Petition[1] to the U.S. Environmental Protection Agency (EPA) alleging that NOx emissions from over 350 stationary sources in nine states interfere with New York's attainment or maintenance of the 2008 and 2015 National Ambient Air Quality Standards (NAAQS) for ozone (0.075 ppm and 0.070 ppm, respectively). The NY Petition notes that upwind sources interfere with the New York Metropolitan Area (NYMA) attaining the 2008 and 2015 ozone NAAQS and "*threaten the ability of Chautauqua County in western New York to maintain attainment of the 2008 and 2015 ozone NAAQS*."(NY Petition, p. 1). The Petition further states that "*Chautauqua County was designated as nonattainment for the 2008 ozone NAAQS, though it currently monitors attainment. Significant levels of transported ozone will interfere with the area's ability to continue monitoring attainment and will negatively impact the area's ability to continue monitoring attainment and will negatively impact the area's future chances of being redesignated to attainment*." (NY Petition, p. 1).

Purpose

The purpose of this memorandum is to document that Chautauqua County is attaining both the 2008 and 2015 ozone NAAQS and that air quality and emission trends indicate that it will continue to attain both ozone NAAQS. Therefore, ozone transport due to NOx emissions from the named sources in the NY Petition does not and will not interfere with the area's ability to continue to demonstrate attainment of the ozone NAAQS.

[1] NY Department of Environmental Conservation, 2018. New York State Petition for a Finding Pursuant to Clean Air Act Section 126(b). https://www.dec.ny.gov/docs/air_pdf/sips126petition.pdf (NY Petition).

OZONE NONATTAINMENT IN SOUTHWESTERN NEW YORK

The Jamestown nonattainment area (NAA), which consists of Chautauqua County, was designated as a "Marginal" 8-hour ozone NAA on July 20, 2012 for the 2008 ozone NAAQS.[2] "Marginal" was the lowest of the nonattainment classifications defined by the EPA for use in designations of NAAs under the 2008 ozone NAAQs[3]. The 2008-2010 measured 8-hour ozone design value (DV)[4] in the Jamestown NAA was 0.077 ppm, which exceeded the 2008 ozone NAAQS of 0.075 ppm and resulted in the Jamestown area being designated as an ozone NAA.

National Ozone Concentration and NOx Emission Trends

Chautauqua County is the most western county in New York with a 2010 census population of 134,905. Unlike the urban ozone NAAs in eastern New York that are home of millions of residents, ozone in Chautauqua County is primarily influenced by ozone transport. Consequently, its ozone concentration has decreased as regional NOx emissions have decreased across the U.S. In EPA's trends analysis website "Our Nation's Air – Status and Trends through 2016,"[5] EPA documents the steady decline in regional NOx emissions and resultant reduction in nation-wide ozone concentrations as shown in Figure 1. Since the Jamestown area was designated as nonattainment for ozone based on the 2008-2010 ozone DVs, U.S. NOx emissions have been reduced by 30 percent nationally.

[2] EPA, 2012. Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards. Federal Register. https://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11618.pdf#page=2

[3] EPA, 2012. Implementation of the 2008 National Ambient Air Quality Stanrdads for Ozone: Nonattainment Area Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes. https://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11605.pdf#page=1

[4] An ozone design value (DV) is defined as the three-year average of the annual fourth highest daily maximum 8-hour ozone concentrations based on three consecutive years of quality-assured ambient monitoring data meeting regulatory completeness requirements.

[5] https://gispub.epa.gov/air/trendsreport/2017/#home

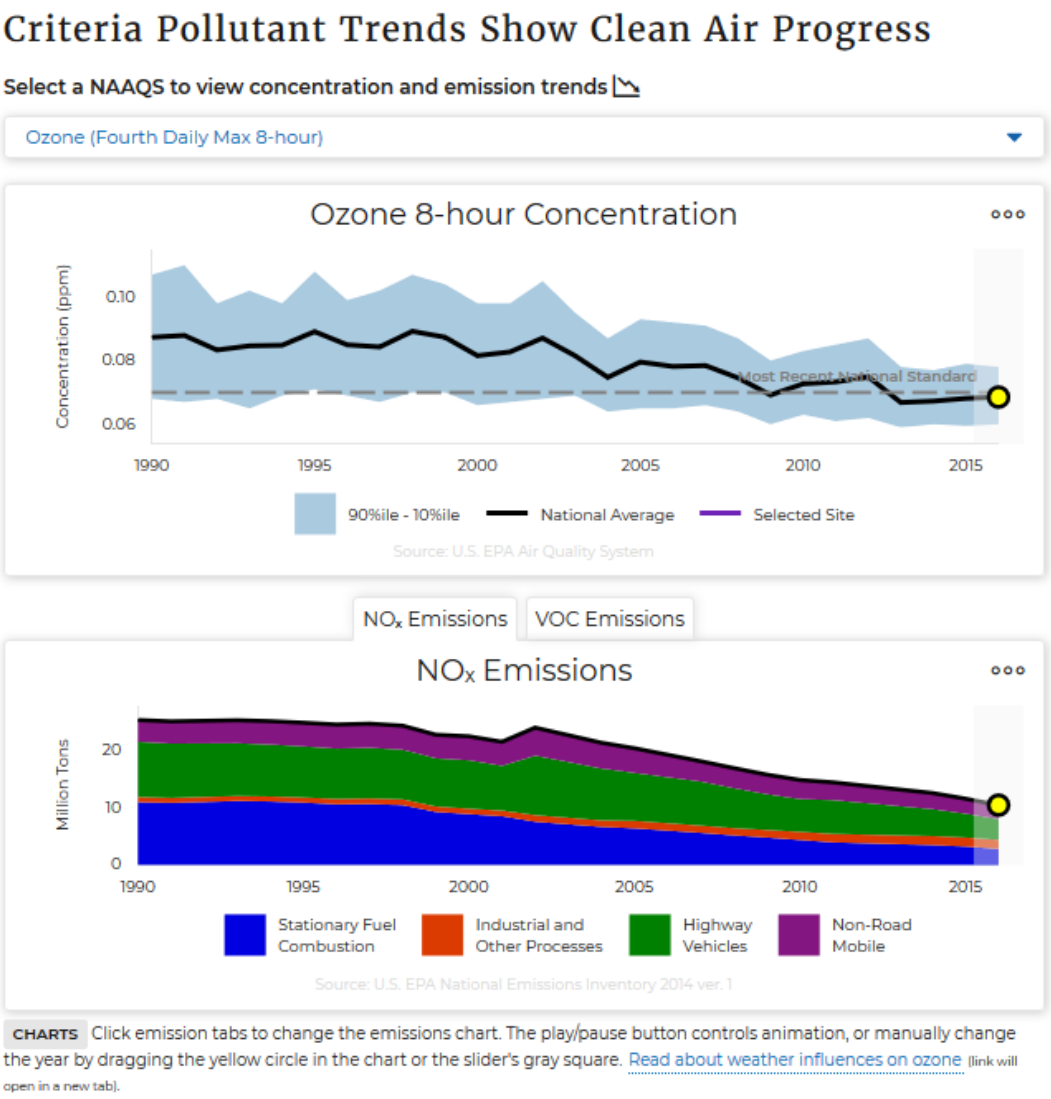


Figure 1. Trends in U.S. national ozone concentrations (top) and NOx emissions (bottom) 1990-2016. (Source: EPA"s "Our Nation's Air" website: https://gispub.epa.gov/air/trendsreport/2017/#naaqs_trends).

Ozone Trends in Chautauqua County

As seen for nation-wide average ozone, ozone concentrations in Jamestown/Chautaqua County have also declined to within attainment of both of the ozone NAAQSs. On June 3, 2016, Jamestown/Chautauqua County was determined to have attained the 2008 ozone NAAQS by the applicable attainment date of July 20, 2015 based on a 2012-2014 ozone DV of 0.071 ppm.[6,7] On July 20, 2018 the EPA published a proposed Determination of Attainment of the 2008 ozone NAAQS for Jamestown/Chautauqua County based on 2012-2014 and 2015-2017 ozone DVs of 0.071 ppm and 0.068 ppm, respectively[8].

EPA has also recently designated NAAs under the more stringent 2015 ozone NAAQS (0.070 ppm) in several phases. On November 16, 2017, EPA designated Chautauqua County as 'Attainment/Unclassifiable' under the 2015 ozone NAAQS based on an observed 2014-2016 ozone DV of 0.068 ppm.[9] This designation accorded with with the designation recommendations New York submitted to EPA on September 22, 2016, in which New York recommends that Chautauqua County should not be designated as nonattainment under the 2015 ozone NAAQS because monitored ozone concentrations in all areas outside of the NYMA are below the 2015 ozone NAAQS.[10]

Recent monitoring data from Chautauqua County demonstrates attainment of both the 2008 and 2015 ozone NAAQS. Figure 2 and Table 1 depicts the observed ozone DVs from two ozone monitors in Chautauqua County from 2007 to 2017.[11] The Westfield monitor has been inactive since December 31, 2012, but DVs at the Dunkirk monitor have been in attainment of the 2008 ozone NAAQS since 2013 and the 2015 ozone NAAQS since 2015. The most recent 2015-2017 8-hour ozone DV in Chautauqua County (Dunkirk) is 0.068 ppm, which is 8 ppb (0.008 ppm) below the 2008 ozone NAAQS and 3 ppb (0.003 ppm) below the 2015 ozone NAAQS. Thus, observed ozone air quality in Chautauqua County is currently attaining both the 2008 and 2015 ozone NAAQS.

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[6] EPA. 2015. Federal Register: Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Several Areas Classified as Marginal for the 2008 Ozone National Ambient Air Quality Standards. August. https://www.gpo.gov/fdsys/pkg/FR-2015-08-27/pdf/2015-21196.pdf#page=1

[7] EPA. 2016. Federal Register: Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Several Areas for the 2008 Ozone National Ambient Air Quality Standards. May. https://www.gpo.gov/fdsys/pkg/FR-2016-05-04/pdf/2016-09729.pdf#page=1

[8] EPA. 2018. Federal Register: Approval and Promulgation of Air Quality Implementation Plans; New York; Determination of Attainment of the 2008 8-Hour Ozone National Ambient Air Quality Standard for the Jamestown, New York Marginal Nonattainment Area. July. https://www.federalregister.gov/documents/2018/07/20/2018-15623/approval-and-promulgation-of-air-quality-implementation-plans-new-york-determination-of-attainment

[9] EPA. 2017. Federal Register: Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards (NAAQS). November. https://www.gpo.gov/fdsys/pkg/FR-2017-11-16/pdf/2017-24640.pdf

[10] New York State, 2016. Designation Recommendations for the 2015 Ozone National Ambient Air Quality Standards. September. https://www.dec.ny.gov/docs/air_pdf/sip2015ozonedesig.pdf.

[11] Design values available from https://www.epa.gov/air-trends/air-quality-design-values

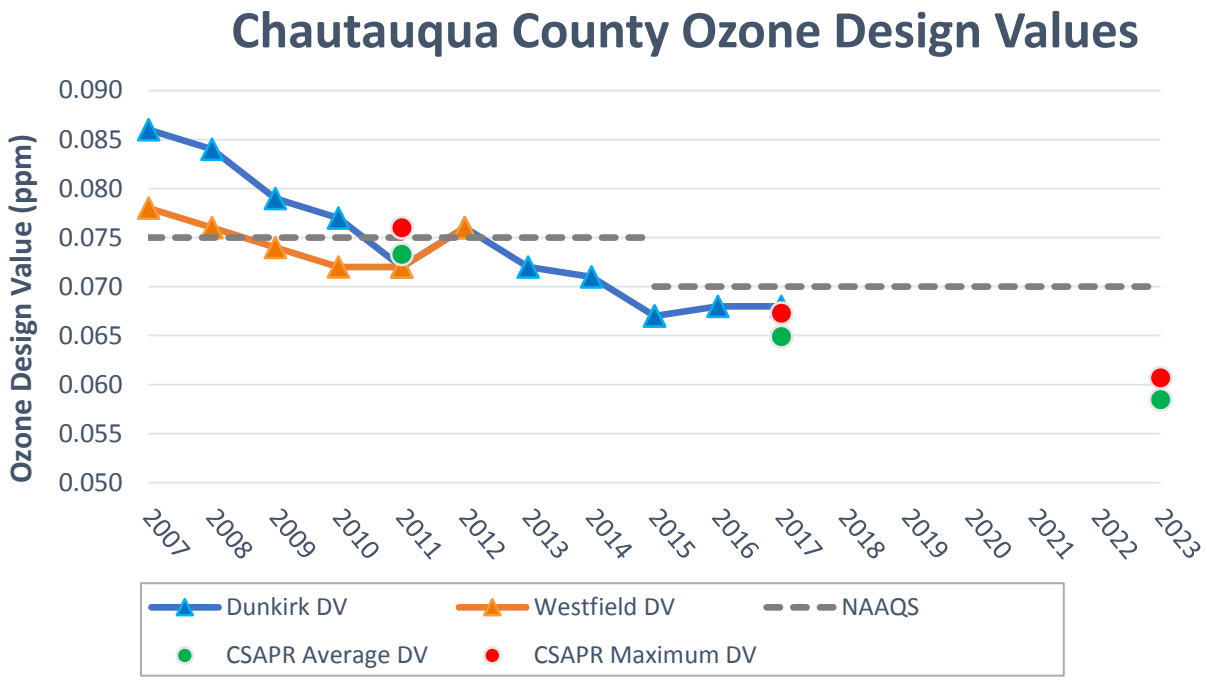

Figure 2. Trends in observational 8-hour ozone design values (ppm) for monitoring sites in Chautauqua County from 2007-2017. Also shown is the 2008 and 2015 ozone NAAQS for reference, and CSAPR projected 2017 and 2023 Average and Maximum ozone design values at the Dunkirk monitor.

Table 1. Observed 8-hour ozone design values (ppm) at Dunkirk and Westfield monitoring sites in Chautauqua County and CSAPR observed 2011 and projected 2017 and 2023 Average and Maximum 8-hour Ozone design values at Dunkirk.

Year	Observed Ozone DV at Dunkirk (ppm)	Observed Ozone DV at Westfield (ppm)	CSAPR Average Ozone DV (ppm)	CSAPR Maximum Ozone DV (ppm)
2007	0.086	0.078	-	-
2008	0.084	0.076	-	-
2009	0.079	0.074	-	-
2010	0.077	0.072	-	-
2011	0.072	0.072	0.073	0.076
2012	0.076	0.076	-	-
2013	0.072	-	-	-
2014	0.071	-	-	-
2015	0.067	-	-	-
2015	0.067	-	-	-
2016	0.068	-	-	-
2017	0.068	-	0.065	0.067
…				
2023	-	-	0.059	0.061

In addition to currently monitoring ozone attainment, EPA has also projected future year ozone DVs for Chautauqua County in its ozone transport analysis. EPA's future year ozone transport analysis uses a 2011 base year modeling platform to estimate future year average and maximum ozone DVs. The 2011 base year average ozone DV is the average of three ozone DVs spanning 2009-2013 period (*i.e.*, average of 2009-2011, 2010-2012 and 2011-2013 ozone DVs), whereas the 2011 base year maximum ozone DV is the maximum of the three years of DVs from 2009-2013. The CSAPR Update Rule projected the average and maximum ozone DVs to 2017 with the results for the Dunkirk monitoring site shown in Figure 2 and Table 1,[12,13] Both the projected 2017 Average (0.065 ppm) and Maximum (0.067 ppm) ozone DVs were below the 2008 and 2015 ozone NAAQS, and close to the actual observed 2017 ozone DV (0.068 ppm) providing confidence in EPA's ozone DV projection technique. Additionally, projected 2023 average and maximum ozone DVs were estimated in EPA's March 2018 supplemental information for ozone transport SIPs for the 2015 ozone NAAQS.[14] By 2023 the projected average (0.059 ppm) and maximum

[12] CSAPR model output of design values and ozone contributions available at: https://www.epa.gov/sites/production/files/2017-05/final_csapr_update_ozone_design_values_contributions_all_sites.xlsx

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

[14] EPA, 2018. 2015 Ozone NAAQS Interstate Transport Assessment Design Values and Contributions. https://www.epa.gov/airmarkets/march-2018-memo-and-supplemental-information-regarding-interstate-transport-sips-2015

(0.061 ppm) ozone DVs at Dunkirk are 10 ppb (0.010 ppm) and 15 ppb (0.015 ppm) below the 2015 and 2008 ozone NAAQS, respectively.

CONCLUSION

The NY Petition's request that EPA impose additional NOx controls on the named sources based in part on its allegations that they interfere with Chautauqua County's maintenance of the ozone NAAQS is unfounded. Chautauqua County is currently attaining both the 2008 and 2015 ozone NAAQS, and data show that the county's ozone concentrations are expected to continue to decline. Regional NOx emissions continue to decrease, and EPA's 2023 projected ozone DVs in Chautauqua County are estimated to be 10 ppb (0.010 ppm) or more below the ozone NAAQS, even without the additional NOx controls requested in the NY Petition. Thus, the named sources in the NY Petition do not interfere with Chautauqua County's ability to continue to attain the 2008 and 2015 ozone NAAQS.

APPENDIX 2
CONTRIBUTIONS TO 2017 OZONE DESIGN VALUES IN CONNECTICUT AND NEW JERSEY

INTRODUCTION

The March 2018 State of New York (NY) Section 126 Petition (NY Petition) also presented ozone contributions at several ozone monitoring sites in Connecticut (CT) and New Jersey (NJ) noting that they are part of the New York Metropolitan Area (NYMA) so are of interest to the NY Department of Environmental Conservation (DEC). The NY Petition named over 350 sources in 9 upwind States (the Named Sources) that emit over 400 tons per year of NOx emissions for which the NY Petition is requesting EPA establish enforceable NOx emissions limits equivalent to NY's Reasonable Available Control Technology (RACT) that is based on a cost of $5,000 per ton of NOx removed. The NY DEC conducted 2017 CMAQ Named Sources NOx emissions zero-out simulations for each of the 9 upwind States and estimated ozone contributions that they allege contribute to, or interfere with maintenance of, attaining the 2008 and 2015 ozone NAAQS at monitoring sites in NY, CT and NJ. The NY Petition used a Maximum Day Ozone Contribution Metric where an upwind State's Named Sources ozone contribution at a monitoring site was defined as the day with the highest upwind State ozone contribution on days the modeled 2017 maximum daily average 8-hour (MDA8) ozone concentrations was greater than or equal to 71 ppb. In the body of this report we summarized why the technical analysis presented in the NY Petition was deficient and presented tables of ozone contributions due to NOx emissions from the Named Sources in each of the 9 upwind States to ozone monitoring sites in the State of NY. In this Appendix we present a similar series of tables of ozone contributions for monitoring sites in CT and NJ.

NY PETITION ALLEGATIONS OF SIGNIFICANT OZONE CONTRIBUTIONS IN CT AND NJ

The NY Petition's Table 3 presented the ozone contributions of the Named Sources in 9 upwind States to monitoring sites in CT and NJ using the Maximum Day Contribution Metric and shaded those linkages as significant under the 2008 (orange) or 2015 (pink) ozone NAAQS if the ozone contributions was greater than 1% of the NAAQS. The NY Petition's use of the 2015 ozone NAAQS is premature as a basic premise of a Section 126 Petition is that it must be based on a violation of the Clean Air Act (CAA) Section 110 "good neighbor provision" that for the 2015 ozone NAAQS is an on-going process so no violation has yet occurred. Thus, we only address the NY Petition claims regarding the 2008 ozone NAAQS. Table 1 reproduces the upwind State Named Sources ozone contributions from Table 3 in the NY Petition, only just shading those linkages that exceed 1% of the 2008 ozone NAAQS. Using the Maximum Day Contribution Metric and the NY Petition 2017 CMAQ zero-out modeling, the Named Sources in 8 of the 9 upwind States contribute over 1% of the 2008 NAAQS at from 2 (KY) to all 16 (PA) monitoring sites in CT and NJ. The Named Sources NOx emissions in the State of IL has no ozone contributions above 1% of the NAAQS at monitoring sites in CT and NJ.

Table 1. NY Petition Upwind State Named Sources ozone contributions to CT/NJ monitoring sites using the Maximum Day Contribution Metric and the NY Petition 2017 CMAQ zero-out modeling (Table 3 in NY Petition) with contributions shaded orange if above 1% of the 2008 ozone NAAQS.

	Monitoring Site	County	AQS Code	Latitude	Longitude	IL	IN	KY	MD	MI	OH	PA	VA	WV
Connecticut	Greenwich	Fairfield	09-001-0017	41.00361	-73.58500	0.211	0.579	0.431	0.670	0.906	0.833	2.086	1.282	0.669
	Danbury	Fairfield	09-001-1123	41.39917	-73.44310	0.200	0.821	0.527	1.087	0.401	0.672	3.674	0.453	1.309
	Stratford	Fairfield	09-001-3007	41.15250	-73.10310	0.196	0.535	0.323	1.693	0.513	0.631	1.660	0.636	0.587
	Westport	Fairfield	09-001-9003	41.11833	-73.33670	0.147	0.567	0.354	1.715	0.506	0.663	1.641	0.689	0.568
	Middletown	Middlesex	09-007-0007	41.55222	-72.63000	0.148	0.365	0.251	0.976	0.392	0.349	1.860	0.393	0.092
	New Haven	New Haven	09-009-0027	41.30140	-72.90290	0.183	0.455	0.226	1.732	0.551	0.649	1.643	0.575	0.594
	Madison Beach	New Haven	09-009-9002	41.26083	-72.55000	0.330	0.635	0.215	2.362	0.680	0.549	1.570	0.776	0.511
New Jersey	Leonia	Bergen	34-003-0006	40.87044	-73.99200	0.118	0.979	0.674	0.654	0.383	0.779	3.907	0.419	1.722
	Newark Firehouse	Essex	34-013-0003	40.72099	-74.19290	0.207	1.002	0.719	0.544	0.730	1.469	5.722	0.691	2.238
	Bayonne	Hudson	34-017-0006	40.67025	-74.12610	0.197	0.982	0.695	0.750	0.751	1.263	4.839	0.617	2.403
	Flemington	Hunterdon	34-019-0001	40.51526	-74.80670	0.195	0.529	0.453	0.631	0.916	1.559	5.195	0.304	2.539
	Rutgers Univ.	Middlesex	34-023-0011	40.46218	-74.42940	0.248	0.477	0.766	1.416	0.812	1.106	3.593	0.584	2.724
	Monmouth Univ.	Monmouth	34-025-0005	40.27765	-74.00510	0.247	0.622	0.700	0.732	1.006	1.594	4.439	0.248	1.596
	Chester	Morris	34-027-3001	40.78763	-74.67630	0.189	1.425	0.805	0.332	0.691	1.324	5.839	0.272	1.965
	Ramapo	Passaic	34-031-5001	41.05862	-74.25550	0.039	0.081	0.057	0.399	0.430	0.724	5.286	0.378	1.560
	Columbia WMA	Warren	34-041-0007	40.92458	-75.06780	0.183	0.330	0.003	0.156	0.746	0.954	4.777	0.197	2.433

EFFECTS OF NONATTAINMENT/MAINTENANCE RECEPTORS ON CT/NJ CONTRIBUTIONS

Table 3 of the NY Petition (Table 1 above) implies that the Named Sources in 8 of the 9 upwind States is linked to monitoring sites in CT and NJ. However, Step 1 of EPA's Four Step Transport Framework requires that significant linkages can only occur at nonattainment or maintenance receptors. Table 2 uses the NY Petition Maximum Day Contribution Metric and highlights those Upwind State downwind monitoring site linkages that are over 1% of the 2008 ozone NAAQS just for the nonattainment and maintenance receptors following CSAPR (see Sections 1.3.1 and 2.3 for how nonattainment/maintenance receptors are defined). When just examining downwind monitoring sites that have an ozone problem in 2017 (i.e., nonattainment or maintenance receptors), the Named Sources in two upwind States (IL and KY) have no Maximum Day Contribution Metric linkages over 1% of the NAAQS and four other states only have one linkage over 1% of the NAAQS.

Table 2. NY Petition Upwind State Named Sources ozone contributions to CT/NJ monitoring sites using the Maximum Day Contribution Metric and the NY Petition 2017 CMAQ zero-out modeling with contributions shaded orange if above 1% of the 2008 ozone NAAQS just for nonattainment and maintenance receptors.

Monitoring Site		County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
Connecticut	Greenwich	Fairfield	09-001-0017	79.0	74.1	76.6	0.211	0.579	0.431	0.670	0.906	0.833	2.086	1.282	0.669
	Danbury	Fairfield	09-001-1123	77.3	71.6	73.1	0.200	0.821	0.527	1.087	0.401	0.672	3.674	0.453	1.309
	Stratford	Fairfield	09-001-3007	83.3	75.5	79.7	0.196	0.535	0.323	1.693	0.513	0.631	1.660	0.636	0.587
	Westport	Fairfield	09-001-9003	83.0	76.5	79.5	0.147	0.567	0.354	1.715	0.506	0.663	1.641	0.689	0.568
	Middletown	Middlesex	09-007-0007	79.0	69.5	70.9	0.148	0.365	0.251	0.976	0.392	0.349	1.860	0.393	0.092
	New Haven	New Haven	09-009-0027	77.0	66.8	70.1	0.183	0.455	0.226	1.732	0.551	0.649	1.643	0.575	0.594
	Madison Beach	New Haven	09-009-9002	82.3	76.2	79.2	0.330	0.635	0.215	2.362	0.680	0.549	1.570	0.776	0.511
New Jersey	Leonia	Bergen	34-003-0006	74.3	68.3	69.2	0.118	0.979	0.674	0.654	0.383	0.779	3.907	0.419	1.722
	Newark Firehouse	Essex	34-013-0003	67.7	68.5	72.0	0.207	1.002	0.719	0.544	0.730	1.469	5.722	0.691	2.238
	Bayonne	Hudson	34-017-0006	70.7	68.9	69.8	0.197	0.982	0.695	0.750	0.751	1.263	4.839	0.617	2.403
	Flemington	Hunterdon	34-019-0001	71.7	67.2	68.9	0.195	0.529	0.453	0.631	0.916	1.559	5.195	0.304	2.539
	Rutgers Univ.	Middlesex	34-023-0011	75.7	70.7	73.9	0.248	0.477	0.766	1.416	0.812	1.106	3.593	0.584	2.724
	Monmouth Univ.	Monmouth	34-025-0005	67.0	70.4	73.0	0.247	0.622	0.700	0.732	1.006	1.594	4.439	0.248	1.596
	Chester	Morris	34-027-3001	69.0	66.9	68.4	0.189	1.425	0.805	0.332	0.691	1.324	5.839	0.272	1.965
	Ramapo	Passaic	34-031-5001	68.3	65.9	67.5	0.039	0.081	0.057	0.399	0.430	0.724	5.286	0.378	1.560
	Columbia WMA	Warren	34-041-0007	64.7	56.2	56.2	0.183	0.330	0.003	0.156	0.746	0.954	4.777	0.197	2.433

USE OF CSAPR AVERAGE DAY CONTRIBUTION METRIC

The 2011 CSAPR and 2016 CSAPR Update rulemakings, as well as the 2017 NODA information on transport for the 2015 ozone NAAQS, used an Average Day Contribution Metric for attributing upwind State contributions to downwind receptors. The Average Day Contribution is more consistent with EPA's 2014 guidance for making ozone Design Value (DV) projections as it used the modeling results in a relative fashion and averages upwind State contributions over several (usually 10) days with high modeled MDA8 ozone concentrations, rather than using the absolute modeling results and selecting the one day with the highest upwind State ozone contributions as used in the Maximum Day Contribution Metric (see Section 3.1.5 for more details).
Table 3 displays the Named Sources ozone contributions at receptors in CT/NJ using the NY Petition 2017 CMAQ zero-out modeling processed using EPA's Average Day Contribution Metric. As we saw with monitoring sites in NY, using EPA's CSAPR Average Day Contribution Metric and NY Petition CMAQ zero-out modeling, Pennsylvania is the only upwind State that has a contribution of greater than 1% of the NAAQS at any CT/NJ nonattainment or maintenance receptor. When just looking at CT/NJ monitoring sites with an ozone problem (i.e., nonattainment/maintenance receptors) and the more robust Average Day Contribution Metric, the NY Petition CMAQ zero-out modeling indicates that just the Named Sources in Pennsylvania have ozone contributions greater than 1% of the NAAQS.

Table 3. NY Petition Upwind State Named Sources ozone contributions to CT/NJ monitoring sites using the Average Day Contribution Metric and the NY Petition 2017 CMAQ zero-out modeling with contributions shaded orange if above 1% of the 2008 ozone NAAQS just for nonattainment and maintenance receptors.

Monitoring Site		County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
Connecticut	Greenwi	Fairfield	09-001-	79.0	74.1	76.6	0.028	0.087	0.054	0.141	0.090	0.155	0.571	0.131	0.131
	Danbury	Fairfield	09-001-	77.3	71.6	73.1	0.048	0.146	0.119	0.415	0.266	0.313	0.947	0.229	0.302
	Stratford	Fairfield	09-001-	83.3	75.5	79.7	0.065	0.145	0.115	0.530	0.272	0.365	0.818	0.288	0.201
	Westport	Fairfield	09-001-	83.0	76.5	79.5	0.063	0.158	0.119	0.562	0.273	0.372	0.855	0.291	0.223
	Middleto	Middlese	09-007-	79.0	69.5	70.9	0.069	0.167	0.083	0.424	0.238	0.271	0.766	0.183	0.113
	New	New	09-009-	77.0	66.8	70.1	0.037	0.098	0.061	0.436	0.211	0.232	0.754	0.221	0.176
	Madison	New	09-009-	82.3	76.2	79.2	0.054	0.117	0.041	0.644	0.199	0.192	0.790	0.267	0.118
New Jersey	Leonia	Bergen	34-003-	74.3	68.3	69.2	0.062	0.229	0.172	0.218	0.236	0.536	1.651	0.116	0.399
	Newark	Essex	34-013-	67.7	68.5	72.0	0.064	0.255	0.205	0.214	0.241	0.576	2.218	0.139	0.512
	Bayonne	Hudson	34-017-	70.7	68.9	69.8	0.056	0.187	0.168	0.292	0.229	0.538	2.063	0.145	0.528
	Flemingt	Hunterdo	34-019-	71.7	67.2	68.9	0.095	0.376	0.197	0.174	0.171	0.715	2.570	0.095	0.730
	Rutgers	Middlese	34-023-	75.7	70.7	73.9	0.089	0.261	0.231	0.355	0.258	0.706	2.146	0.137	0.763
	Monmout	Monmout	34-025-	67.0	70.4	73.0	0.069	0.206	0.140	0.182	0.186	0.479	1.696	0.070	0.304
	Chester	Morris	34-027-	69.0	66.9	68.4	0.092	0.370	0.222	0.176	0.214	0.789	2.921	0.107	0.623
	Ramapo	Passaic	34-031-	68.3	65.9	67.5	0.034	0.127	0.104	0.210	0.230	0.378	1.308	0.174	0.329
	Columbi	Warren	34-041-	64.7	56.2	56.2	0.078	0.360	0.193	0.093	0.161	0.585	2.324	0.082	0.455

CSAPR-APPROXIMATE OZONE CONTRIBUTIONS ALSO INDICATE NAMED SOURCES IN ALMOST ALL UPWIND STATES CONTRIBUTE LESS THAN 1% OF THE NAAQS

The CSAPR-Approximate approach estimates the ozone contributions of the Named Sources in upwind States by scaling the 2017 CSAPR Update whole State ozone contributions by the ratio of the NOx emissions from the Named Sources to the whole State NOx emissions (see section 3.2 for details). The CSAPR Update used the Average Day Contribution Metric so it carries over to the CSAPR-Approximate approach. The Named Sources upwind State contributions to ozone at CT/NJ receptors are shown in Table 4 and are qualitatively similar to the Average Day Contribution Metric for the NY Petition CMAQ results (Table 3). Pennsylvania is the only upwind State in which the Named Sources have a greater than 1% of the NAAQS ozone contribution to any nonattainment or maintenance receptor in CT or NJ.

Table 4. CSAPR-Approximate Upwind State NY Petition Named Sources ozone contributions to CT/NJ monitoring sites using the Average Day Contribution Metric and the CSAPR Update 2017 CAMx source apportionment modeling with contributions shaded orange if above 1% of the 2008 ozone NAAQS just for nonattainment and maintenance receptors.

	Monitoring Site	County	AQS Code	2017 Ozone DVs	CSAPR Avg Ozone DV	CSAPR Max Ozone DV	IL	IN	KY	MD	MI	OH	PA	VA	WV
Connecticut	Greenwich	Fairfield	09-001-0017	79.0	74.1	76.6	0.087	0.291	0.124	0.371	0.123	0.369	1.528	0.326	0.320
	Danbury	Fairfield	09-001-1123	77.3	71.6	73.1	0.096	0.428	0.230	0.638	0.171	0.519	1.687	0.392	0.449
	Stratford	Fairfield	09-001-3007	83.3	75.5	79.7	0.088	0.341	0.136	0.486	0.216	0.475	1.722	0.335	0.367
	Westport	Fairfield	09-001-9003	83.0	76.5	79.5	0.087	0.346	0.140	0.488	0.211	0.475	1.823	0.363	0.406
	Middletown	Middlesex	09-007-0007	79.0	69.5	70.9	0.125	0.492	0.273	0.495	0.153	0.407	1.214	0.360	0.383
	New Haven	New Haven	09-009-0027	77.0	66.8	70.1	0.075	0.287	0.115	0.424	0.186	0.407	1.432	0.273	0.297
	Madison Beach	New Haven	09-009-9002	82.3	76.2	79.2	0.099	0.314	0.136	0.368	0.118	0.394	1.447	0.210	0.277
New Jersey	Leonia	Bergen	34-003-0006	74.3	68.3	69.2	0.157	0.651	0.397	0.467	0.138	0.745	2.280	0.275	0.644
	Newark Firehouse	Essex	34-013-0003	67.7	68.5	72.0	0.144	0.605	0.437	0.375	0.136	0.851	3.117	0.235	0.878
	Bayonne	Hudson	34-017-0006	70.7	68.9	69.8	0.142	0.546	0.400	0.463	0.115	0.698	2.775	0.237	0.687
	Flemington	Hunterdon	34-019-0001	71.7	67.2	68.9	0.125	0.533	0.406	0.361	0.161	0.984	3.769	0.331	1.163
	Rutgers Univ.	Middlesex	34-023-0011	75.7	70.7	73.9	0.129	0.469	0.397	0.437	0.131	0.675	2.693	0.242	0.855
	Monmouth Univ.	Monmouth	34-025-0005	67.0	70.4	73.0	0.151	0.441	0.239	0.207	0.344	0.664	2.290	0.131	0.425
	Chester	Morris	34-027-3001	69.0	66.9	68.4	0.114	0.523	0.285	0.302	0.171	0.644	1.968	0.257	0.714
	Ramapo	Passaic	34-031-5001	68.3	65.9	67.5	0.074	0.146	0.047	0.336	0.166	0.374	1.182	0.257	0.429
	Columbia WMA	Warren	34-041-0007	64.7	56.2	56.2	0.083	0.364	0.205	0.265	0.103	0.420	2.889	0.348	0.648

2017 SENSITIVITY MODELING OF NAMED SOURCES OZONE CONTRIBUTIONS

The 2017 emissions were updated with estimates of 2017 actual emission estimates, which were mainly for the EGU sector, and the ozone contributions of the Named Sources were estimated using the CSAPR CAMx ozone source apportionment modeling approach with updates (details on the 2017 sensitivity modeling are contained in Section 4.1). The updates to the 2017 NOx emissions for the Named Sources reduced their State total NOx emissions from 9% (WV) to 38% (MD) with an average reduction of 18%; most of the NOx reductions come from the EGU component of the Named Sources. The ozone contributions of the Named Sources from the 2017 sensitivity modeling are shown in Table 5 with again Pennsylvania being the only upwind State where the Named Sources have over a 1% of the NAAQS ozone contributions at a nonattainment/maintenance receptor in CT.

Table 5. 2017 sensitivity modeling of the Upwind State NY Petition Named Sources ozone contributions to CT/NJ monitoring sites using updated almost actual 2017 emissions (mainly for EGUs), the Average Day Contribution Metric and the CSAPR Update 2017 modeling approach with contributions shaded orange if above 1% of the 2008 ozone NAAQS just for nonattainment and maintenance receptors.

Monitoring Site		County	AQS Code	2017 Ozo	R Avg Ozo	R Max Ozo	IL	IN	KY	MD	MI	OH	PA	VA	WV
Connecticut	Greenwic	Fairfield	9-001-001	79.0	74.1	76.6	0.115	0.261	0.260	0.332	0.197	0.547	1.695	0.222	0.568
	Danbury	Fairfield	9-001-112	77.3	71.6	73.1	0.137	0.292	0.293	0.268	0.215	0.455	1.316	0.226	0.470
	Stratford	Fairfield	9-001-300	83.3	75.5	79.7	0.125	0.292	0.254	0.373	0.189	0.490	1.576	0.267	0.472
	Westport	Fairfield	9-001-900	83.0	76.5	79.5	0.157	0.321	0.306	0.340	0.188	0.526	1.546	0.261	0.525
	Middletow	Middlesex	9-007-000	79.0	69.5	70.9	0.118	0.272	0.245	0.283	0.154	0.414	1.315	0.174	0.311
	New Have	New Have	9-009-002	77.0	66.8	70.1	0.108	0.252	0.220	0.295	0.150	0.417	1.322	0.212	0.406
	Madison E	New Have	9-009-900	82.3	76.2	79.2	0.136	0.260	0.228	0.300	0.180	0.383	1.210	0.325	0.383
New Jersey	Leonia	Bergen	4-003-000	74.3	68.3	69.2	0.116	0.285	0.315	0.306	0.168	0.543	1.670	0.195	0.591
	Newark F	Essex	4-013-000	67.7	68.5	72.0	0.159	0.351	0.339	0.237	0.252	0.677	1.924	0.273	0.722
	Bayonne	Hudson	4-017-000	70.7	68.9	69.8	0.142	0.320	0.317	0.298	0.229	0.651	2.013	0.296	0.755
	Flemingto	Hunterdon	4-019-000	71.7	67.2	68.9	0.151	0.322	0.266	0.154	0.241	0.706	1.869	0.203	0.875
	Rutgers U	Middlesex	4-023-001	75.7	70.7	73.9	0.146	0.354	0.385	0.299	0.205	0.714	2.028	0.353	0.953
	Monmouth	Monmouth	4-025-000	67.0	70.4	73.0	0.167	0.337	0.278	0.115	0.355	0.632	1.642	0.106	0.588
	Chester	Morris	4-027-300	69.0	66.9	68.4	0.102	0.286	0.271	0.257	0.207	0.575	1.737	0.165	0.793
	Ramapo	Passaic	4-031-500	68.3	65.9	67.5	0.050	0.130	0.142	0.206	0.160	0.354	1.330	0.242	0.487
	Columbia	Warren	4-041-000	64.7	56.2	56.2	0.084	0.194	0.130	0.224	0.191	0.408	2.291	0.254	0.535

A second 2017 sensitivity test was conducted that examined the ozone contributions of just the nonEGU and Oil&Gas sector components of the Named Sources. The reasoning behind the second 2017 sensitivity simulations was that the EGU sector component of the Named Sources have already been subjected to NOx controls under the CSAPR Update rulemaking that the CSAPR Close-Out proposes satisfies the upwind State's good neighbor provision under the 2008 ozone NAAQS. Thus, the ozone impacts of the Named Sources nonEGU plus Oil&Gas ozone impacts were modeled separately with the EGU sources. Table 6 displays the Named Sources nonEGU and Oil&Gas source sector contributions from the 9 upwind States to CT and NJ monitoring sites. above the 1% of the ozone NAAQS threshold. Pennsylvania was the only upwind State with Named Sources nonEGU plus Oil&Gas ozone contributions were above the 1% of the NAAQS and that just occurred for one nonattainment receptor in CT.

Table 6. 2017 sensitivity modeling of the Upwind State NY Petition Named Sources nonEGU plus Oil&Gas ozone contributions to CT/NJ monitoring sites using updated almost actual 2017 emissions (mainly for EGUs), the Average Day Contribution Metric and the CSAPR Update 2017 modeling approach with contributions shaded orange if above 1% of the 2008 ozone NAAQS just for nonattainment and maintenance receptors.

Monitoring Site		County	AQS Code	2017 Ozo	R Avg Ozo	R Max Ozo	IL	IN	KY	MD	MI	OH	PA	VA	WV
Connecticut	Greenwic	Fairfield	9-001-001	79.0	74.1	76.6	0.055	0.112	0.055	0.168	0.079	0.179	0.781	0.105	0.138
	Danbury	Fairfield	9-001-112	77.3	71.6	73.1	0.068	0.127	0.064	0.137	0.091	0.134	0.558	0.116	0.112
	Stratford	Fairfield	9-001-300	83.3	75.5	79.7	0.062	0.131	0.056	0.183	0.078	0.164	0.683	0.131	0.119
	Westport	Fairfield	9-001-900	83.0	76.5	79.5	0.077	0.141	0.066	0.165	0.077	0.171	0.693	0.128	0.130
	Middletow	Middlesex	9-007-000	79.0	69.5	70.9	0.059	0.127	0.055	0.148	0.067	0.141	0.587	0.086	0.087
	New Have	New Have	9-009-002	77.0	66.8	70.1	0.053	0.111	0.048	0.153	0.061	0.138	0.582	0.104	0.105
	Madison I	New Have	9-009-900	82.3	76.2	79.2	0.066	0.112	0.049	0.145	0.074	0.127	0.590	0.165	0.103
New Jersey	Leonia	Bergen	4-003-000	74.3	68.3	69.2	0.055	0.115	0.065	0.166	0.071	0.165	0.842	0.089	0.146
	Newark F	Essex	4-013-000	67.7	68.5	72.0	0.072	0.157	0.072	0.128	0.096	0.213	0.912	0.132	0.157
	Bayonne	Hudson	4-017-000	70.7	68.9	69.8	0.064	0.145	0.068	0.158	0.081	0.206	0.985	0.142	0.165
	Flemingto	Hunterdo	4-019-000	71.7	67.2	68.9	0.068	0.157	0.057	0.093	0.089	0.225	0.940	0.116	0.175
	Rutgers U	Middlesex	4-023-001	75.7	70.7	73.9	0.065	0.145	0.081	0.168	0.086	0.200	1.058	0.174	0.194
	Monmouth	Monmouth	4-025-000	67.0	70.4	73.0	0.076	0.162	0.056	0.073	0.129	0.223	0.827	0.070	0.128
	Chester	Morris	4-027-300	69.0	66.9	68.4	0.049	0.123	0.057	0.164	0.087	0.183	0.980	0.090	0.178
	Ramapo	Passaic	4-031-500	68.3	65.9	67.5	0.023	0.059	0.030	0.130	0.074	0.106	0.568	0.127	0.101
	Columbia	Warren	4-041-000	64.7	56.2	56.2	0.038	0.096	0.031	0.142	0.065	0.142	1.266	0.137	0.122

USE OF ALTERNATIVE SIGNIFICANT CONTRIBUTION THRESHOLDS

In Chapter 5 we introduced and justified alternative significant contributions thresholds including the Air Quality Variability Analysis 1 ppb threshold that represents an insignificant change in an ozone DV and a controllable emissions significance threshold that varies based on the level of contributions of U.S. anthropogenic emissions. In the three approaches we examined for estimating the ozone contributions of the Name Sources in Tables 3 through 5 above, Pennsylvania would still have ozone contributions above the alternative significant contribution thresholds at nonattainment/maintenance receptors in CT. However, the Named Sources non-EGU and Oil&Gas sectors, which Pennsylvania had one CT site above the 1% of the NAAQS threshold, had no contributions above the two alternative significant thresholds.

ATTACHMENT B

Overview of Reasonably Available Control Technology (RACT)

Section 182 of the Clean Air Act (CAA), as amended on November 15, 1990, includes provisions for sources emitting volatile organic compounds (VOCs) or nitrogen oxides (NO_X) to implement additional emissions reduction measures to improve the air quality of the region.[1] This process, referred to as RACT, is applicable to major stationary sources of VOC or NO_X emissions located in an area that is nonattainment for the National Ambient Air Quality Standard (NAAQS) for ozone or that is located in the Ozone Transport Region (OTR).

The United States Environmental Protection Agency (EPA) has defined RACT as:[2]

> *The lowest emission rate that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. RACT for a particular source is determined on a case-by-case basis considering the technological and economic circumstances of the individual source.*

The process for evaluating RACT is similar to that of evaluating best available control technology (BACT) or lowest achievable emission rate (LAER) for sources undergoing federal New Source Review (NSR) permitting in an attainment or nonattainment area, respectively. However, the economic feasibility threshold is typically much less stringent for RACT than for a BACT evaluation, and LAER evaluations do not include any economic considerations. On the other hand, BACT and LAER are only applicable for new and modified emissions sources, whereas RACT is also applicable to existing sources (i.e., a source cannot be grandfathered out of RACT).

All major stationary sources of NO_X emissions located in an ozone nonattainment area or the OTR must evaluate RACT for their NO_X emitting operations. The OTR was established in Section 184(a) of the 1990 CAA amendments to address air pollution in downwind states caused by activities in upwind states. The OTR consists of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Vermont, parts of Virginia, and Washington, D.C. Outside the OTR, NO_X RACT requirements only apply to NO_X major sources located in an ozone nonattainment area.

In December 2013, the states of Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont submitted a petition under Section 176A of the CAA.[3] The petition requested that EPA expand the OTR to include the states of Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Tennessee, West Virginia, and the portion of Virginia not currently in the OTR. EPA denied this petition in November 2017, stating that sufficient emissions reduction measures were already in place to improve air quality in the OTR as a result of existing control technologies both within and outside the OTR, additional emissions reductions through implementation

[1] https://www.gpo.gov/fdsys/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm

[2] 44 FR 53762 (September 17, 1979). https://www.govinfo.gov/content/pkg/FR-1979-09-17/pdf/FR-1979-09-17.pdf

[3] http://www.ct.gov/deep/lib/deep/air/176a/Petition_2013Dec9.pdf. The petition was amended on December 17, 2013 to add the state of Pennsylvania as a petitioner.

of the 2016 Cross State Air Pollution Control Rule (CSAPR), and the emission reductions achieved pursuant to federal and state programs promulgated pursuant to these and other CAA authorities.[4]

Overview of New York State's Section 126(b) Petition

In March 2018, New York State Department of Environmental Conservation (NYSDEC) submitted a petition to the EPA pursuant to Section 126(b) of the CAA (the NY Petition).[5] In the petition, NYSDEC alleged that upwind states contribute significantly to nonattainment in New York of the 2008 and 2015 ozone NAAQS, and as such, requested that EPA direct sources of NO_X emissions in nine upwind states to apply NO_X emissions controls commensurate with New York's RACT requirements, which are based on $5,000 per ton of pollutant removed.[6] The nine upwind states identified in the NY Petition as interfering with attainment for the ozone NAAQS in New York include Illinois, Indiana, Kentucky, Maryland, Michigan, Ohio, Pennsylvania, Virginia, and West Virginia. NYSDEC acknowledges that there are sources of NO_X emissions in these states that are already meeting RACT at a level of $5,000 per ton. For these sources, NYSDEC requests that EPA impose new daily emission limits during the ozone season.

NYSDEC also provides in Appendix B of its petition a list of the electric generating units (EGUs) in the nine upwind states and their associated facility-wide average NO_X emission rates in units of pounds of NO_X per million British thermal units heat input (lb/MMBtu). NYSDEC requested that EPA impose permanent and enforceable NO_X emission limits to sources emitting at rates above 0.15 lb/MMBtu. NYSDEC assumes that sources with three-year average emission rates less than or equal to 0.15 lb/MMBtu already meet RACT at $5,000 per ton. There is no clear NO_X RACT-related basis for this threshold.

Review of RACT Regulations

Pursuant to the emission reduction requirements of the CAA Section 182, EPA issued Control Techniques Guidelines (CTG) documents for sources of VOC emissions, which are intended to directly assist states with development of RACT regulations for the VOC sources. No CTG has been developed for sources of NO_X. Instead, EPA developed Alternative Control Techniques (ACT) documents, which review the control techniques for various sources of NO_X emissions. All current ACTs predate the 2008 ozone NAAQS, which is the main subject of the NY Petition. However, they are still used in developing state RACT regulations.[7]

Instead of issuing specific NO_X RACT requirements to individual states, EPA issued guidance which considers two factors for setting presumptive RACT limits: technological and economic feasibility. Technological feasibility of a pollution control technology is generally defined by previous control device installations within the same industry, but considers site-specific conditions such as space constraints, quality of raw materials that may change from plant-to-plant, and economic feasibility. Final emission limits implementing RACT depend on factors such as the quality of raw materials or fuels used in the

[4] 82 FR 51239 (November 3, 2017). https://www.gpo.gov/fdsys/pkg/FR-2017-11-03/pdf/2017-23983.pdf

[5] https://www.dec.ny.gov/docs/air_pdf/sips126petition.pdf

[6] https://www.dec.ny.gov/chemical/91851.html

[7] See for example, http://mde.maryland.gov/programs/Air/AirQualityPlanning/Documents/RACT%20-%20NOx/Proposed_%20MD_RACT_SIP_NOX_%2075ppbNAAQS.pdf

process or operational limitations at a particular source. Similarly, the cost of a pollution control device depends on factors like the availability and price of chemical agents, the difficulty of installation, and annual operational costs. As such, cost is usually site-specific and can vary depending on the geographical location of the facility. States typically determine a presumptive RACT in their regulations based on a certain cost threshold; but sources can submit a case-by-case RACT analysis based on site-specific costs and technical feasibility.

With no set RACT threshold dictated by the EPA, the cost threshold varies from state to state. Under EPA precedent and the CAA's guiding principle of cooperative federalism, States have the flexibility to establish their own presumptive RACT requirements necessary to protect the NAAQS. However, there are general guidelines:[8]

> *In 1992, EPA set presumptive NO_X RACT for boilers as combustion modification, consistent with title IV acid rain requirements. For all other NO_X stationary source categories, EPA guidance in 1994 indicated States should consider in their RACT determinations technologies that achieve 30–50 percent reduction within a cost range of $160–1300 per ton of NO_X removed. In the NO_X SIP Call Rule, we reviewed all major NO_X source categories and stated in the final rule that the NO_X SIP Call controls, at less than $2,000/ton, represent reductions beyond those required by RACT.*

EPA states that higher thresholds for NO_X RACT are not supported based on the agency's previous decision makings:[9]

> *The suggestion of one State that EPA's RACT guidance should be revised to reflect 85 percent control and $10,000/ton of pollutant removed is inconsistent with EPA's previous conclusions regarding what level of control represents RACT and because the comment lacked supporting documentation that the suggested values represent feasible control levels for the many source categories affected by the RACT program.*

EPA's 1994 guidance to use a cost range of $160 - $1,300 per ton of NO_X removed for RACT is equivalent to an inflation adjusted cost range of $270 - $2,200 in 2018, using the Consumer Price Index (CPI) information available through the Bureau of Labor Statistics (BLS) to adjust for inflation.[10] A review of the available information from the Pennsylvania Department of Environmental Protection (PADEP) during the development of their RACT regulations in 2015, demonstrates that all states identified in the NY Petition consider higher cost thresholds in developing their presumptive RACT limits than the adjusted range in EPA's 1994 guidance. Specifically, Wisconsin used $2,500, Illinois $2,500 to

[8] 70 FR 71654 (November 29, 2005). https://www.gpo.gov/fdsys/pkg/FR-2005-11-29/pdf/05-22698.pdf

[9] *Ibid.*

[10] https://data.bls.gov/pdq/SurveyOutputServlet

$3,000, Maryland $3,500 to $5,000, and Ohio $5,000 per ton NO_X.[11, 12] Note that EPA specifically commented on Pennsylvania's proposed RACT regulations on June 27, 2014, stating that it would be appropriate for Pennsylvania to use Wisconsin's cost threshold of $3,160 (2012 dollars) for NO_X RACT.[13] Pennsylvania used a cost threshold of $3,500 per ton of NO_X in its final rulemaking. Note that compliance with RACT emissions limits can often be demonstrated via emissions average across multiple emission units, providing increased operational flexibility. As such, it is possible for a site to not control a specific source to a level commensurate with RACT if other sources at the facility are controlled at a higher level. Averaging is usually subject to state approval and could be category-specific. For example, NYSDEC allows emissions averaging for their presumptive NO_X RACT emission limits for stationary combustion installations.[14] The sources that are included in the averaging plan must be within the same nonattainment designation areas (i.e., emissions from sources within severe ozone nonattainment areas cannot be averaged with those outside). New York's regulations do not explicitly allow system averaging plans for other RACT categories, such as process operations in 6 NYCRR 212-3; however, a source could propose system emissions averaging as part of the case-by-case analysis. Application of system emission averaging for compliance with RACT (either for presumptive RACT limits or case-by-case RACT) would be subject to NYSDEC's approval.

States also consider other factors in determining RACT beyond cost effectiveness, either on a case-by-case basis or in some states by source category. For example, a state may review controls in place for similar source types and either require or exclude a control as RACT based on typical practices for other operations. Further, New York State's air regulations provide presumptive NO_X RACT emission limits for various categories of stationary combustion installations, and facilities operating one of the subject source types may choose to either comply with the NO_X emission limitation or conduct a case-by-case NO_X RACT evaluation.[15] Ramboll has prepared a separate table outlining the differences in NO_X emission limits and fuel combustion subcategories between New York and the nine upwind states identified in the petition.[16]

Although the NO_X RACT cost effectiveness thresholds vary by state, this does not necessarily correlate to a proportional variation in the presumptive NO_X RACT emission limits. For instance, the NO_X RACT cost effectiveness threshold is higher in New York ($5,000/ton) than in Illinois ($2,500-3,000/ton); however, Illinois' regulations have more stringent NO_X emission limits for both oil-fired and gas-fired simple cycle combustion turbines (96 parts per million on a volume basis (ppmv) and 42 ppmv, respectively) than New York's regulations have for equivalent sources (100 ppmv and 50 ppmv, respectively). Similarly, New York and Maryland have the same NO_X RACT effectiveness threshold, but

[11] http://files.dep.state.pa.us/Air/AirQuality/AQPortalFiles/Permits/RACT/RACT%20II%20Training%20Final%20Presentation%206-20-2016-SRedits.pptx - These values are in 2015 dollars and not corrected for inflation.

[12] There are no ozone nonattainment counties in West Virginia and Michigan. As such, no RACT is developed for these states. However, both these states are subject to NO_X emission reduction requirements under the 2000 NO_X SIP Call and the 2016 update to the Cross-State Air Pollution Rule. West Virginia limits NO_X emissions during the ozone season for boilers larger than 250 MMBtu/hr, cement kilns, and large SIP Call engines [45 Code of State Regulations (CSR), Section 40]. Michigan has NO_X limitations on utility boilers, large boilers, and large engines under Part 8 of Chapter 336.

[13] http://www.irrc.state.pa.us/docs/3052/COMMENTS_PUBLIC/3052%2007-02-14%20EPA%20REGION%203.pdf

[14] 6 NYCRR 227-2.5(b)

[15] 6 NYCRR Chapter III, Part 227-2

[16] *See* Ramboll RACT Analysis, Table 1.

New York's regulations have lower NO_X emission limits for large natural gas-fired boilers (0.08 lb/MMBtu) than those found in Maryland's regulations (0.20 lb/MMBtu).

Further, while other states with sources named in the NY Petition have regulations with presumptive NO_X RACT emission limits for similar fuel combustion sources as those with limits under the New York regulations, the NO_X emission limits are not directly comparable. Different types of fuel combustion sources can achieve different NO_X emission rates; a state cannot set a blanket NO_X emission limit for all types of fuel combustion. As such, the states have assigned emission limits for different fuel combustion subcategories based on firing configuration, fuel(s) burned, and capacity. These subcategories vary significantly by state. For example, for oil-fired simple cycle combustion turbines alone, New York's regulations contain a single NO_X concentration limit (ppmv on a dry basis) for all units with heat input capacities greater than 10 MMBtu/hr, whereas Pennsylvania's regulations contain two separate NO_X concentration limits depending on turbine size for all turbines in the state except those in the Philadelphia metropolitan area, for which there are mass-based NO_X emission limits (lb/MMBtu) that vary depending on turbine size. As another example, New York requires limits for gas-fired boilers based on boiler size while Pennsylvania applies them state-wide regardless of boiler heat input. Also, New York requires case-by-case RACT evaluations for many source categories in the state while other states have specific regulations with hard numerical emission limits for the same sources (see for instance, paper mills in New York compared to Maryland, or natural gas-fired combined cycle turbines in New York versus Illinois, Ohio, Maryland, Pennsylvania, or Virginia).

It should also be noted that two of the upwind states identified in the NY Petition, Pennsylvania and Maryland,[17] are currently part of the OTR and, therefore, NO_X RACT requirements are already applicable state-wide.

Other Regulatory Programs Addressing the NAAQS

In the agency's denial of the Section 176A petition from NYSDEC and other northeastern states requesting an expansion of the OTR, EPA provided as one of its reasons for denying the petition that "the emission reductions achieved pursuant to federal and state programs promulgated pursuant to these and other CAA authorities" in upwind states are sufficient for protecting the ozone NAAQS in downwind states.[18] While RACT impacts NO_X levels from existing emission sources in a state, there are also other regulatory programs in place designed to protect the ozone NAAQS. From a federal permitting perspective, new major sources or major modifications of existing major sources are required to undergo federal NSR permitting, including a review of BACT or LAER for new and modified sources. There are no economic considerations for a LAER evaluation. BACT does include an assessment of the economics of a control option; however, the cost threshold is more stringent for BACT than for RACT. A typical BACT threshold is often in the range of $8,000 - $12,000 per ton pollutant removed, while a typical RACT threshold is generally below $5,000 per ton pollutant removed.

In addition, several upwind states identified in the NY petition have implemented minor source permitting programs that include provisions designed to protect the ozone NAAQS, even for projects not subject to federal NSR review. These regulatory programs apply state-wide and, while they do not

[17] In addition to applying RACT state-wide, the State of Maryland already applies a presumptive RACT cost threshold equivalent to New York's desired cost threshold of $5,000 per ton.

[18] 82 FR 51239 (November 3, 2017). https://www.gpo.gov/fdsys/pkg/FR-2017-11-03/pdf/2017-23983.pdf

impose requirements on the sources named in the NY Petition, they play a role in reducing NO_X emission at the state level. For example, Pennsylvania requires that all new sources undergoing construction permitting analyze Best Available Technology (BAT) to demonstrate that the "*emissions from a new source are the minimum attainable.*"[19] BAT demonstrations in Pennsylvania typically involve reviewing information from federal determinations for BACT or LAER, as available.

Ohio implements a similar review as part of their construction permitting program, which requires the permit writers to "*review other similar sources in Ohio and in other states with similar air quality (excluding states, for example, that have severe non-attainment areas) to determine what level of control has been demonstrated to work for these sources.*"[20] Virginia also has a presumptive BACT emission level for engines, but reviews other projects on a case-by-case basis to determine whether BACT is required given the emission levels from each project. Permit writers in Virginia have verbally stated that the thresholds for BACT determinations vary from $3,000 to over $20,000 depending on the source.[21]

Arbitrary Grouping of Emission Units in the NY Petition

There is no RACT basis for a threshold of 400 tons per year.

The NY Petition provides a list of emissions sources with NO_X emissions above 400 tons per year and requests that EPA require upwind states to apply NO_X RACT with a $5,000 cost effectiveness threshold to these sources. The petition does not provide a technical basis for selecting sources with 400 tons per year of emissions. This threshold is arbitrary and unrelated to RACT regulations as it would apply across the board to EGU or non-EGUs. It is unclear how NYSDEC's conclusions might have changed had a higher or lower threshold been used for the analysis.

There is no RACT basis for a threshold of 0.15 lb NO_X/MMBtu.

Appendix B of the NY Petition provides a list of the EGUs with NO_X emissions above 400 tons per year in all nine upwind states listed in the petition. The petition specifically requests that NO_X RACT equivalent to $5,000 per ton be applied to all listed sources with facility-wide NO_X emission rates above 0.15 lb/MMBtu, averaged over three years. EPA has implemented multiple programs beyond RACT and federal nonattainment NSR which are designed to improve air quality and reduce ground-level ozone. Certain programs have included a regional cap-and-trade of NO_X emissions, whereby EPA sets a NO_X budget for the region that is allocated to the major NO_X emitters, and the NO_X emitters may trade emissions credits throughout the region as needed. Although there have been instances under these types of cap-and-trade programs in which EPA has set the regional NO_X budget by multiplying the regional heat input by a threshold of 0.15 lb/MMBtu, RACT is conducted on a case-by-case basis. The use of a regional threshold is not appropriate for setting a NO_X RACT emission limit for any type of EGU.

Even under New York's air regulations, the presumptive NO_X RACT emission limits for certain types of coal- and oil-fired boilers exceeds 0.15 lb/MMBtu.[22] Specifically, the presumptive NO_X RACT emission

[19] 25 Pennsylvania Code 127.411(a)(6)

[20] http://www.epa.ohio.gov/Portals/27/sb265/Final20140207Post090803BATv11.pdf

[21] Phone conversation between Ramboll and Virginia Department of Environmental Quality (VDEQ) on July 9, 2018.

[22] 6 NYCRR Chapter III, Part 227-2

limit is 0.20 lb/MMBtu for pulverized coal-fired boilers between 100 and 250 MMBtu/hr, wet bottom/cyclone coal-oil boilers greater than 250 MMBtu/hr, all residual oil-fired boilers between 25 and 100 MMBtu/hr, and cyclone oil-fired boilers greater than 250 MMBtu/hr. As such, it was inappropriate for NYSDEC to state in its petition that sources exceeding 0.15 lb/MMBtu are not meeting RACT.

RACT is evaluated on a case-by-case, unit-by-unit basis.

The NY Petition requests relief that ignores the fundamental requirement that RACT for a unit be determined on a case-by-case basis. The treatment of EGUs in NYSDEC's Section 126(b) petition is an example of NYSDEC's improper characterization of existing controls and whether they meet RACT. The petition requested that NO_X RACT be required for EGUs with a facility-wide NO_X emission rate exceeding 0.15 lb/MMBtu, averaged over three years.

EPA annually issues a database of coal-fired power plants which lists the individual emission units, installation years, criteria pollutant emissions, and control technology installed. This database includes the majority of the EGUs listed in the NY Petition. [23] A comparison of the emission units listed in EPA's database with the NYSDEC EGU list indicates that, while RACT is reviewed on a case-by-case basis, NYSDEC appears to group together all emission units at a facility. For instance, the four boilers at the Chesterfield power plant in Chester, Virginia are listed under the umbrella name "Chesterfield Power Station," even though three of these boilers are equipped with selective catalytic reduction (SCR), which is considered state-of-the-art technology for removing NO_X.

Additionally, using the information in EPA's coal-fired plant database, Ramboll identified the 50 highest NO_X-emitting emission units on NYSDEC's EGU list, and 32 of these 50 emission units are already equipped with SCR, which in all cases is installed in conjunction with low-NO_X burners, overfire air, fluidized bed combustion, or a combination thereof. Cost of these combined measured could be expected to surpass the $5,000 per ton RACT cost effectiveness threshold requested by NYSDEC. Six more units are equipped with selective non-catalytic reduction (SNCR) and other technologies such as low-NO_X burners and overfire air. These measures (i.e., SNCR and combustion control technologies) serve to minimize NO_X emissions although would potentially not exceed the cost effectiveness threshold for large NO_X-emitting units. In other words, when reviewing the NYSDEC list with a focus on controls on individual units, many are already controlled with the state-of-the-art control technology for NO_X, and well below typical RACT emission limits, although it is not possible to evaluate the cost for removing NO_X without reviewing all the pertinent information for each individual source.[24]

Conclusion

The NY Petition's requests for relief present several concerns. First, there does not appear to be a basis for selecting units with 400 tons per year or carving out separate relief for named sources with a

[23] https://www.epa.gov/sites/production/files/2018-02/coalunitcharacteristics2017_0.xls - 56 of the 64 facilities presented on the NYSDEC's EGU list are included on EPA's list.

[24] Note that unrelated to NYSDEC's petition, at least one state has already imposed NO_X emission limits for EGUs that are more stringent than the 0.15 lb/MMBtu listed in NYSDEC's petition. Code of Maryland Regulations (COMAR) 26.11.38.04 requires meeting a limit of 0.09 lb/MMBtu, switching to natural gas, retiring the unit, or capping the emissions. Also, COMAR 26.11.38.03 requires a daily limit using the control technology. The limits apply to C.P. Crane units 1 and 2, Chalk Point unit 2, Dickerson units 1, 2, and 3, and H.A. Wagner unit 2, which are some of the same emission units noted in the NYSDEC petition.

facility-wide three-year average NO_X emission rate of 0.15 lb/MMBtu. These thresholds are arbitrary and unrelated to RACT or other federal rules applicable to EGU or non-EGUs. Second, New York fails to take into account the case-by-case nature of RACT. RACT is evaluated based on individual emission units, not a facility-wide average. When these emission units are reviewed individually, many of them are already equipped with state of the art emission controls.

In addition, many of the states listed in the petitions are already required to apply NO_X RACT in part or all of the state due to requirements for ozone nonattainment areas and the OTR. Many of the sources listed by NYSDEC have previously gone through permitting programs such as NSR that have cost effectiveness thresholds higher than $5,000 per ton. Several state regulatory programs already in place impose requirements in addition to RACT that are designed to address the ozone NAAQS. Examples include BAT in Pennsylvania or Ohio, which apply to all new or modified sources within the states, even emission units permitted under state minor source permitting programs.

Presumptive RACT for NOx Emissions in Upwind States with Nonattainment Areas*

State	IL	IN	KY	MD	NY	OH	PA	VA
Coal-Fired Boilers	**35 Ill. Adm. Code. 217.164** **Chicago or Metro East Areas** **> 100 MMBtu/hr, circulating fluidized bed combustor**: 0.12 lb NOx/MMBtu **≤ 100 MMBtu/hr**: Combustion tuning **> 250 MMBtu/hr**: 0.18 lb NOx/MMBtu **≥ 100 and ≤ 250 MMBtu/hr**: 0.25 lb NOx/MMBtu	**326 IAC 10-1-4(b)(3)** **Heat Input ≥ 100 MMBtu/hr in Clark or Floyd County** **Wall-fired dry bottom Pulverized Coal Boiler**: 0.5 lb NOx/MMBtu **Tangentially-fired Pulverized Coal Boiler**: 0.4 lb NOx/MMBtu **Spreader Stoker Pulverized Coal Boiler**: 0.5 lb NOx/MMBtu **Overfeed Stoker Pulverized Coal Boiler**: 0.4 lb NOx/MMBtu	**401 KAR 51:160 Section 2** **To satisfy exemption requirements from 401 KAR 51:160, Sections 3 to 7** 1) Limit the unit's NOx emissions during each control period to 25 tons or less; 2) Restrict the unit to burning only natural gas or fuel oil during each control period; 3) Restrict the unit's operating hours during each control period to the number calculated by dividing 25 tons of potential NOx mass emissions by the unit's maximum potential hourly NOx mass emissions	**COMAR 26.11.09.08** **Major Stationary Sources:** **Tangential-Fired (dry bottom)**: 0.38 lb NOx/MMBtu **Wall-Fired (dry bottom)**: 0.38 lb NOx/MMBtu **Tangential-Fired (wet bottom)**: 1.00 lb NOx/MMBtu **Wall-Fired (wet bottom)**: 1.00 lb NOx/MMBtu	**6NYCRR 227-2.4** **Effective July 1, 2014** **Pulverized Coal**: 0.20 lb/MMBtu **Coal**: 0.08 lb/MMBtu (100-250 MMBtu/hr) **Tangential/Wall**: 0.12 lb/MMBtu **Wet Bottom, Cycl**: 0.20 lb/MMBtu **Dry Bottom, Fluidized Bed**: 0.08 lb/MMBtu (>250 MMBtu/hr)	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **Very Large Boilers (>250 MMBtu/hr), Large Boilers (>100 MMBtu/hr and ≤ 250 MMBtu/hr), and Midsize Boilers (>50 MMBtu/hr and < 100 MMBtu/hr):** **Tangetential-fired Wet/Dry Bottom:** 0.30 lb NOx/MMBtu **Wall-fired Wet/Dry Bottom:** 0.30 lb NOx/MMBtu **Cyclone-fired Wet/Dry Bottom:** 0.30 lb NOx/MMBtu **Spreader Stoker-fired Dry Bottom:** 0.30 lb NOx/MMBtu **Overfeed Stoker-fired Dry Bottom:** 0.30 lb NOx/MMBtu **Small Boiler (>25 MMBtu/hr and ≤ 50 MMBtu/hr)**: Annual tune-up and associated recordkeeping requirements Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(1)** **State-Wide:** 0.45 lb/MMBtu (50-250 MMBtu/hr) **Fluidized Bed**: 0.16 lb/MMBtu **Tangential**: 0.35 lb/MMBtu **Other Coal Firing**: 0.40 lb/MMBtu **Coal Firing with SCR**: 0.12 lb/MMBtu (>250 MMBtu/hr) **Philadelphia Area:** 0.20 lb/MMBtu (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430** **Face and Tangential-Fired (wet bottom)**: 1.0 lb NOx/MMBtu **Cyclone-Fired (wet bottom)**: 0.55 lb NOx/MMBtu **Stokers-Fired (wet bottom)**: N/A **Face and Tangential-Fired (dry bottom)**: 0.38 lb NOx/MMBtu **Cyclone-Fired (dry bottom)**: N/A **Stokers-Fired (dry bottom)**: 0.4 lb NOx/MMBtu
Oil-Fired Boilers	**35 Ill. Adm. Code. 217.164** **Chicago or Metro East Areas** **> 100 MMBtu/hr**: 0.10 lb NOx/MMBtu **≤ 100 MMBtu/hr**: Combustion tuning	**326 IAC 10-1-4(b)(3)** **Heat Input ≥ 100 MMBtu/hr in Clark or Floyd County** **Distillate Oil-Fired Boiler**: 0.2 lb NOx/MMBtu **Residual Oil-Fired Boiler**: 0.3 lb NOx/MMBtu	**401 KAR 51:160 Section 2** **To satisfy exemption requirements from 401 KAR 51:160, Sections 3 to 7** 1) Limit the unit's NOx emissions during each control period to 25 tons or less; 2) Restrict the unit to burning only natural gas or fuel oil during each control period; 3) Restrict the unit's operating hours during each control period to the number calculated by dividing 25 tons of potential NOx mass emissions by the unit's maximum potential hourly NOx mass emissions	**COMAR 26.11.09.08** **Major Stationary Sources:** **Tangential-Fired Gas/Oil**: 0.25 lb NOx/MMBtu **Wall-Fired Gas/Oil**: 0.25 lb NOx/MMBtu	**6NYCRR 227-2.4** **Effective July 1, 2014** **Distillate Oil**: 0.08 lb/MMBtu **Residual Oil**: 0.20 lb/MMBtu (25-100 MMBtu/hr) 0.15 lb/MMBtu (100-250 MMBtu/hr) **Tangential/Wall**: 0.15 lb/MMBtu **Cyclone**: 0.20 lb/MMBtu (>250 MMBtu/hr)	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **Very Large Boilers (>250 MMBtu/hr), Large Boilers (>100 MMBtu/hr and ≤ 250 MMBtu/hr), and Midsize Boilers (>50 MMBtu/hr and < 100 MMBtu/hr):** **Tangetential-fired Distillate Oil:** 0.12 lb NOx/MMBtu **Wall-fired Distillate Oil:** 0.12 lb NOx/MMBtu **Cyclone-fired Distillate Oil:** 0.12 lb NOx/MMBtu **Tangetential-fired Residual Oil**: 0.23 lb NOx/MMBtu **Wall-fired Residual Oil:** 0.23 lb NOx/MMBtu **Cyclone-fired Residual Oil**: 0.23 lb NOx/MMBtu **Small Boiler (>25 MMBtu/hr and ≤ 50 MMBtu/hr)**: Annual tune-up and associated recordkeeping requirements Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(1)** **State-Wide:** **Distillate Oil**: 0.12 lb/MMBtu **Residual Oil**: 0.20 lb/MMBtu (>50 MMBtu/hr) **Philadelphia Area:** 0.20 lb/MMBtu (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430** **Oil or Gas-fired or Both** **Face and Tangential-Fired**: 0.25 lb NOx/MMBtu **Cyclone-Fired**: 0.43 lb NOx/MMBtu **Stokers-Fired**: N/A
Other Liquid Fuel Boilers	**35 Ill. Adm. Code. 217.164** **Chicago or Metro East Areas** **> 100 MMBtu/hr**: 0.15 lb NOx/MMBtu **≤ 100 MMBtu/hr**: Combustion tuning	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**401 KAR 51:160 Section 2** **To satisfy exemption requirements from 401 KAR 51:160, Sections 3 to 7** 1) Limit the unit's NOx emissions during each control period to 25 tons or less; 2) Restrict the unit to burning only natural gas or fuel oil during each control period; 3) Restrict the unit's operating hours during each control period to the number calculated by dividing 25 tons of potential NOx mass emissions by the unit's maximum potential hourly NOx mass emissions	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**6NYCRR 227-2.4** Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	**25 Pa Code 129.97(g)(1)** Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Gas-Fired Boilers	**35 Ill. Adm. Code. 217.164** **Chicago or Metro East Areas** **> 100 MMBtu/hr**: 0.08 lb NOx/MMBtu **≤ 100 MMBtu/hr**: Combustion tuning	326 IAC 10-1-4(b)(3) **Heat Input > 100 MMBtu/hr in Clark or Floyd County** **Gas-Fired Boiler**: 0.2 lb NOx/MMBtu	**401 KAR 51:160 Section 2** **To satisfy exemption requirements from 401 KAR 51:160, Sections 3 to 7** 1) Limit the unit's NOx emissions during each control period to 25 tons or less; 2) Restrict the unit to burning only natural gas or fuel oil during each control period; 3) Restrict the unit's operating hours during each control period to the number calculated by dividing 25 tons of potential NOx mass emissions by the unit's maximum potential hourly NOx mass emissions	COMAR 26.11.09.08 **Major Stationary Sources:** **Tangential-Fired**: 0.20 lb NOx/MMBtu **Wall-Fired**: 0.20 lb NOx/MMBtu	**6NYCRR 227-2.4** 0.05 lb/MMBtu (25-100 MMBtu/hr) 0.06 lb/MMBtu (100-250 MMBtu/hr) 0.08 lb/MMBtu (>250 MMBtu/hr)	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **Very Large Boilers (>250 MMBtu/hr), Large Boilers (>100 MMBtu/hr and ≤ 250 MMBtu/hr), and Midsize Boilers (>50 MMBtu/hr and < 100 MMBtu/hr):** **Tangetential-fired Distillate Oil:** 0.10 lb NOx/MMBtu **Wall-fired Distillate Oil:** 0.10 lb NOx/MMBtu **Small Boiler (>25 MMBtu/hr and ≤ 50 MMBtu/hr)**: Annual tune-up and associated recordkeeping requirements Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(1)** **State-Wide:** **Natural Gas**: 0.10 lb/MMBtu **Refinery Gas**: 0.25 lb/MMBtu (>50 MMBtu/hr) **Philadelphia Area:** 0.10 lb/MMBtu (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430** **Face and Tangential-Fired**: 0.20 lb NOx/MMBtu **Cyclone-Fired**: N/A **Stokers-Fired**: N/A
Natural Gas or Other Gaseous Fuels Process Heaters	**35 Ill. Adm. Code. 217.184** **Chicago or Metro East Areas** **> 100 MMBtu/hr**: 0.08 lb NOx/MMBtu **≤ 100 MMBtu/hr**: Combustion tuning	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the OTR	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	**25 Pa Code 129.97(g)(1)** **State-Wide:** **Natural Gas**: 0.10 lb/MMBtu **Refinery Gas**: 0.25 lb/MMBtu (>50 MMBtu/hr) **Philadelphia Area:** 0.10 lb/MMBtu (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430** **Face and Tangential-Fired**: 0.20 lb NOx/MMBtu **Cyclone-Fired**: N/A **Stokers-Fired**: N/A

Presumptive RACT for NOx Emissions in Upwind States with Nonattainment Areas [*]

State	IL	IN	KY	MD	NY	OH	PA	VA
Residual Fuel Oil Process Heaters	**35 Ill. Adm. Code. 217.184** **Chicago or Metro East Areas** **> 100 MMBtu/hr, natural draft**: 0.10 lb NOx/MMBtu **> 100 MMBtu/hr, mechanical draft**: 0.15 lb NOx/MMBtu **≤ 100 MMBtu/hr**: Combustion tuning	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	**25 Pa Code 129.97(g)(1)** **State-Wide:** **Distillate Oil**: 0.12 lb/MMBtu **Residual Oil**: 0.20 lb/MMBtu (>50 MMBtu/hr) **Philadelphia Area:** 0.20 lb/MMBtu (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430** **Face and Tangential-Fired (wet bottom)**: 1.0 lb NOx/MMBtu **Cyclone-Fired (wet bottom)**: 0.55 lb NOx/MMBtu **Stokers-Fired (wet bottom)**: N/A **Face and Tangential-Fired (dry bottom)**: 0.38 lb NOx/MMBtu **Cyclone-Fired (dry bottom)**: N/A **Stokers-Fired (dry bottom)**: 0.4 lb NOx/MMBtu
Other Liquid Fuel Process Heaters	**35 Ill. Adm. Code. 217.184** **Chicago or Metro East Areas** **> 100 MMBtu/hr, natural draft**: 0.05 lb NOx/MMBtu **> 100 MMBtu/hr, mechanical draft**: 0.08 lb NOx/MMBtu **≤ 100 MMBtu/hr**: Combustion tuning	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**9VAC5-40-7430** **Oil or Gas-fired or Both** **Face and Tangential-Fired**: 0.25 lb NOx/MMBtu **Cyclone-Fired**: 0.43 lb NOx/MMBtu **Stokers-Fired**: N/A
Oil-Fired CCCT	**35 Ill. Adm. Code. 217.388** 96 ppmv @15%O2 dry for liquid fuel-fired turbines	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.09.08 (G)(2)** **Combustion turbine with a capacity factor > 15%**: 65 ppm @15%O2 dry or meet applicable Prevention of Significant Deterioration limits (whicever is more restrictive)	**6NYCRR 227-2.4** **Effective July 1, 2014** N/A - Case-by-Case RACT required (>10 MMBtu/hr)	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **< 3.5 MW:** 200 ppmvd @15%O2 **≥ 3.5 MW and ≤ 25 MW:** 96 ppmvd @15%O2 **> 25 MW and < 50 MW:** 96 ppmvd @15%O2 **≥ 50 MW:** 96 ppmvd @15%O2 Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(2)** **25 Pa. Code 129.202** **State-Wide:** 96 ppmvd @15%O2 (≥ 1,000 bhp and < 180 MW) 8 ppmvd @15%O2 (>180 MW) **Philadelphia Area:** 0.26 lb/MMBtu *or* 2.0 lb/MWh (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430B(b)** **For fuel bound nitrogen <0.015%**: 65 ppmvd @15%O2 **For FBN ≥ 0.015%**: 77 ppmvd @15%O2
Gas-Fired CCCT	**35 Ill. Adm. Code. 217.388** 42 ppmv @15%O2 dry for gaseous fuel-fired turbines	326 IAC 10-1-4(b)(5) **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.09.08 (G)(2)** **Combustion turbine with a capacity factor > 15%**: 42 ppm @15%O2 dry or meet applicable Prevention of Significant Deterioration limits (whicever is more restrictive)	**6NYCRR 227-2.4** **Effective July 1, 2014** N/A - Case-by-Case RACT required (>10 MMBtu/hr)	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **< 3.5 MW:** 150 ppmvd @15%O2 **≥ 3.5 MW and ≤ 25 MW:** 42 ppmvd @15%O2 **> 25 MW and < 50 MW:** 42 ppmvd @15%O2 **≥ 50 MW:** 42 ppmvd @15%O2 Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(2)** **25 Pa. Code 129.202** **State-Wide:** 42 ppmvd @15%O2 (≥ 1,000 bhp and < 180 MW) 4 ppmvd @15%O2 (>180 MW) **Philadelphia Area:** 0.17 lb/MMBtu *or* 1.3 lb/MWh (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430B(b)** 42 ppmvd @15%O2
Oil-Fired SCCT	**35 Ill. Adm. Code. 217.388** 96 ppmv @15%O2 dry for liquid fuel-fired turbines	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.09.08 (G)(2)** **Combustion turbine with a capacity factor > 15%**: 65 ppm @15%O2 dry or meet applicable Prevention of Significant Deterioration limits (whicever is more restrictive)	**6NYCRR 227-2.4** 100 ppmvd @15%O2 (>10 MMBtu/hr)	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **< 3.5 MW:** 200 ppmvd @15%O2 **≥ 3.5 MW and ≤ 25 MW:** 96 ppmvd @15%O2 **> 25 MW and < 50 MW:** 96 ppmvd @15%O2 **≥ 50 MW:** 96 ppmvd @15%O2 Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(2)** **25 Pa. Code 129.202** **State-Wide:** 150 ppmvd @15%O2 (1,000 - 6,000 bhp) 96 ppmvd @15%O2 (>6,000 bhp) **Philadelphia Area:** 0.30 lb/MMBtu *or* 3.0 lb/MWh (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430B(b)** **For FBN <0.015%**: 65 ppmvd @15%O2 **For FBN ≥ 0.015%**: 77 ppmvd @15%O2
Gas-Fired SCCT	**35 Ill. Adm. Code. 217.388** 42 ppmv @15%O2 dry for gaseous fuel-fired turbines	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.09.08 (G)(2)** **Combustion turbine with a capacity factor > 15%**: 42 ppm @15%O2 dry or meet applicable Prevention of Significant Deterioration limits (whicever is more restrictive)	**6NYCRR 227-2.4** 50 ppmvd @15%O2 (>10 MMBtu/hr)	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **< 3.5 MW:** 150 ppmvd @15%O2 **≥ 3.5 MW and ≤ 25 MW:** 42 ppmvd @15%O2 **> 25 MW and < 50 MW:** 42 ppmvd @15%O2 **≥ 50 MW:** 42 ppmvd @15%O2 Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(2)** **25 Pa. Code 129.202** **State-Wide:** 150 ppmvd @15%O2 (1,000 - 6,000 bhp) 42 ppmvd @15%O2 (>6,000 bhp) **Philadelphia Area:** 0.20 lb/MMBtu *or* 2.2 lb/MWh (100-250 MMBtu/hr) 0.17 lb/MMBtu (>250 MMBtu/hr)	**9VAC5-40-7430B(b)** 42 ppmvd @15%O2

Presumptive RACT for NOx Emissions in Upwind States with Nonattainment Areas [*]

State	IL	IN	KY	MD	NY	OH	PA	VA
Oil-Fired ICE	**35 Ill. Adm. Code. 217.388** 660 ppmv @15%O2 for diesel engines	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**401 KAR 51 Subchapter 150 Section 3** Shall not operate the engine during a control period unless: 1) The NOx emission rate for a Large NOx SIP Call Engine is reduced from Past NOx emission rate by at least 82 %; or 2) The owner or operator complies with requirements in Section 4 of 401 KAR 51	**COMAR 26.11.29.02.B,C** **ICE at a natural gas pipeline compression station** **Diesel Engines ≥ 3100 HP**: 175 ppmv @15%O2 **Dual-fired Engines ≥ 4400 HP**: 125 ppmv @15%O2 Facilities with 5 or fewer ICE shall meet a combined maximum hourly emission limit of 300 lbs NOx/hr or less. Facilities with more than 5 ICE shall meet a combined maximum hourly emission limit of 566 lbs NOx/hr.	**6NYCRR 227-2.4(f)** **Stationary ICE (>200 bhp in NYC Area; > 400 bhp Rest of NY)** 2.3 g/hp-hr **Small Stationary ICE (≤200 bhp in NYC Area; ≤400 bhp Rest of NY)** Annual tune-up and associated recordkeeping requirements	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **Diesel or Distillate Fuel Engines > 2,000 hp:** 3.0 g/bhp-hr **Dual Burn Engines > 2,000 hp:** 3.0 g/bhp-hr Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(1)** 25 Pa Code 129.203 **State-Wide:** 8.0 g/bhp-hr (>500 bhp) **Philadelphia Area:** 2.3 g/bhp-hr (>1,000 bhp)	**ICE at a natural gas pipeline compression station** **Diesel Engines ≥ 3100 HP**: 175 ppmv @15%O2 **Dual-fired Engines ≥ 4400 HP**: 125 ppmv @15%O2 Facilities with 5 or fewer ICE shall meet a combined maximum hourly emission limit of 300 lbs NOx/hr or less. Facilities with more than 5 ICE shall meet a combined maximum hourly emission limit of 566 lbs NOx/hr.N11:N17
Gas-Fired ICE	**35 Ill. Adm. Code. 217.388** **For spark-ignited rich-burn engines**: 150 ppmv @15%O2 dry; **For spark-ignited lean-burn engines (except for existing spark-ignited Worthington engines that are not listed in Appendix G of Part 217)**: 210 ppmv @15%O2 dry; **For existing spark-ignited Worthington engines that are lot listed in Appendix G of Part 217:** 365 ppmv @15%O2 dry	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**401 KAR 51 Subchapter 150 Section 3** Shall not operate the engine during a control period unless: 1) The NOx emission rate for a Large NOx SIP Call Engine is reduced from Past NOx emission rate by at least 82 %; or 2) The owner or operator complies with requirements in Section 4 of 401 KAR 51	**COMAR 26.11.29.02.B,C** **ICE at a natural gas pipeline compression station** **Spark ignited rich burn ≥ 2400 HP**: 110 ppmv @15%O2 **Spark ignited lean burn ≥ 2400 HP**: 125 ppmv @15%O2 Facilities with 5 or fewer ICE shall meet a combined maximum hourly emission limit of 300 lbs NOx/hr or less. Facilities with more than 5 ICE shall meet a combined maximum hourly emission limit of 566 lbs NOx/hr.	**6NYCRR 227-2.4(f)** **Stationary ICE (>200 bhp in NYC Area; > 400 bhp Rest of NY)** **Natural Gas:** 1.5 g/hp-hr LFG or Digester Gas: 2.0 g/bhp-hr **Small Stationary ICE (≤200 bhp in NYC Area; ≤400bhp Rest of NY)** Annual tune-up and associated recordkeeping requirements	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **Rich Burn Engines > 2,000 hp:** 3.0 g/bhp-hr **Lean Burn Engines > 2,000 hp**: 3.0 g/bhp-hr Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	**25 Pa Code 129.97(g)(1)** 25 Pa Code 129.203 **Philadelphia Area:** 3.0 g/bhp-hr (>1,000 bhp)	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Portland Cement	**35 Ill. Adm. Code. 217.224 and 217.402** **Chicago or Metro East Areas** **Long Dry Cement Kiln**: 5.1 lb NOx/ton clinker produced **Short Dry Cement Kiln**: 5.1 lb NOx/ton clinker produced **Preheater Cement Kiln**: 3.8 lb NOx/ton clinker produced **Preheater/precalciner Cement Kiln**: 2.8 lb NOx/ton clinker produced **State-Wide** **Long Wet Cement Kiln**: 6.0 lb NOx/ton clinker produced	**326 IAC 10-1-4(b)(1)(A and B)** **Production Capacity ≥ 20 tons clinker/hour in Clark or Floyd County** **Long Dry Kiln**: 10.8 lb NOx/ton clinker produced (operating day basis) and 6.0 lb NOx/ton of clinker produced (30 day rolling average basis) **Dry Preheater Process Kiln**: 5.9 lb NOx/ton clinker produced (operating day basis) and 4.4 lb NOx/ton of clinker produced (30 day rolling average basis)	**401 KAR 51:170 Section 2 (2)** 6.6 lb NOx/ton of clinker (30 day rolling period)	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**6 NYCRR 220-1.6** N/A - Case-by-Case RACT (Site-Specific RACT Compliance Plan Required)	**3745-14-11** **RACT requirements applicable to the following Portland Cement Kilns**: Long dry kilns (12 tph process rate); Long wet kilns (10 tph process rate); Preheater kilns (16 tph process rate); Precalciner and preheater/precalciner kilns (22 tph process rate): Shall not operate during May 1st through September 30th unless the kiln has installed and operates with low NOx burners, mid-kiln system firing, or alternative control techniques, subject to the approval by the administrator, that achieve at least the same emissions decreases as low-NOx burners or mid-kiln system firing	**25 Pa. Code 129.97(h)** **State-Wide:** **Wet-Process Kiln**: 3.88 lb/ton clinker **Dry-Process Kiln**: 3.44 lb/ton clinker **Preheater/Precalciner**: 2.36 lb/ton clinker	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Lime Kilns	**35 Ill. Adm. Code. 217.224** **Chicago or Metro East Areas** **Gas-Fired Rotary Kiln**: 2.2 lb NOx/ton lime produced **Caol-Fired Rotary Kiln**: 2.5 lb NOx/ton lime produced	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.**2 **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern Virginia are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Glass Melting Furnace	**35 Ill. Adm. Code. 217.204** **Chicago or Metro East Areas** **Container Glass Furnace**: 5.0 lb/ton glass produced **Flat Glass Furnace**: 7.9 lb/ton glass produced **Other Glass Furnace**: 11.0 lb/ton glass produced	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**6 NYCRR 220-2.3** N/A - Case-by-Case RACT (Site-Specific RACT Compliance Plan Required)	None Listed	**25 Pa. Code 129.304** **State-Wide:** **Container Glass Furnace**: 4.0 lb/ton glass pulled **Pressed/Blown Glass Furnace**: 7.0 lb/ton glass pulled **Fiberglass Furnace**: 4.0 lb/ton glass pulled **Flat Glass Furnace**: 7.0 lb/ton glass pulled **Other Glass Furnace**: 6.0 lb/ton glass pulled	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Coke Oven Batteries	None listed	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**6 NYCRR 214.9** N/A - Case-by-Case RACT (Site-Specific RACT Compliance Plan Required)	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).

Presumptive RACT for NOx Emissions in Upwind States with Nonattainment Areas [*]

State	IL	IN	KY	MD	NY	OH	PA	VA
Iron and Steel	Refer to Reheat, Annealing, and Galvanzing Furnaces	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**6 NYCRR 216.5** N/A - Case-by-Case RACT (Site-Specific RACT Compliance Plan Required)	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Hot Mix Asphalt Plants	None listed	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**6 NYCRR 212-4.1** **By January 1, 2020** - an economic feasability analysis for the installation of Low NO_x Burners must be submited to NYSDEC. All economically feasible sites will be required to install Low NOx Burners.	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
MSW Combustor	None listed	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.08.08** **Existing Large MWC with a Capacity > 250 tons/day**: 205 ppmv @7%O@ 24-hr arithmetic average or 75% reduction. Mass burn refractory MWC is exempt	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Exempt under OAC 3745-110-03 (K)	**25 Pa Code 129.97(f)** **State-Wide:** 180 ppmvd @7%O2	**9VAC5-40-8050** **Facilities not engaged in an emissions averaging plan** **Mass burn waterwall units**: 205 ppmvd (corrected to 7% oxygen) **Mass burn rotary waterwall units**: 250 ppmvd (corrected to 7% oxygen) **Refuse-derived fuel combustors**: 250 ppmvd (corrected to 7% oxygen) **Fluidized bed combustors**: 180 ppmvd (corrected to 7% oxygen) **Mass burn refractory combustors**: no limit **Facilities engaged in an emissions averaging plan** **Mass burn waterwall units**: 185 ppmvd (corrected to 7% oxygen) **Mass burn rotary waterwall units**: 220 ppmvd (corrected to 7% oxygen) **Refuse-derived fuel combustors**: 230 ppmvd (corrected to 7% oxygen) **Fluidized bed combustors**: 165 ppmvd (corrected to 7% oxygen)
Sewage Sludge Incinerator	None listed	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Reheat Furnace	**35 Ill. Adm. Code. 217.244** **Chicago or Metro East Areas** **Regenerative**: 0.18 lb NOx/MMBtu **Recuperative, natural gas**: 0.09 lb NOx/MMBtu **Recuperative, combination of natural gas and coke oven gas**: 0.142 lb NOx/MMBtu **Cold-air**: 0.03 lb NOx/MMBtu	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	**3745-110-03** **Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, or Summit County** **Capacity > 50 MMBtu/hr:** 0.09 lb NOx/MMBtu (based on average of 3 one-hour stack test runs or 24-hr daily heat input weight average if continuous emissions monitors are used) Exemptions under OAC 3745-110-03 (K). See specific conditions for exemptions.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Annealing Furnace	**35 Ill. Adm. Code. 217.244** **Chicago or Metro East Areas** **Regenerative**: 0.38 lb NOx/MMBtu **Recuperative**: 0.16 lb NOx/MMBtu **Cold-air**: 0.07 lb NOx/MMBtu	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Galvanizing Furnace	**35 Ill. Adm. Code. 217.244** **Chicago or Metro East Areas** **Regenerative**: 0.46 lb NOx/MMBtu **Recuperative**: 0.16 lb NOx/MMBtu **Cold-air**: 0.06 lb NOx/MMBtu	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).

Presumptive RACT for NOx Emissions in Upwind States with Nonattainment Areas [*]

State	IL	IN	KY	MD	NY	OH	PA	VA
Reverberatory Furnace	**35 Ill. Adm. Code. 217.244** **Chicago or Metro East Areas** 0.08 lb NOx/MMBtu	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Crucible Furnace	**35 Ill. Adm. Code. 217.244** **Chicago or Metro East Areas** 0.16 lb NOx/MMBtu	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None Listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Electric Generating Units	**35 Ill. Adm. Code. 217.344 and 217.706** **Chicago or Metro East Areas Effective January 1, 2015** **Solid Fuel Boiler**: 0.12 lb NOx/MMBtu **Natural Gas Boiler**: 0.06 lb NOx/MMBtu **Liquid Fuel Boiler (Operation before 1/1/2008)**: 0.10 lb NOx/MMBtu **Liquid Fuel Boiler (Operation on or after 1/1/2008)**: 0.08 lb NOx/MMBtu **State-Wide Effective May 1, 2003** 0.25 lb NOx/MMBtu during ozone control period	**326 IAC 10-1-4(b)(2)** **Heat Input ≥ 250 MMBtu/hr in Clark or Floyd County** **Wall-fired dry bottom Pulverized Coal Boiler**: 0.5 lb NOx/MMBtu **Wall-fired dry bottom Distillate Oil Boiler**: 0.2 lb NOx/MMBtu **Wall-fired dry bottom Residual Oil Boiler**: 0.3 lb NOx/MMBtu **Wall-fired dry bottom Gas Boiler**: 0.2 lb NOx/MMBtu	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.09.08(B)(1)(c)** **and 26.11.38.04** **and COMAR 26.11.27.03 (B)(2)** **Fuel Burning Equipment at an electric generating facility with a heat input capacity ≥ 250 MMBtu/hr** **Tangentially coal fired units**: 0.45 lb/MMBtu **Wall coal fired units**: 0.50 lb/MMBtu **Oil or gas fired units**: 0.30 lb/MMBtu **Coal fired cyclone**: 0.70 lb/MMBtu (5/1 - 9/30) and 1.5 lb/MMBtu (10/1 - 4/30) **Tangentially coal fired high heat release unit**: 0.70 lb/MMBtu **Wall coal fired high heat release unit**: 0.80 lb/MMBtu **Coal fired cell burners**: 0.6 lb/MMBtu **Not later than June 1, 2020, a coal-fired EGU**: 1) Install and operate SCR meet a 0.09 lb/MMBtu (30-day rolling average during the ozone season) 2) Permanently retire the unit 3) Permanently switch fuel from coal to natural gas for the unit 4) Meet 0.13 lb/MMBtu (24-hour systemwide block average) or 21 ton/day (systemwide tonnage cap) during the ozone season	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
New Weak Nitric Acid Processes	**35 Ill. Adm. Code. 217.381** 1.5 kg NOx/MT acid produced (100% acid basis) (3.0 lbs NOx/ton) 0.05 kg NOx/ MT acid produced (100% acid basis) from any acid storage tank vents (0.1 lbs NOx/ton)	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**Any nitric acid plant**: 3 lb NOx/ton of acid (100% basis) produced	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Existing Weak Nitric Acid Processes	**35 Ill. Adm. Code. 217.381** 2.75 kg NOx/MT acid produced (100% acid basis) (5.5 lbs NOx/ton) 0.1 kg NOx/MT acid produced (100% acid basis) from any acid storage tank vents (0.2 lbs NOx/ton)	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).

Presumptive RACT for NOx Emissions in Upwind States with Nonattainment Areas [*]

State	IL	IN	KY	MD	NY	OH	PA	VA
Concentrated Nitric Acid Processes	**35 Ill. Adm. Code. 217.381** 1.5 kg NOx/MT acid produced (100% acid basis) (3.0 lbs NOx/ton) 225 ppm of NOx in any effluent gas stream emitted into the atmosphere	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Nitric Acid Concentrating Processes	**35 Ill. Adm. Code. 217.381** 1.5 kg NOx/MT acid produced (100% acid basis) (3.0 lbs NOx/ton)	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Biomass Fuel-Burning Equipment	**35 Ill. Adm. Code. 217.141** **Fuel Combustion Unit with a Heat input ≥ 250 MMBtu/hr located in Chicago or St. Louis major metropolitan areas** **For Gaseous and/or liquid fossil fuel**: 0.3 lb NOx/MMBtu of actual heat input **For Solid fossil fuel**: 0.9 lb NOx/MMBtu **Exemption**: Cyclone fired boilers burning solid or liquid fuel	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.09.12€** **≥ 10 MMBtu/hr and ≤ 250 MMBtu/hr**: 0.30 lb NOx/MMBtu **≥ 10 MMBtu/hr and > 250 MMBtu/hr**: 0.25 lb NOx/MMBtu **> 1.5 MMBtu/hr and < 10 MMBtu/hr**: 0.30 lb NOx/MMBtu **≥ 350,000 Btu/hr and < 1.5 MMBtu/hr**: 0.30 lb NOx/MMBtu	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Kraft Pulp Mill	None listed	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.14.07** **Only applies to the Luke Kraft Pulp Mill:** 1) 0.70 lb NOx/MMBtu (May 1st - September 30th) 2) 0.99 lb NOx/MMBtu (October 1st - April 30th) 3) NOx ozone season emission cap in COMAR 26.11.40.03	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).
Other	**35 Ill. Adm. Code. 217.141** **Fuel Combustion Unit with a Heat input ≥ 250 MMBtu/hr located in Chicago or St. Louis major metropolitan areas** **For Gaseous and/or liquid fossil fuel**: 0.3 lb NOx/MMBtu of actual heat input **For Solid fossil fuel**: 0.9 lb NOx/MMBtu **Exemption**: Cyclone fired boilers burning solid or liquid fuel	**326 IAC 10-1-4(b)(5)** **For NOx PTE ≥ 40 tpy located in Clark or Floyd County** Any facility not listed in 326 IAC 10-1-4(b)(1-3) shall control actual NOx emissions by at least 40% (based on a 3-hr basis unless CEMS are installed).	**Regulation 6.42 Section 4.3.2** **Jefferson County** The District shall make a case-by-case determination of RACT based on the applicant's proposal and the information listed in Regulation 6.42 Section 4.3.2.1-4.3.2.6.	**COMAR 26.11.09.08(D)** **Coal fired fuel-burning equipment with a rated heat input capacity of < 250 MMBtu and > 100 MMBtu/hr**: 0.65 lb NOx/MMBtu/hr	**6 NYCRR 227-2.4 (g)** **For any emission source not specifically addressed in 6 NYCRR 227 located at a Major Facility of NOx that is not regulated in Part 212, 214, 216, 219, 220, or 224** **Potential emission rate ≥ 3.0 lb NOx/hr and actual uncontrolled emisions of 15 lbs NOx/day**: Case-by-Case RACT (Site-Specific RACT Compliance Plan Required)	None listed	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region	Case-by-Case RACT required for all NOx Major Sources in the Ozone Transport Region (Only 9 counties in Northern VA are in the OTR. The rest of Virginia is in attainment/unclassifiable).

* MI and WV do not have nonattainment areas for the 2008 ozone NAAQS and are thus not included in this chart.

Glossary:

bhp = boiler or brake horespower
CCCT = Combined-Cycle Combustion Turbine
CEMS = Continuous Emissions Monitoring System
EGU = Electric Generating Unit
FBN = Fuel Bound Nitrogen
HP = Horsepower
IAC = Illinois Administrative Code
ICE = Internal Combustion Engine
KAR = Kentucky Air Regulations
lb/MMBtu = pounds per million British thermal units per hour
lb/MW-h = pounds per megawatt-hour
MMBtu/hr = million British thermal units per hour
MSW = Municipal Solid Waste
MT = metric ton
MW = megawatt
MWC = Municipal Waste Combustor
NOx = Nitrogen Oxides
NYSDEC = New York State Department of Environmental Conservation
OAC = Ohio Administrative Code
OTR = Ozone Transport Region
ppmv = Parts per Million on a volume basis
ppmvd = Part per Million volume dry basis
ppmvd = Parts per Million on a dry volume basis
PTE = Potential to Emit
RACT = Reasonably Available Control Technology
SCCT = Simple-Cycle Combustion Turbine
SCR = Selective Catalytic Reduction
SIP = State Implementation Plan
tph = tons per hour