# FINAL Proposal

## DELAWARE STATE IMPLEMENTATION PLAN REVISION

## MODERATE NON-ATTAINMENT PLAN FOR NEW CASTLE COUNTY FOR THE 2015 8-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD

The New Castle County Portion of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Non-attainment Area

Submitted To
U.S. Environmental Protection Agency

By

Delaware Department of Natural Resources and
Environmental Control

**November 28, 2023**

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## Executive Summary

On June 4, 2018 (effective date August 3, 2018), the United States Environmental Protection Agency (EPA) designated 51 areas of the country as "non-attainment" under the 2015 8-hour ozone National Ambient Air Quality Standard (NAAQS) of 70 parts per billion (ppb). Among those non-attainment areas is the Philadelphia-Wilmington-Atlantic City (PA-NJ-MD-DE) Non-Attainment Area (NAA). This NAA includes New Castle County in Delaware, five counties in eastern Pennsylvania, one county in Maryland and nine counties in southern New Jersey. According to the federal Clean Air Act (CAA), this entire NAA must attain the 8-hour ozone NAAQS by August 3, 2024.

The 2018-2020 design value for the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE NAA was 0.074 parts per million (ppm). The attainment deadline for the marginal NAAs was August 3, 2021. On October 7, 2022,[1] the EPA finalized actions to fulfill its statutory obligation under CAA section 181 to determine whether 31 marginal ozone NAAs attained the 2015 ozone NAAQS by August 3, 2021, the applicable attainment date for such areas. Delaware's New Castle County, along with the greater Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE metropolitan statistical area was redesignated as moderate non-attainment for the 2015 Ozone NAAQS based upon the failure of the NAA to record data below the standard.

The effect of failing to attain by the applicable attainment date (August 3, 2021) requires that these areas or portions of areas to be reclassified by operation of law to ''moderate'' non-attainment for the 2015 ozone NAAQS on November 7, 2022, the effective date of this final rule. Accordingly, the responsible state air agencies are required to submit State Implementation Plan (SIP) revisions and implement controls to satisfy the statutory and regulatory requirements for moderate areas for the 2015 ozone NAAQS according to the deadlines established in the final rule.

Areas reclassified to moderate face more stringent CAA requirements designed to achieve attainment of the NAAQS by no later than August 3, 2024. These requirements include stricter permitting requirements, implementing reasonably available control technology for major sources and sources covered by certain EPA control technique guidance documents, basic vehicle inspection and maintenance (I/M) for urbanized areas, and the submission of a new plan demonstrating how the area will attain expeditiously.

Ground level ozone, one of the principal components of "smog," is a serious air pollutant that harms human health and the environment. High levels of ozone can damage the respiratory system and cause breathing problems, throat irritation, coughing, chest pains, and greater susceptibility to respiratory infection. High levels of ozone also cause serious damage to forests and agricultural crops, resulting in economic losses to logging and farming operations.

[1] Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as marginal for the 2015 Ozone National Ambient Air Quality Standards. EPA Final Rule. 87 FR 60897. October 7, 2022. https://www.govinfo.gov/content/pkg/FR-2022-10-07/pdf/2022-20460.pdf

This document contains Delaware's State Implementation Plan revision for meeting the requirements associated with the 2015 8-hour ozone NAAQS. Specifically, this SIP revision:

- Fulfills the federal CAA's requirements for Reasonable Further Progress (RFP) and Attainment Demonstration (AD) under the 2015 8-hour ozone NAAQS.

- Demonstrates that with all existing and proposed controls, Delaware will meet the RFP requirements on Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx) emission reductions in 2023.

- Demonstrates that New Castle County portion of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE moderate NAA will attain the 2015 8-hour ozone NAAQS in 2023.

- Confirms Delaware's 2023 mobile source budgets (portions of total allowable emissions that are allocated to Onroad mobile sources) for transportation conformity determination.

- Establishes Contingency Measures, specific control measures to be implemented if the area fails to make RFP, fails to meet any applicable milestone, or fails to attain the NAAQS by the applicable attainment date.

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## Acronym List

| | | |
|---|---|---|
| AEO | - | Annual Energy Outlook |
| AST | - | Above Ground storage tanks |
| ACT | - | Alternative Control Techniques |
| AD | - | Attainment Demonstration |
| AIM | - | Architectural and Industrial Maintenance |
| AVFT | - | Alternative Vehicle Fuels and Technologies |
| AQ | - | Division of Air Quality |
| AQS | - | Air Quality System |
| BenMAP | - | Benefits Mapping and Analysis Program |
| BYI | - | Base Year Inventory |
| CAA | - | Clean Air Act |
| CAAA | - | Clean Air Act Amendments of 1990 |
| CAMD | - | Clean Air Markets Division |
| CAMx | - | Comprehensive Air Quality Model with Extensions |
| CARB | - | California Air Resources Board |
| CFR | - | Code of Federal Regulations |
| CM | - | Contingency Measures |
| CMAQ | - | Community Multi-scale Air Quality model |
| CMV | - | Commercial Marine Vessel |
| CNG | - | Compressed Natural Gas |
| CO | - | Carbon Monoxide |
| C&CP | - | Consumer and Commercial Products |
| CPM | - | Continuous Pressure Monitoring |
| CTG | - | Control Technology Guidance |
| DPC | - | Delaware Population Consortium |
| DelDOT | - | Delaware Department of Transportation |
| DNREC | - | Delaware Department of Natural Resources and Environmental Control |
| DOL | - | Department of Labor |
| EGU | - | Electric Generating Unit |
| EPA | - | United States Environmental Protection Agency |
| ERC | - | Emission Reduction Credit |
| EVR | - | Enhanced Vapor Recovery |
| FHWA | - | Federal Highway Administration |
| FMVCP | - | Federal Motor Vehicle Control Program |
| GHG | - | Greenhouse Gas |
| GDFs | - | gasoline dispensing facilities |
| HPMS | - | Highway Performance Monitoring System |
| I/M | - | Inspection and Maintenance Program |
| IPM | - | Integrated Planning Model |
| LEV | - | Low Emission Vehicle |
| LPG | - | Liquefied Petroleum Gas |
| LTO | - | Landings and Take-offs |
| MANEVU | - | Mid-Atlantic and Northeast Visibility Union |
| MAR | - | Marine, Aircraft, and Rail |
| MARAMA | - | Mid-Atlantic Regional Air Management Association |
| MW | - | Megawatts |
| MOVES | - | Motor Onroad Vehicle Emissions Simulator |

| | | |
|---|---|---|
| MPO | - | Metropolitan Planning Organization |
| MVEB | - | Motor Vehicle Emissions Budget |
| NAA | - | Non-Attainment Area |
| NAAQS | - | National Ambient Air Quality Standard |
| NEI | - | National Emission Inventory |
| NLEV | - | National Low Emission Vehicle |
| NLLJ | - | Nocturnal Low-level Jet |
| NNSR | - | Non-attainment New Source Review |
| NOx | - | Oxides of Nitrogen |
| NSR | - | New Source Review |
| $O_3$ | - | Ozone |
| OBD | - | On-Board Diagnostic |
| ORVR | - | On-board Refueling Vapor Recovery |
| OTC | - | Ozone Transport Commission |
| OTR | - | Ozone Transport Region |
| OYW | - | One Year's Worth |
| PFC | - | Portable Fuel Containers |
| PM | - | Particulate Matter |
| POTW | - | Publicly Owned Treatment Works |
| ppm | - | parts per million |
| ppb | - | parts per billion |
| PSD | - | Prevention of Significant Deterioration |
| PSM | - | Performance Standard Modeling |
| RACM | - | Reasonably Available Control Measure |
| RACT | - | Reasonably Available Control Technology |
| RFG | - | Reformulated Gasoline |
| RFP | - | Reasonable Further Progress |
| ROP | - | Rate of Progress |
| RRF | - | Relative Response Factor |
| RTP | - | Regional Long-range Transportation Plan |
| RVP | - | Reid Vapor Pressure |
| SAFE | - | Safer Affordable Fuel Efficiency |
| SCC | - | Source Classification Code |
| SIP | - | State Implementation Plan |
| SLAMS | - | state and local air monitoring stations |
| SM | - | Synthetic Minor |
| SSWD | - | Summer Season Weekday |
| TIM | - | Time-in-Mode |
| TIP | - | Transportation Improvement Program |
| tpd | - | Tons per Day |
| tpy | - | Tons per Year |
| TSD | - | Technical Supporting Document |
| TV | - | Title V |
| UST | - | Underground Storage Tanks |
| VRS | - | Vapor Recovery Systems |
| VMT | - | Vehicle Miles Traveled |
| VOC | - | Volatile Organic Compound |
| WILMAPCO | - | Wilmington Area Planning Council |

# 1.0 Introduction and Background

This document contains Delaware's SIP revision for meeting the moderate non-attainment requirements for Delaware's New Castle County for the 2015 8-hour ozone NAAQS. The document demonstrates that the New Castle County portion of the Philadelphia-Wilmington-Atlantic City (i.e., PA-NJ-MD-DE) moderate NAA will attain compliance with the 2015 8-hour ozone standard by August 3, 2024. The document is hereafter referred to as "Delaware's 8-hour ozone SIP revision," or simply as "the ozone SIP" and will show how New Castle County meets CAA Sections 172 and 182.

## 1.1 Background and Requirements

### Clean Air Act

The CAA was designed to control air pollution in the United States, is administered by the EPA, and its implementing regulations are codified at 40 Code of Federal Regulations (CFR) Subchapter C, Parts 50-97. The history of national air pollution legislation began with the 1955 Air Pollution Control Act, but the first piece of legislation to control air pollution was the CAA of 1963. The Air Quality Act of 1967 continued the process of developing legislation to reduce air pollution, but it was in 1970 that the CAA in its modern form was adopted. Amendments were added in 1977 and 1990, which further expanded the control of emissions.

One of the programs to come out of the 1970 CAA was the creation of NAAQS, thresholds of air pollution considered to be the upper limit of healthy air that are based on the best scientific evidence available that must be met nationally).[2] NAAQS were developed for several pollutants, including ground-level (tropospheric) ozone.

The 1970 CAA also introduced the SIP, which is intended to demonstrate how an area that is not complying with the NAAQS will meet that standard through state programs that become federally enforceable following approval of the SIP. The 1990 amendments expanded the requirements for SIPs, particularly with regard to ground-level ozone.[3]

Ground level ozone, one of the principal components of "smog," is a serious air pollutant that harms human health and the environment. High levels of ozone can damage the respiratory system and cause breathing problems, throat irritation, coughing, chest pains, and greater susceptibility to respiratory infection. High levels of ozone also cause serious damage to forests and agricultural crops, resulting in economic losses to logging and farming operations. Ground level ozone is not emitted directly into the air but is created by chemical reactions between oxides of nitrogen and VOCs. This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight.

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[2] National primary and secondary ambient air quality standards. Clean Air Act, Section 109. https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partA-sec7409.htm

[3] State implementation plans for national primary and secondary ambient air quality standards. Clean Air Act, Section 110. https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partA-sec7410.htm

**Ozone Transport Region and Ozone Transport Commission**

Congress established the Ozone Transport Region (OTR) in the federal CAA to address air pollution in downwind states that is caused by activities in upwind states. In order to reduce ozone concentrations in the ambient air, the CAA requires all ozone NAAs, and areas in the OTR established pursuant to Section 184 of the CAA, to implement relevant control measures on VOCs and NOx emission sources to achieve emission reductions. The OTR is essentially a single, 13-state ozone NAA. The original member states of the OTR are: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, parts of Virginia, and the District of Columbia (Figure 1-1).

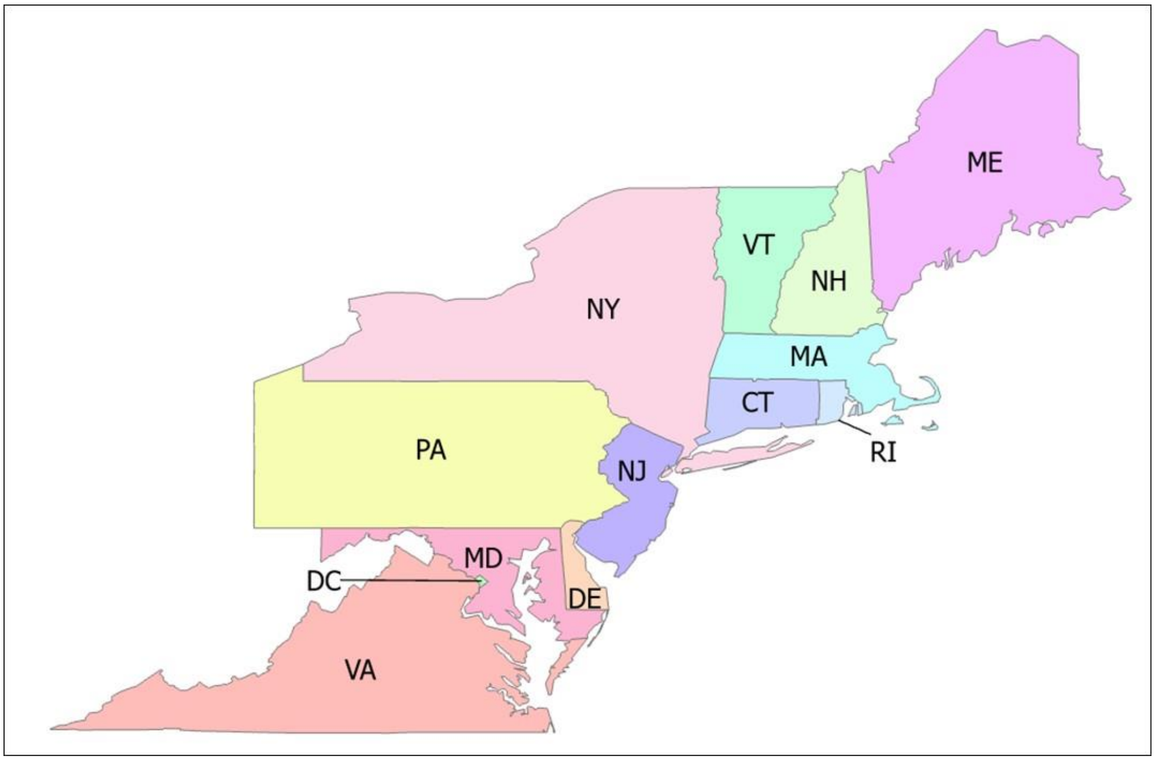


**Figure 1-1. Original member states of the Ozone Transport Region**

The Ozone Transport Commission (OTC) is a multi-state organization created under the CAA, Section 176A. It is responsible for advising EPA on transport issues and for developing and implementing regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions. OTC members states are the same as those of the OTR.

## National Ambient Air Quality Standards

EPA is required by CAA Section 107(d) to designate areas throughout the nation as attaining or not attaining the NAAQS. Section 179(c)(1) of the CAA requires EPA to determine whether a NAA[4] attained the applicable standard by the applicable attainment date based on the area's air quality as of that attainment date. A determination of whether an area's air quality meets applicable standards is generally based upon the most recent three years of complete, quality-assured data gathered at the established state and local air monitoring stations (SLAMS) in a NAA and entered into the EPA's Air Quality System (AQS) database. Data from ambient air monitors operated by state and local agencies in compliance with EPA's monitoring requirements must be submitted to AQS. Monitoring agencies annually certify that these data are accurate to the best of their knowledge.

EPA uses the certified air monitoring data to calculate design values that are used to determine the area's status in accordance with 40 CFR 50 Appendix U. Specifically, under EPA regulations in 40 CFR 50.19 and in accordance with 40 CFR 50 Appendix U, the primary and secondary NAAQS for ozone ($O_3$) are met at an ambient air quality monitoring site when the 3-year average of the annual fourth-highest daily maximum 8-hour average $O_3$ concentration (i.e., the design value) is less than or equal to 0.070 ppm. Design values are calculated by computing the annual fourth-highest daily maximum 8-hour $O_3$ concentration, averaged over three years, expressed in ppm. The fourth-highest daily maximum 8-hour $O_3$ concentration for each year shall be determined based only on days meeting the validity criteria in 40 CRF 50 Appendix U 3(d). The 3-year average shall be computed using the three most recent, consecutive years of ambient $O_3$ monitoring data. Design values shall be reported in ppm to three decimal places, with additional digits to the right of the third decimal place truncated.

After EPA sets a new NAAQS or revises an existing standard for a criteria air pollutant, the CAA requires EPA to determine if areas of the country meet the new standards. Within one year of setting a new or revised NAAQS for a criteria pollutant, States and tribes submit recommendations to the EPA as to whether or not an area is attaining the standard. The states and tribes base these recommendations on available air quality data collected from monitors at locations in urban and rural settings as well as other information characterizing air quality such as modeling. After working with the states and tribes and considering the information from air quality monitors, and/or models, EPA will "designate" an area based on whether or not it is meeting the standard.

If the air quality in a geographic area meets or is cleaner than the national standard, it is called an attainment area (designated "attainment/unclassifiable"); areas that don't meet the national standard are called NAAs. A designated NAA can include portions of two, three, or four states rather than falling entirely within a single state. In some cases, EPA is not able to determine an area's status after evaluating the available information and those areas are designated "unclassifiable." Once designations take effect, state and local governments with NAAs must develop implementation plans outlining how areas will attain and maintain the standards by reducing air pollutant emissions.

[4] Delaware's New Castle County is included with the greater Philadelphia Metropolitan Statistical Area (MSA) which also includes counties in Pennsylvania, Maryland and New Jersey. For additional information on how EPA designates an area as nonattainment see EPA's Green Book - https://www.epa.gov/green-book.

## 2015 8-hour Ozone NAAQS

On October 26, 2015, the EPA issued its final action to revise the NAAQS for ozone to establish a new 8-hour standard.[5] In that action, the EPA promulgated identical tighter primary and secondary ozone standards designed to protect public health and welfare that specified an 8-hour ozone level of 0.070 ppm for the three-year average of the 4th highest 8-hour average ozone concentration. Specifically, the standards require that the 3-year average of the annual fourth highest daily maximum 8-hour average ozone concentration may not exceed 0.070 ppm.

Prior to EPA making the attainment or non-attainment designations, the states provide EPA their recommendations as required by CAA Section 107(d). Delaware submitted its ozone attainment designation recommendations on September 23, 2016. In the letter, Delaware recommended a broad NAA:

> *"Emissions cause ozone non-attainment and Delaware believes it is necessary to establish non-attainment boundaries that encompass enough of these emissions to make attainment feasible and possible goal for the area. To this end Delaware hereby recommends that the non-attainment area borders associated with New Castle County be the borders of the States of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin…due to EPA's analysis that these states significantly impact Delaware as part of the CASPR and CASPR Update. If EPA again rejects establishing non-attainment area that is consistent with science to solve the problem, Delaware requests EPA establish New Castle County as a stand-alone non-attainment area under the 2015 8-hour ozone NAAQS."*

The EPA rejected Delaware's recommendation and announced on November 16, 2017,[6] that New Castle County was to be designated non-attainment for ozone and associated it with the greater Philadelphia Metropolitan Area (see 40 CFR 81.15), which consists of New Castle County in Delaware and counties in Maryland, New Jersey, and Pennsylvania, as shown in Figure 1-2. On June 4, 2018 the EPA designated the Philadelphia Metropolitan area as marginal non-attainment for the 2015 ozone NAAQS.[7] EPA based the designations on the most recent 3 years (2014-2016) of certified ozone air quality monitoring data and on an evaluation of factors to assess contributions to non-attainment in nearby areas. In 2017, New Castle County was deemed to contribute emissions to the Philadelphia area and thereby included in the broad NAA.

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[5] National Ambient Air Quality Standards for Ozone. EPA Final Rule. 80 FR 65292. October 26, 2015. https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf

[6] Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards (NAAQS). EPA Final Rule. 82 FR 54232. November 16, 2017. https://www.govinfo.gov/content/pkg/FR-2017-11-16/pdf/2017-24640.pdf

7 Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards. EPA Final Rule. 83 FR 25776, June 4, 2018. https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf

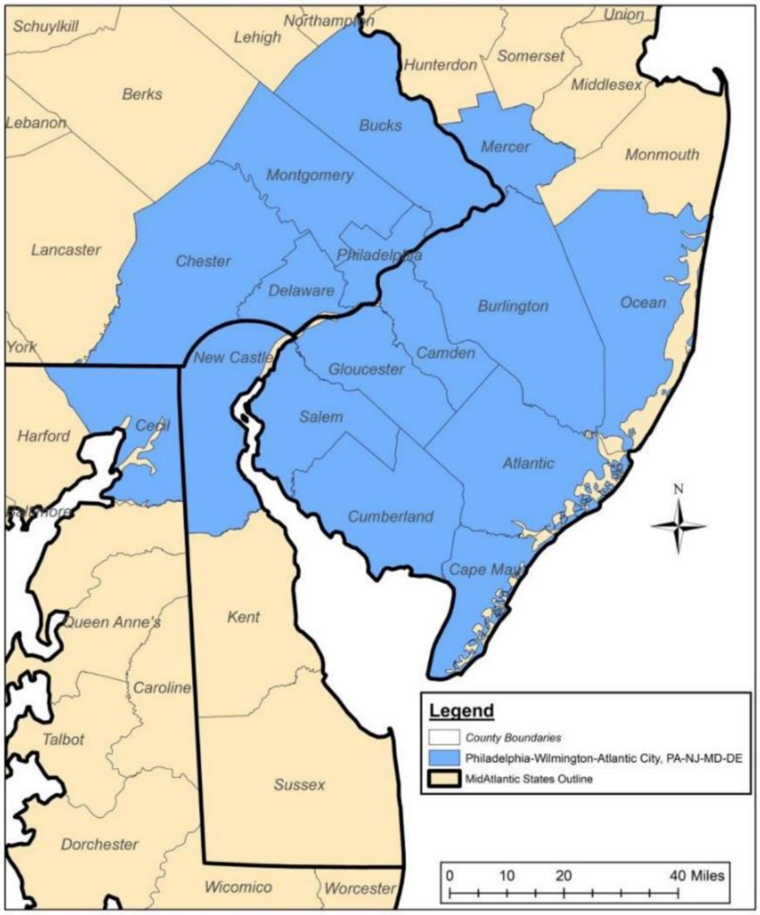


**Figure 1-2. Philadelphia-Wilmington-Atlantic City, PA-DE-MD-NJ Moderate Non-Attainment Area for the 8-Hour Ozone NAAQS**

In a final rule dated June 4, 2018,[8] the EPA designated 51 areas (Figure 2-2) in the country as non-attainment for the 2015 8-hour ozone NAAQS. In the same final rule, Kent and Sussex Counties were designated as attainment. The EPA made the designations of all three Delaware counties based on their 2014-2016 design values,[9] and the effective date of the designations was August 3, 2018.

The 2015 Ozone NAAQS is met at an EPA approved regulatory monitoring site, when the design value does not exceed 0.070 ppm. For areas classified as marginal non-attainment for the 2015 Ozone NAAQS, the attainment deadline date was August 3, 2021. Because the design values are based on the three most recent, complete calendar years (2018- 2020), attainment must occur no later than December 31 of the year prior to the attainment date (i.e., December 31, 2020, in the case of marginal NAAs for the 2015 Ozone NAAQS).

[8] Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards (NAAQS). EPA Final Rule. 83 FR 25776. June 4, 2018. https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf

[9] The air quality design value at a monitoring site is defined as the 3-year average annual fourth-highest daily maximum 8-hour average ozone concentration is also the air quality design value for the site. (40 CFR Part 50, Appendix I, Interpretation of the 8-Hour Primary and Secondary National Ambient Air Quality Standards for Ozone)

Under CAA Section 107(c), within six months of the attainment deadline date (August 3, 2021), the EPA is required to make a determination on the area's air quality as of the attainment date, and whether an area (PA, NJ, MD, DE) attained by that date. If the EPA determines that area failed to attain by the attainment date, EPA is required to publish that determination in the Federal Register per CAA section 107(c)(2). As such the EPA's proposed determinations for each area are based upon the complete, quality assured, and certified ozone monitoring data from calendar years 2018, 2019 and 2020.

The 2018-2020 design value for the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE NAA was 0.074 ppm, as shown in Table 2-1. The attainment deadline for the marginal NAAs was August 3, 2021. On October 7, 2022, [10] the EPA finalized actions to fulfill its statutory obligation under CAA section 181 to determine whether 31 marginal ozone NAAs attained the 2015 ozone NAAQS by August 3, 2021, the applicable attainment date for such areas. Delaware's New Castle County, along with the greater Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE metropolitan statistical area was redesignated as moderate Non-attainment for the 2015 Ozone NAAQS based upon the failure of the NAA to record data below the standard.

The effect of failing to attain by the applicable attainment date (August 3, 2021) requires that these areas or portions of areas to be reclassified by operation of law to ''moderate'' non-attainment for the 2015 Ozone NAAQS. Accordingly, the responsible state air agencies are required to submit SIP revisions and implement controls to satisfy the statutory and regulatory requirements for moderate NAAs according to the deadlines established in the final rule.

EPA established a deadline of January 1, 2023 for submittal of the SIP revisions. Because EPA did not issue its final rule until October 7, 2022, states were only given 87 days after the rule was published to submit their SIP revisions. This timeline was impossible to meet for a number of reasons. 1) Early engagement. It is recommended by EPA that Delaware submit draft SIP revisions to the EPA Region III office for a 30-60 day review prior to presenting a proposal at public hearing. 2) Public engagement. Delaware is required by statue to provide opportunity for the public to comment on the proposal. Delaware accomplishes this by holding a public hearing with an associated 30+ day comment period. 3) Draft EPA Guidance. EPA did not release its draft guidance for contingency measures (Section 14.1), until March 17, 2023. This guidance has yet to be finalized. Therefore, Delaware may need to revise its SIP if the draft guidance is revised substantially.

Delaware's designation to moderate non-attainment was the result of air quality monitors in the Philadelphia-Wilmington-Atlantic City recording ozone design value data for 2018-2020 above the 2015 Ozone NAAQS. Three monitors in Pennsylvania recorded design values for the 3-year period 2018-2020 that were greater than the standard (Table 1-1), thereby EPA determined that the NAA failed to meet the standard and was redesignated from marginal non-attainment to moderate non-attainment. The attainment deadline for areas designated moderate non-attainment is August 3, 2024, which requires the NAA's 3-year design value data for 2020-2023 to demonstrate attainment with the 2015 Ozone NAAQS.

[10] Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as marginal for the 2015 Ozone National Ambient Air Quality Standards. EPA Final Rule. 87 FR 60897. October 7, 2022. https://www.govinfo.gov/content/pkg/FR-2022-10-07/pdf/2022-20460.pdf

## Table 1-1 Philadelphia-Wilmington-Atlantic City NAA 2018-2020 Design Values - Moderate Reclassification

| State Name | County Name | Local Site Name | Valid 2018-2020 Design Value (ppm) [1,2] | 2018 4th Highest Daily Max. Value (ppm) | 2019 4th Highest Daily Max. Value (ppm) | 2020 4th Highest Daily Max. Value (ppm) | Number of Exceedance Days in 2018 | Number of Exceedance Days in 2019 | Number of Exceedance Days in 2020 |
|---|---|---|---|---|---|---|---|---|---|
| Delaware | New Castle | Lums Pond | 0.065 | 0.071 | 0.064 | 0.061 | 4 | 1 | 0 |
| Delaware | New Castle | Brandywine Creek State Park | 0.063 | 0.067 | 0.067 | 0.057 | 2 | 1 | 0 |
| Delaware | New Castle | Bellevue State Park, | 0.066 | 0.072 | 0.068 | 0.060 | 4 | 3 | 0 |
| Delaware | New Castle | MLK Corner Of Mlk Blvd And Justison St | 0.067 | 0.071 | 0.067 | 0.063 | 4 | 2 | 2 |
| Maryland | Cecil | Fair Hill Natural Resource Management Area | 0.068 | 0.073 | 0.068 | 0.064 | 7 | 3 | 0 |
| New Jersey | Camden | Camden Spruce Street | 0.069 | 0.075 | 0.070 | 0.062 | 5 | 3 | 0 |
| New Jersey | Camden | Ancora State Hospital | 0.064 | 0.068 | 0.067 | 0.059 | 1 | 3 | 0 |
| New Jersey | Gloucester | Clarksboro | 0.069 | 0.077 | 0.068 | 0.064 | 7 | 1 | 1 |
| Pennsylvania | Bucks | Bristol | 0.074 | 0.084 | 0.067 | 0.071 | 12 | 3 | 4 |
| Pennsylvania | Chester | Chester County Transport Site Into Philadelphia | 0.064 | 0.065 | 0.068 | 0.060 | 1 | 1 | 0 |
| Pennsylvania | Delaware | A420450002lat/Lon Point Is Of Corner Of Trailer | 0.068 | 0.073 | 0.069 | 0.062 | 4 | 3 | 1 |
| Pennsylvania | Montgomery | A420910013lat/Lon Point Is Of Corner Of Trailer | 0.068 | 0.073 | 0.065 | 0.066 | 7 | 1 | 0 |
| Pennsylvania | Philadelphia | Air Management Services Laboratory | 0.067 | 0.071 | 0.067 | 0.064 | 5 | 3 | 0 |
| Pennsylvania | Philadelphia | North East Airport (NEA) | 0.073 | 0.079 | 0.071 | 0.070 | 8 | 4 | 3 |
| Pennsylvania | Philadelphia | North East Waste (New) | 0.071 | 0.076 | 0.072 | 0.067 | 9 | 4 | 2 |

Notes:

1. The level of the 2015 8-hour ozone NAAQS is 0.070 parts per million (ppm). The design value is the 3-year average of the annual 4th highest daily maximum 8-hour ozone concentration.

2. The design values shown here are computed using Federal Reference Method or equivalent data reported by State, Tribal, and Local monitoring agencies to EPA's Air Quality System (AQS) as of May 5, 2021.

This document contains Delaware's SIP revision for meeting the requirements associated with the 2015 8-hour ozone NAAQS. Specifically, this SIP revision:

- Fulfills the federal CAA's requirements for RFP and AD under the 2015 8-hour ozone NAAQS.
- Demonstrates that with all existing and proposed controls, Delaware will meet the RFP requirements on VOCs and NOx emission reductions in 2023.
- Demonstrates that the New Castle County portion of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE moderate NAA will attain the 2015 8-hour ozone NAAQS in 2023.
- Confirms Delaware's 2023 mobile source budgets for transportation conformity determination.
- Establishes Contingency Measures, specific control measures to be implemented if the area fails to make RFP, fails to meet any applicable milestone, or fails to attain NAAQS by the applicable attainment date.

**Table 1-2: Ozone Implementation Plan SIP Revision Elements – 40 CFR 51.1308 – 51.1316**

| Source: | Required Element: | Location in SIP: |
|---|---|---|
| 51.1308 (a) | *An area classified moderate under § 51.1303(a) shall submit an attainment demonstration that provides for such specific reductions in emissions of VOCs and $NO_X$ as necessary to attain the primary NAAQS by the applicable attainment date, and such demonstration is due no later than 36 months after the effective date of the area's designation for the 2015 ozone NAAQS.* | Section 13 – Attainment Demonstration Modeling and Weight of Evidence. |
| 51.1308 (c) | *An attainment demonstration due pursuant to paragraph (a) or (b) of this section must meet the requirements of Appendix W of this part and shall include inventory data, modeling results, and emission reduction analyses on which the state has based its projected attainment date; the adequacy of an attainment demonstration shall be demonstrated by means of a photochemical grid model or any other analytical method determined by the Administrator, in the Administrator's discretion, to be at least as effective.* | Section 13 – Attainment Demonstration Modeling and Weight of Evidence. |
| 51.1308(d) | *Implementation of control measures. For each nonattainment area for which an attainment demonstration is required pursuant to paragraph (a) or (b) of this section, the state must provide for implementation of all control measures needed for attainment as expeditiously as practicable. All control measures in the attainment plan and demonstration must be implemented no later than the beginning of the attainment year ozone season, notwithstanding any alternate RACT and/or RACM implementation deadline requirements in § 51.1312.* | Section 10 – Control Measures and Emission Reductions for Attainment |
| 51.1310(a) | *RFP for nonattainment areas classified pursuant to § 51.1303. The RFP requirements specified in CAA section 182 for that area's classification shall apply.* | Section 8 – Reasonable Further Progress Calculation |
| 51.1310(a)(2)(i) | *If classified moderate, the area is subject to the RFP requirements under CAA section 172(c)(2) and shall submit a SIP revision that:* | Section 8 – Reasonable Further Progress |

| Source: | Required Element: | Location in SIP: |
|---|---|---|
| | *(A) Provides for a 15 percent emission reduction from the baseline year within 6 years after the baseline year; and* <br> *(B) Relies on either NOx or VOC emissions reductions (or a combination) to meet the requirements of paragraph (a)(2)(i)(A) of this section. Use of NOx emissions reductions must meet the criteria in CAA section 182(c)(2)(C).* | |
| 51.1310(b) | *Baseline emissions inventory for RFP plans. For the RFP plans required under this section, at the time of designation as nonattainment for an ozone NAAQS the baseline emissions inventory shall be the emissions inventory for the most recent calendar year for which a complete triennial inventory is required to be submitted to the EPA under the provisions of subpart A of this part. …The emissions values included in the inventory required by this section shall be actual ozone season day emissions as defined by § 51.1300(q).* | Section 7 – Delaware 2017 Base Year Emission Inventory (Previously submitted to EPA) |
| 51.1312(a)(1) | *For each nonattainment area classified moderate or higher, the state shall submit a SIP revision that meets the VOC and $NO_X$ RACT requirements in CAA sections 182(b)(2) and 182(f).* | Section 11 – Reasonably Available Control Technology (Previously submitted to EPA) |
| 51.1312(c) | *RACM requirements. For each nonattainment area required to submit an attainment demonstration under § 51.1308(a) and (b), the state shall submit with the attainment demonstration a SIP revision demonstrating that it has adopted all RACM necessary to demonstrate attainment as expeditiously as practicable and to meet any RFP requirements. The SIP revision shall include, as applicable, other control measures on sources of emissions of ozone precursors located outside the nonattainment area, or portion thereof, located within the state if doing so is necessary or appropriate to provide for attainment of the applicable ozone NAAQS in such area by the applicable attainment date.* | Section 12 – Reasonably Available Control Measure (RACM) |
| 51.1314 | *… For each nonattainment area, the state shall submit a nonattainment NSR plan or plan revision for a specific ozone NAAQS no later than 36 months after the effective date of the area's designation of nonattainment or redesignation to nonattainment for that ozone NAAQS.* | Section 5 – Non-attainment New Source Review Certification (Previously submitted to EPA) |
| 51.1315(a) | *For each nonattainment area, the state shall submit a base year inventory as defined by § 51.1300(p) to meet the emissions inventory requirement of CAA section 182(a)(1). This inventory shall be submitted no later than 24 months after the effective date of designation. The inventory year shall be selected consistent with the baseline year for the RFP plan as required by § 51.1310(b).* | Section 7 – Delaware 2017 Base Year Emission Inventory (Previously submitted to EPA) |
| 51.1315(b) | *For each nonattainment area, the state shall submit a periodic emissions inventory of emissions sources in the area to meet the requirement in CAA section 182(a)(3)(A). With the exception of the inventory year and timing of submittal, this inventory shall be consistent with the requirements of paragraph (a) of this section. Each periodic inventory shall be submitted no later than the end of each 3-year period after the required submission of the base year inventory for the nonattainment area.…* | Section 7 – Delaware 2017 Base Year Emission Inventory (Previously submitted to EPA) |
| 53.1316(b)(1) | *The state shall submit a SIP revision that meets the RACT requirements of CAA section 184(b) for all portions of the state located in an ozone transport region.* | Section 11 – Reasonably Available Control Technology (RACT) |

# 2.0 Ozone Air Quality Status and Trends Analysis

## 2.1 Delaware Ozone Monitoring Network

Delaware set up its ambient ozone monitoring network in late 1980s under the 1-hour ozone standard. The network was modified and approved by EPA in 1995 for meeting the then-upcoming 8-hour ozone standard. The current network for monitoring ambient air quality contains 11 monitors, with 7 monitors in New Castle County. Figure 2-1 shows the locations of these monitors. Delaware currently monitors for ozone concentrations under the 8-hour ozone NAAQS at 4 of the New Castle County sites: Brandywine Creek State Park, Bellefonte II, MLK, and Lums Pond. Prior to 2001 an ozone monitor was located at the Bellefonte I site, in 2001 the ozone monitor was moved to a new site because of siting issues, the Bellefonte II site. Delaware maintains and operates the network to measure ambient ozone levels within Delaware for comparison to NAAQS. All data is measured using EPA approved methods, and the data is submitted to EPA's AQS.

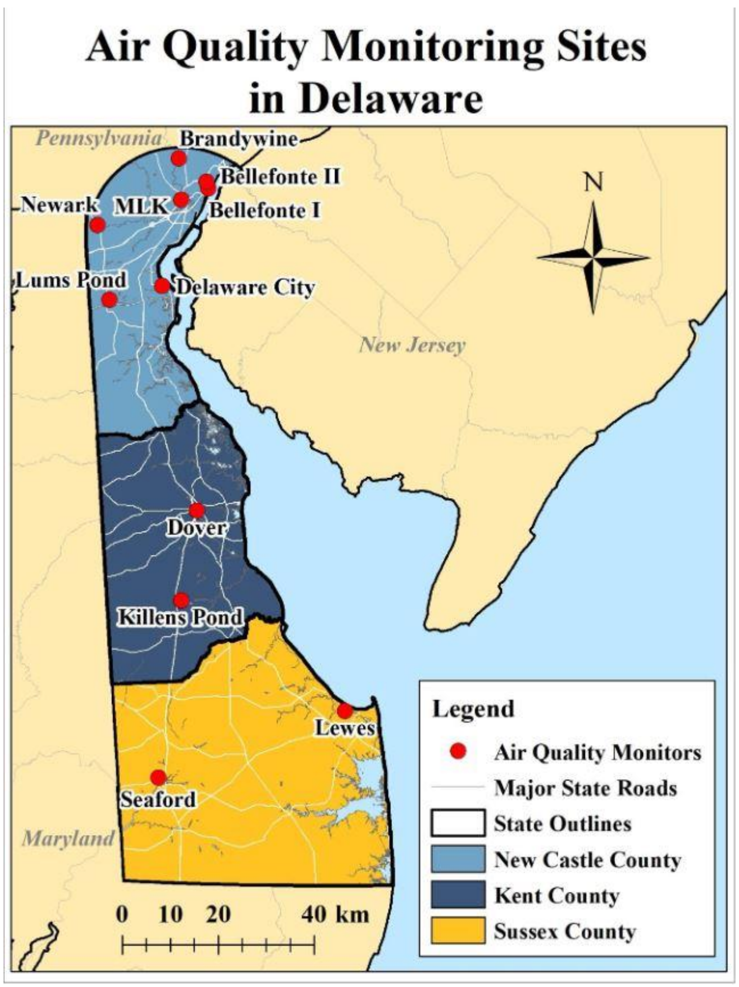


**Figure 2-1. Delaware Ozone Monitoring Network for 8-Hour Ozone NAAQS**

## 2.2 Delaware 8-Hour Ozone Design Values

Under the 8-hour ozone standard (0.070 ppm), the design value of a specific county is defined as the highest three-year average of the 4th highest daily 8-hour maximum. The average is calculated as a ppm value truncated at three decimal places. Where there is more than one monitor in a county, the highest calculated value becomes the design value for that county. Figure 2-2 summaries the 8-hour ozone design values of New Castle County in Delaware from 1997 to 2021. Figure 2-3 summarizes the 8-hour ozone design values for each individual monitor in New Castle County.

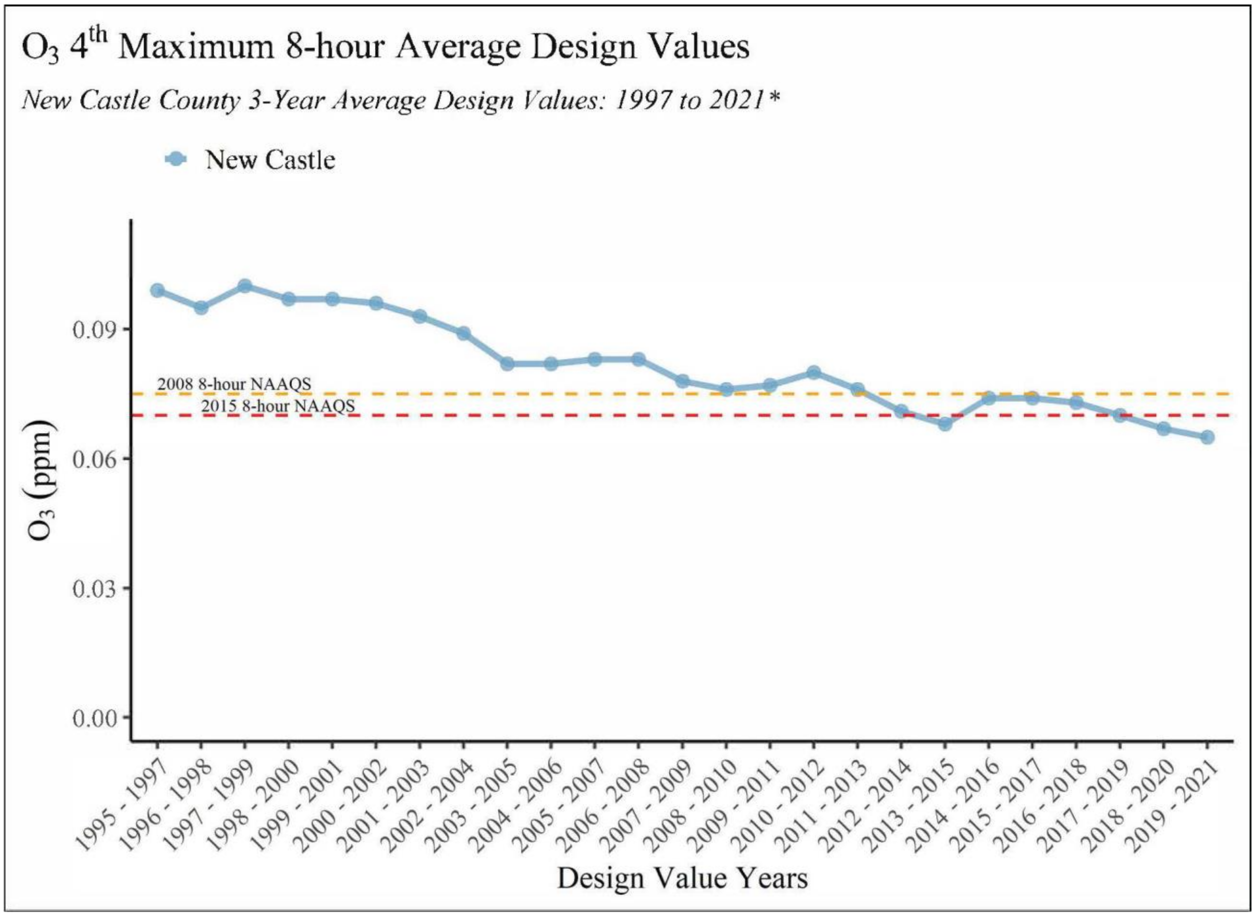


**Figure 2-2. Delaware 8-Hour Ozone Design Values New Castle County**
* At the time of preparation of this document, validated ozone monitoring data for New Castle County was only available through 2021.

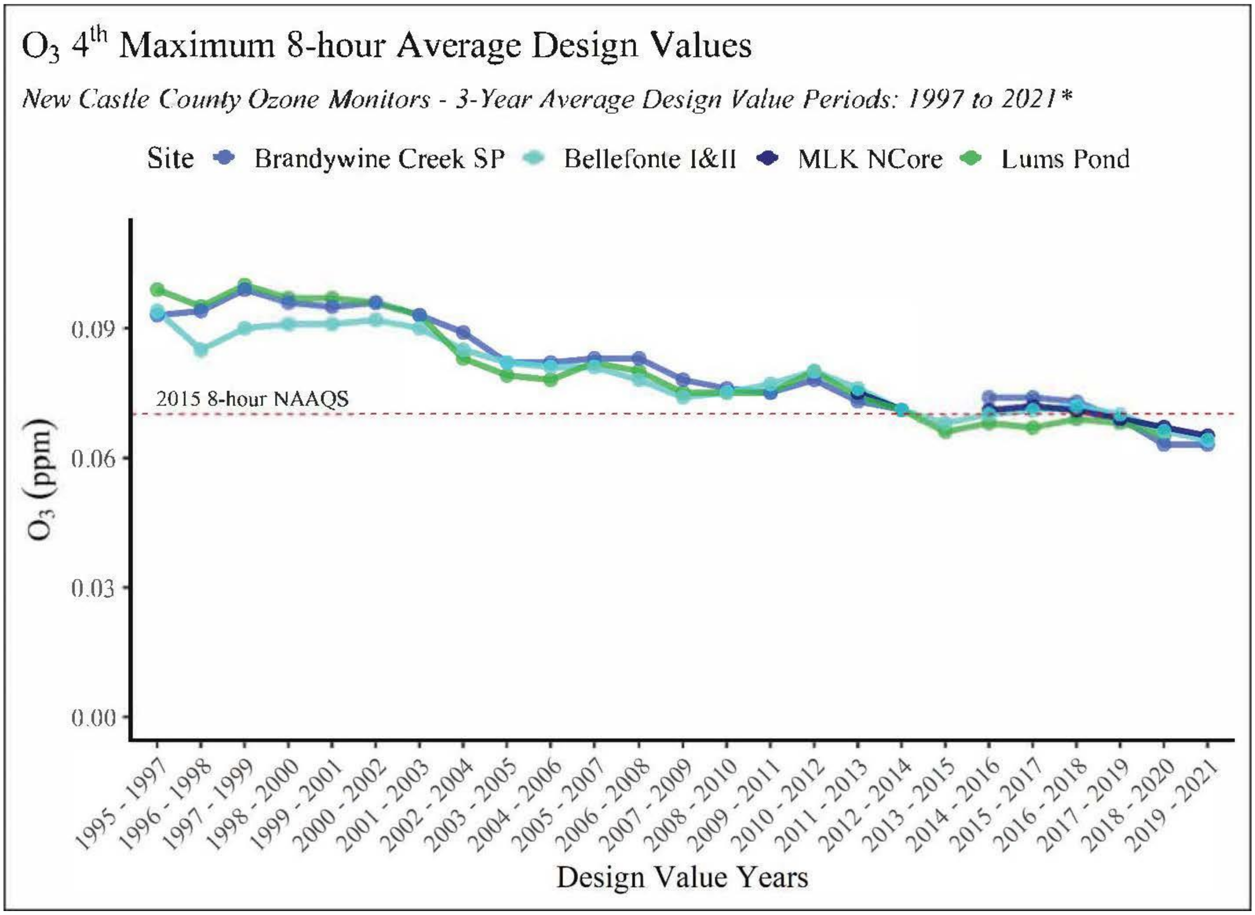


**Figure 2-3. Delaware 8-Hour Ozone Design Values New Castle County Monitors**
* At the time of preparation of this document, validated ozone monitoring data for New Castle County was only available through 2021.

## 2.3 Ozone Exceedances at Delaware Monitors

Delaware began recording the 8-hour ozone exceedances at its ambient monitors in 1997. An exceedance is recorded at a monitoring site when the daily maximum 8-hour average, rounded to three decimals, is greater than the standard of 0.070 ppm. Figure 2-4 summarizes the number of exceedances at all Delaware monitors from 1997 to 2021. It shows an overall decreasing trend in the number of exceedances. Since there is no averaging across years, it also shows the variability between years, likely due to variation in both emissions and meteorological conditions. For example, the implementation of control strategies or warm vs. cool summers.

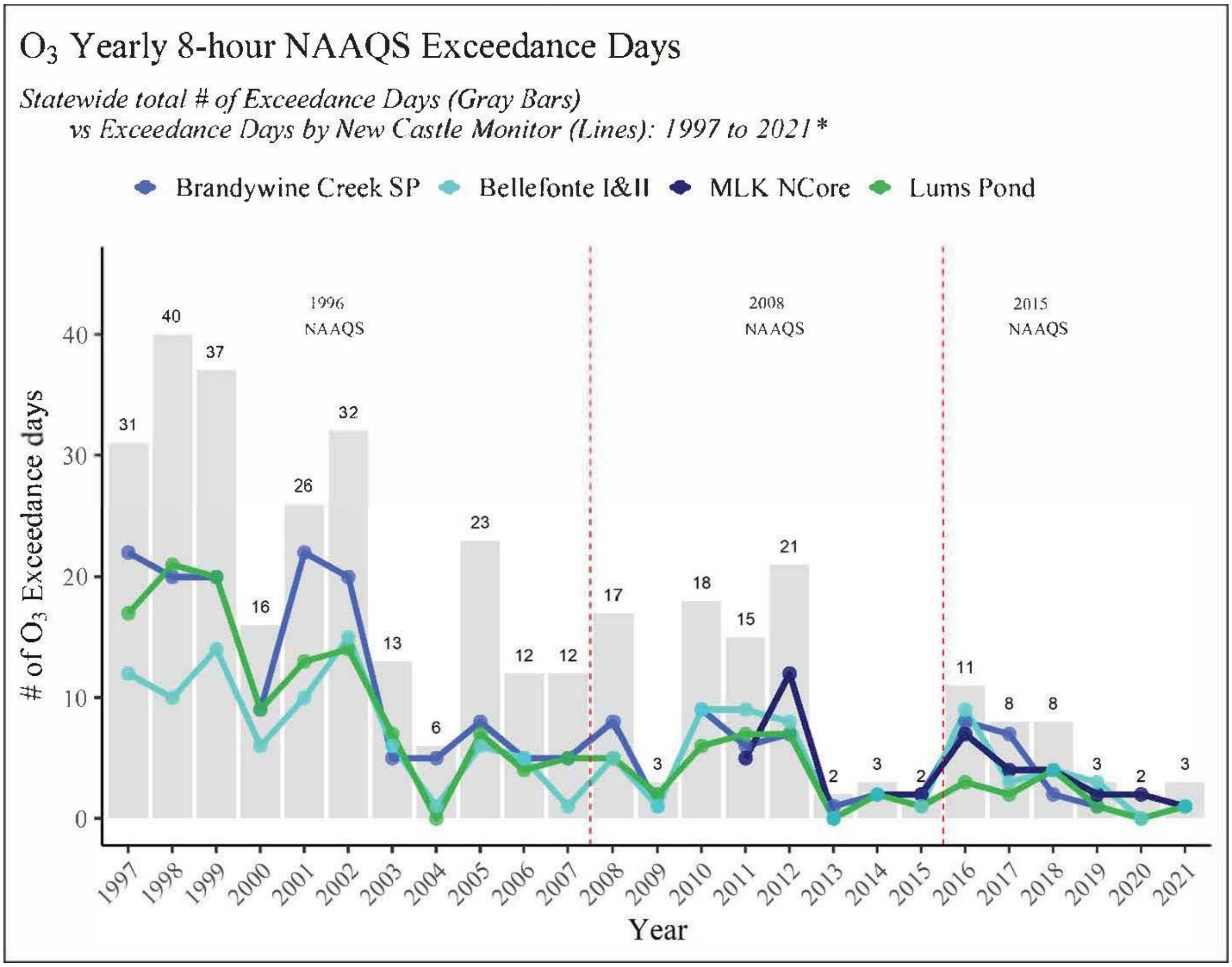


**Figure 2-4. Number of 8-hour Ozone Exceedance Days at New Castle County Monitors**
* At the time of preparation of this document, validated ozone monitoring data for New Castle County was only available through 2021.

## 2.4 Meteorological Analysis

Many meteorological factors affect the formation of ground level ozone. One major factor is the ambient temperature during the ozone season. One way of incorporating meteorology in evaluating trends in ozone concentrations is to analyze the number of ozone exceedances, the number of days with temperatures equal to or greater than 90°F and the ratio of these two variables. Figure 2-5 shows this set of data for Delaware from 1997 through 2001. It should be noted that the temperature data in Figure 2-5 is from New Castle County only (Wilmington Airport), while the number of exceedance days are for the entire state (i.e., all three counties). It can be reasonably assumed that the temperature profile for the entire state be similar to that of New Castle County. Figure 2-6 shows the ratio of 8-Hour Ozone NAAQS exceedance days to the number of ≥ 90º Days.

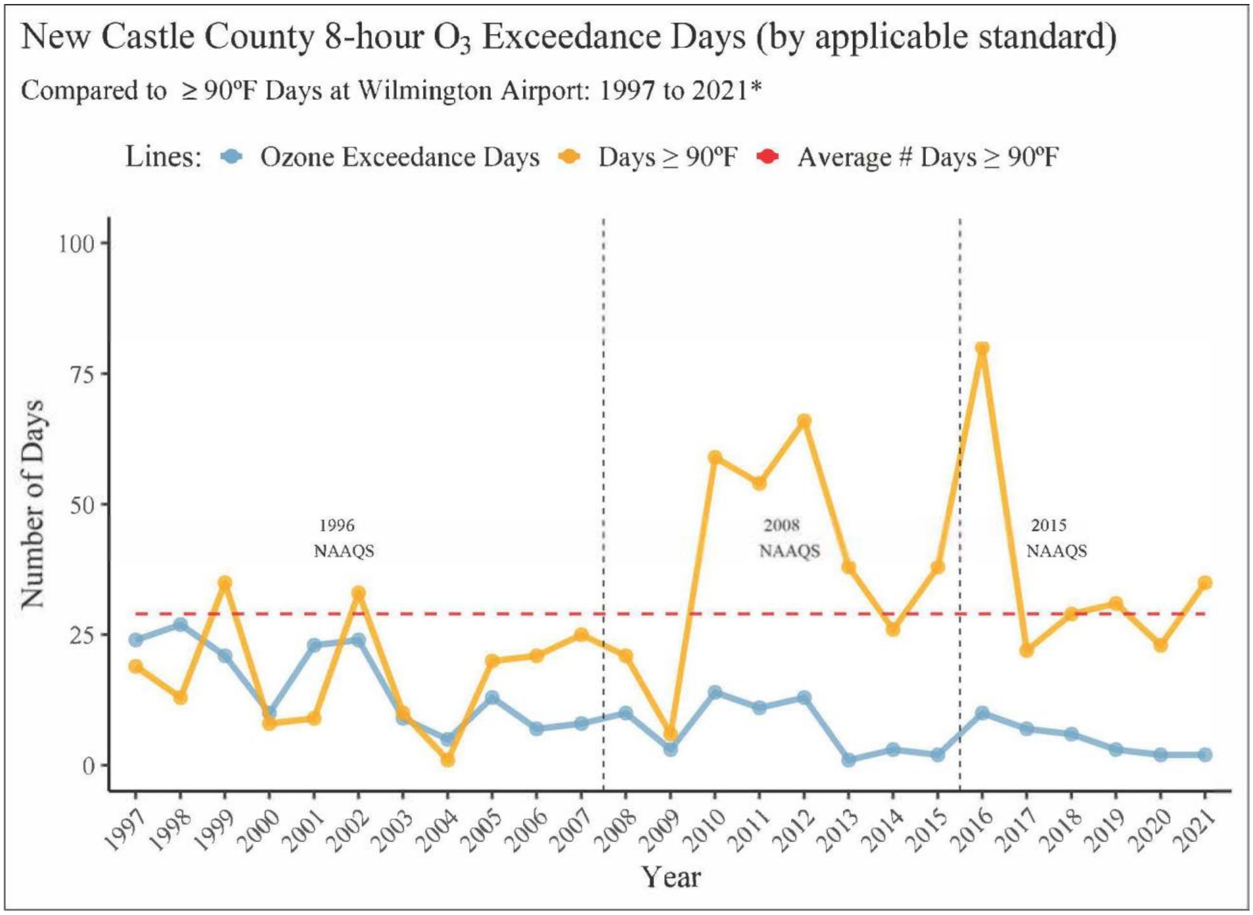


**Figure 2-5 Delaware 8-Hour Ozone NAAQS Exceedance Days Compared to Number of ≥ 90º Days at Wilmington Airport**

* At the time of preparation of this document, validated ozone monitoring data for New Castle County was only available through 2021.

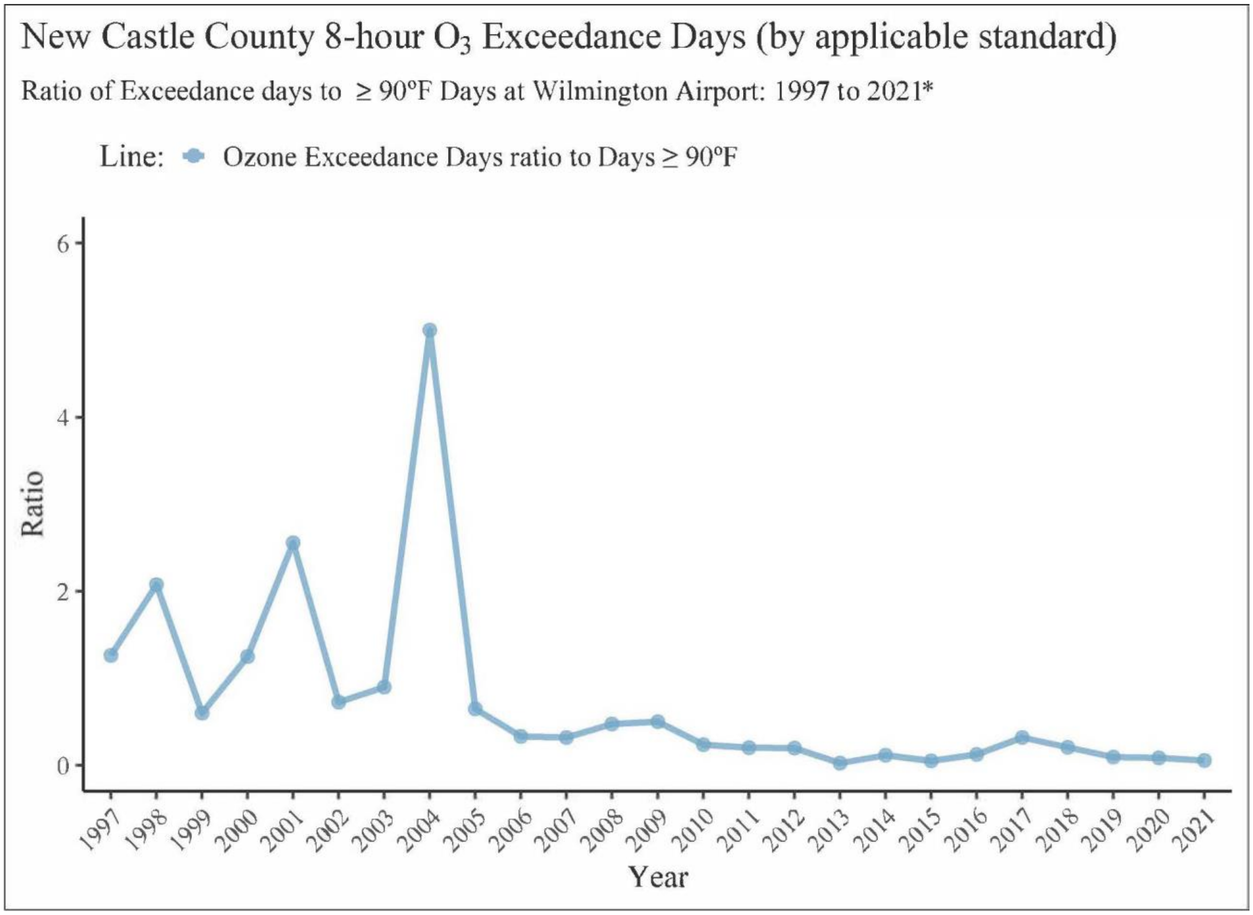


**Figure 2-6 Delaware Ratio of 8-Hour Ozone NAAQS Exceedances Days to Number of ≥ 90º Days at Wilmington Airport**

* At the time of preparation of this document, validated ozone monitoring data for New Castle County was only available through 2021.

## 2.5 General Trend of Ambient Air Quality For 8-Hour Ozone NAAQS

From the data presented in this section, it is clear that the general trend of ambient ozone air quality in New Castle County is continuously improving, especially in the past 3 years. In summary:

(1) The number of 8-hour ozone exceedances at New Castle County monitors show a clear decreasing trend (Figure 2-2)
(2) Ambient ozone concentrations recorded at New Castle County monitors show a clear downward trend Figure 2-3)

# 3.0 Gasoline Vapor Recovery

CAA Section 182(b)(3) requires that this SIP revision must include information regarding Delaware's Gasoline Vapor Recovery program.

## 3.1 Background and Federal Requirements

Because gasoline vapors contain mainly VOCs that contribute to the formation of ground-level ozone in the ambient air, Section 182(b)(3) of the CAA requires states with moderate and higher ozone NAAs, including Delaware,[11] to revise their SIPs to require "owners or operators of gasoline dispensing systems to install and operate......a system for gasoline vapor recovery of emissions from the fueling of motor vehicles."[12]

To comply with the above CAA requirement, Delaware has required, since 1993, gasoline dispensing facilities (GDFs) in the state to install Stage II vapor recovery systems (VRS) to control gasoline vapor emissions from motor vehicles during refueling processes. Stage II VRS controls gasoline vapor emissions by collecting gasoline vapors displaced from a vehicle's gasoline tank during the transfer of gasoline from GDF to the vehicle's tank, returning the collected vapors to GDF's Underground Storage Tanks (UST) or Above Ground storage tanks (AST).

Delaware has also required, since 1993, the GDFs to install Stage I VRS for their gasoline storage tanks to control gasoline vapor emissions during gasoline delivery. Stage I VRS controls gasoline vapor emissions by collecting gasoline vapors displaced from GDF's UST or AST when a delivery truck delivers gasoline into the UST or AST and returning the collected vapors to the tank of the delivery truck. A properly designed and installed Stage I system will assist in maintaining a vapor tight UST or AST and thereby prevent the escape of gasoline vapors during the daily operation at a GDF.

Since 1998, automobile manufacturers in the United States have been required by Section 202(a)(6) of the CAA to install on-board refueling vapor recovery (ORVR) systems on new vehicles. Both Stage II and ORVR systems are effective for controlling gasoline vapor emissions during vehicle refueling. However, the vacuum-assist Stage II systems[13] and the ORVR systems are incompatible. When such Stage II-equipped GDFs are refueling ORVR-equipped vehicles, the ORVR system will force the Stage II's vacuum pump to pull fresh air into the UST or AST, causing vapor pressure growth in the storage tanks. The vapor pressure growth leads to additional vapor emissions from the USTs or ASTs, especially when those tanks are not vapor-tight.

[11] In early 1990s, two counties in Delaware, New Castle and Kent, were designated as "severe non-attainment areas" under the 1-hour ozone national ambient air quality standard.
[12] CAA 182(b)(3)(A)
[13] There are two types of Stage II vapor recovery systems, the vacuum-assist system and the balance system. The Stage II systems installed at Delaware GDFs are all vacuum-assist systems.

In May 2012, the EPA determined that the ORVR systems were in widespread use nationwide on gasoline-powered vehicles and issued a final rule to waive Section 182(b)(3) Stage II requirements.[14] The final rule aimed to reduce the adverse effect of the functional overlap and incompatibility between the vacuum-assist Stage II systems at GDFs and the ORVR system on vehicles. Under the final rule, the states in the OTR, including Delaware, are allowed to remove their GDF's Stage II vapor recovery requirements, provided the overall emissions from the GDFs without Stage II systems do not increase. Section 184(b)(2) of the CAA requires the Administrator of the EPA to identify "control measures capable of achieving emission reductions comparable to those achievable through vehicle refueling controls" and for states that are in OTR to adopt "such [comparable] measures or such vehicle refueling controls."

Since Delaware's Stage II systems are all vacuum-assist systems, in 2019, Delaware proposed to decommission the Stage II systems installed at all GDFs in Delaware, through amendments to 7 **DE Admin. Code** 1124, Section 26.0 "Gasoline Dispensing Facility Stage I Vapor Recovery" and Section 36.0 "Vapor Emission Control at Gasoline Dispensing Facilities".

### 3.2 Regulatory Amendments

The purpose of the amendments, effective July 11, 2020, were to: (1) finalize the deadline for decommissioning all Stage II systems in Delaware, (2) implement necessary requirements for GDFs to ensure that gasoline vapor emissions are well-controlled at both existing and new GDFs, and (3) provide to GDFs flexibilities for adopting new and revised requirements.

The amendments required the decommissioning of Stage II systems by December 31, 2021, and installing Stage I Enhanced Vapor Recovery (EVR) systems by December 31, 2025. The amendments will: (1) will result in VOC emission reductions of 71 tons per year starting in 2021, (2) provide an additional 58 tons of VOC emission reduction per year after 2025, and resulting in a total 129 tons of long-term VOC emission reductions for attaining and maintain the ozone air quality.

The amendments were submitted to EPA on November 30, 2020 and were approved into SIP on July 11, 2022.[15]

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[14] Air Quality: Widespread Use for Onboard Refueling Vapor Recovery and Stage II Waiver. EPA Final Rule. 77 FR 28772. May 16, 2012. https://www.govinfo.gov/content/pkg/FR-2012-05-16/pdf/2012-11846.pdf.
[15] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Removal of Stage II Gasoline Vapor Recovery Program Requirements and Revision of Stage I Gasoline Vapor Recovery Program Requirements. EPA Final Rule. 87 FR 35423. June 10, 2022. https://www.govinfo.gov/content/pkg/FR-2022-06-10/pdf/2022-12236.pdf

# 4.0 Inspection and Maintenance Program

CAA Section 182(b)(4) requires that this SIP revision must include information regarding Delaware's Motor Vehicle Inspection and Maintenance program.

## 4.1 Introduction and Background

Motor vehicles are significant contributors of VOCs, Carbon Monoxide (CO) and NOx emissions. An important control measure to reduce these emissions is the implementation of a motor vehicle I/M program. Despite being subject to rigorous Federal and state vehicle pollution control programs, cars and trucks still create toxic contaminants, which contribute to about half of the ozone air pollution and nearly all of the CO air pollution in United States cities. Of all highway vehicles, passenger cars and light-duty trucks emit most of the vehicle-related CO and ozone-forming hydrocarbons. They also emit substantial amounts of NOx and air toxics.

The CAA as amended in 1990 requires that most polluted areas adopt either ''Basic'' or ''Enhanced'' I/M programs, depending on the severity of the problem and the population of the area. The moderate ozone NAAs, plus marginal ozone areas with existing or previously required I/M programs, fall under the ''Basic'' I/M requirements. The 1990 Amendments to the CAA signed into law on November 15, 1990 required EPA to develop Federally enforceable guidance[16] for two levels of I/M program: "Basic" I/M for areas designated as moderate nonattainment, and "Enhanced " I/M for serious and worse NAAs, as well as for areas within an OTR, regardless of attainment status.

''Basic'' and ''Enhanced'' I/M programs both achieve their objective by identifying vehicles that have high emissions as a result of one or more malfunctions, and by requiring them to be repaired. An ''Enhanced'' program covers vehicles in operation more thoroughly than a Basic program. It employs inspection methods that are better at finding high emitting vehicles and has additional features to better assure that all vehicles are tested properly and effectively repaired.

The "Enhanced" I/M program can be implemented in two ways, as "Low Enhanced" or "High Enhanced". The determination of whether an area has a Low Enhanced or a High Enhanced program depends on the emissions reductions required for the area. If minimal reductions are needed to meet the Rate of Progress (ROP)/Attainment requirements, the Low Enhanced program is acceptable, otherwise a High Enhanced program must be adopted and implemented.

[16] USEPA - Vehicle Emissions Inspection and Maintenance (I/M): Policy and Technical Guidance. 2022. Retrieved from https://www.epa.gov/state-and-local-transportation/vehicle-emissions-inspection-andmaintenance-im-policy-and-technical .

The EPA's rule for the "Enhanced" I/M program established two standards codified in 40 CFR 51.351(f) - *High Enhanced Performance Standard* and 40 CFR 51.351(g) - *Low Enhanced Performance Standard*. The High Enhanced performance standard achieves a greater reduction in emissions and uses a highly technical test method. The Low Enhanced performance standard provides flexibility for nonattainment areas that are required to implement enhanced I/M programs and can meet the Act's emission reduction requirements for reasonable further progress (referred to as 15% plans) and attainment from other sources. States may select the low enhanced performance standard if they have an approved SIP for 15%.

Delaware's I/M program for New Castle County was implemented on January 1, 1983, due to New Castle County being designated non-attainment for the 1979 1-hour standard with a severe classification in 1981. Vehicle inspection and maintenance is a mandated requirement of the CAA for any area classified as "moderate" or above. By 1982, EPA accepted Delaware's State Implementation Plan, and the program started on January 1, 1983. At the behest of the Governor Dupont's Clean Air Tasks Force's recommendation, the I/M program was expanded to include Sussex County with a subsequent amendment to 7 DE Admin. Code 1126.

On January 11, 2023, Delaware implemented the amended 7 **DE Admin. Code** 1131 in New Castle County. Under Delaware regulation 7 **DE Admin. Code** 1131, vehicle owners are now required to bring in their vehicles for emissions inspection every two years except newer vehicles with a seven model year exemption. Vehicle I/M programs help improve air quality by identifying high emitting vehicles and require them to be repaired. Owners of vehicles with high emissions are notified to make repairs so that emissions are within legal limits so that the vehicles can pass emission testing. For more information on EPA's approval of Delaware's I/M program amendments, see Tables 10-4 and 10-6 in Section 10.

## 4.2 Performance Standard Certification

EPA's final rule[17] published October 7, 2022, reclassified certain ozone NAAs from marginal to moderate for the 2015 ozone NAAQS, which included New Castle County. The rule obligated NAAs reclassified as moderate for the 2015 ozone NAAQS to certify their "Basic" I/M programs. This rulemaking explained that states with existing I/M programs would need to conduct and submit a Performance Standard Modeling (PSM) analysis as well as make any necessary program revisions as part of their moderate area SIP submissions to ensure that I/M programs are operating at or above the "Basic" I/M performance standard level for the 2015 ozone NAAQS.

[17] Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as marginal for the 2015 Ozone National Ambient Air Quality Standard. EPA Final Rule. 87 FR 60897. October 7, 2022. https://www.govinfo.gov/content/pkg/FR-2022-10-07/pdf/2022-20460.pdf.

Since New Castle County already implements a “Low Enhanced” I/M program that is more stringent than the “Basic” I/M program, Delaware was only required to perform the analysis and certify their program. The modeling and certification requirement is fulfilled in a separate report following EPA’s October 2022 Guidance, “Performance Standard Modeling for New and Existing Vehicle I/M Programs using the Motor Onroad Vehicle Emissions Simulator (MOVES) Mobile Source Emissions Model”.[18] The PSM analysis shows New Castle County’s I/M program meets the “Basic” performance standard without modification or revision required of the regulation and that Delaware’s current I/M SIP (Motor Vehicle Emissions Inspection Program; Plan for Implementation), and meets the I/M regulations at 40 CFR 51.372 required elements outlined in (a)(1)-(8).

Delaware is addressing the PSM Certification requirement in a separate action. The public hearing for the PSM Certification is expected to take place in conjunction with this SIP revision. Delaware will submit an I/M certification SIP that both demonstrates compliance with the basic I/M performance standard at 40 CFR 51.352(e), by means of an I/M Performance Standard Certification (PSC) demonstration and a narrative description of Delaware’s SIP-approved program that attests how the existing enhanced I/M program (including Delaware’s most recent I/M update SIP revision request) complies with all applicable requirements for a basic I/M program under CAA section 182(b)(4).

[18] Performance Standard Modeling for New and Existing Vehicle Inspection and Maintenance (I/M) Programs Using the MOVES Mobile Source Emissions Model EPA. October 2022. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1015S5C.pdf

## 5.0 NNSR Certification

40 CFR 51.1314 requires that states shall submit a Non-attainment New Source Review (NNSR) plan after a NAAQS designation. When new NAAQS are promulgated, states must submit certifications of adequacy for their NNSR Program as part of the required SIP elements. On August 3, 2020, Delaware submitted to EPA its certification that its existing NNSR program is at least as stringent as the requirements at 40 CFR 51.165 for ozone and its precursors, as amended by the final rule titled "Implementation of the 2015 NAAQS for Ozone: Nonattainment Area State Implementation Plan Requirements". The requirements necessary to appropriately implement Delaware's NNSR program are included in Table 5-1. Delaware's NNSR SIP submittal was approved by EPA, effective June 14, 2021.

**Table 5-1. 2015 Ozone NAAQS SIP Requirements for Review of New Sources and Modifications**

| 40 CFR 51.165 Permit Requirements | Delaware Requirements |
|---|---|
| (a)(1)(iv)(A)(*1*)(i)-(iv) and (*2*): Major source thresholds for ozone – VOC and NOx | 7 **DE Admin. Code** 1125 Section 2.2. |
| (a)(1)(iv)(A)(*3*): Change constitutes a major source by itself | 7 **DE Admin. Code** 1125 Section 2.2.3. |
| (a)(1)(v)(E): Significant net emissions increase of NOx is significant for ozone | 7 **DE Admin. Code** 1125 Section 1.9, Definitions – "Major Modification". |
| (a)(1)(v)(F): Any emissions change of VOC in Extreme area triggers NNSR | Not applicable since no Delaware NAA is or has previously been designated as Extreme. |
| (a)(1)(x)(A)-(C) and (E): Significant emissions rates for VOC and NOx as ozone precursors | 7 **DE Admin. Code** 1125 Section 1.9, Definitions – "Significant". |
| (a)(3)(ii)(C)(*1*)-(*2*): Provisions for emissions reduction credits | 7 **DE Admin. Code** 1125 Section 2.5 as approved into Delaware's SIP on October 2, 2012. These SIP-approved provisions continue to apply to Delaware sources in NAAs. |
| (a)(8): Requirements for VOC apply to NOx as ozone precursors | 7 **DE Admin. Code** 1125 Section 2.2.4. |
| (a)(9)(i)-(iii): Offset ratios for VOC and NOx for ozone nonattainment areas *[subparagraphs (a)(9)(i)-(iii) were changed to (a)(9)(ii)-(iv)]* | 7 **DE Admin. Code** 1125 Section 2.4.3. |
| (a)(12): Anti-backsliding provision(s), where applicable | Sources in Kent and New Castle Counties remain subject to requirements and major source thresholds based on the Severe designation for the 1-hour ozone standard. Sussex County remains subject to requirements and major source thresholds based on the moderate designation as part of an ozone transport region. |

# 6.0 Offsets and Emission Reduction Credits

CAA Section 182(b)(5) requires that this SIP revision must include information regarding General Offset Requirements.

## 6.1 Non-attainment New Source Review Offsets

Major stationary sources of air pollution and major modifications to major stationary sources are required by the CAA Section 182 to a obtain an air pollution permit before commencing construction. The process is called new source review (NSR) and is required whether the major source or modification is planned for an area where the NAAQS are exceeded (NAAs). Permits for sources in attainment areas are referred to as prevention of significant air quality deterioration (PSD) permits; while permits for sources located in NAAs are referred to as NAA permits. The entire program, including both PSD and NAA permit reviews, is referred to as the NSR program.

Non-attainment New Source Review (NNSR) requires new major sources, or major modifications at existing sources, within NAAs to offset the annual emissions increase from the new source or modification and to provide a net air quality benefit. (7 **DE Admin. Code** 1125, or "Regulation 1125"). Emissions offset by NNSR are based upon NAA classification severity, using a ratio, which is specified in Section 2.0 of Regulation 1125.

As a result of Delaware's non-attainment designations for prior ozone NAAQS, the offset requirements for new sources remain in place and are as stringent as the classifications from the 1979 1-hr ozone standard:

- Kent County - Severe under 1-hr standard; requires 1.3:1 offsets for NOx and VOCs
- New Castle County - Severe under 1-hr standard; requires 1.3:1 offsets for NOx and VOCs
- Sussex County - Marginal under 1-hr standard (but considered moderate since Delaware is part of the OTR; requires 1.15:1 offsets for NOx and VOCs

Per the CAA Section 173(c)(1)-(2), Offsets, emission offsets may be obtained from a NAA which 1) is equal or higher in classification; and 2) contributes to non-attainment in the area.

## 6.2 Emission Reduction Credits

The CAA Section 182 requires new emission sources in NAAs for ozone to offset VOC and NOx emissions, which are ozone precursors, depending on the non-attainment level for the area. The purpose for requiring offsetting emissions decreases is to allow an area to move towards attainment of the ozone NAAQS while still allowing for industrial growth.

This can be accomplished through the implementation of an emission banking and trading program, which provides incentives to make progress toward attainment of air quality standards. The 1990 CAA allows for the use of market-based approaches, including emission trading, to assist in attaining and maintaining the NAAQS, for all criteria pollutants. Emissions trading programs have two key components: a limit (or cap) on pollution, and tradable allowances equal to the limit that authorize allowance holders to emit a specific quantity (e.g., one ton) of the pollutant.

An emission reduction credit (ERC) is a credit earned by a company when it reduces its air emissions. ERCs are discrete quantities of actual emissions expressed in tons of pollutant reduced. ERCs are reductions in emissions in one place that can be used to compensate for (or offset) emission increases which occur in a NAA. These reductions can be generated through the shutdown of individual pieces of equipment or entire facilities. These credits can then be sold by the companies that hold them, to offset new emissions sources.

Delaware's regulation 7 **DE Admin. Code** 1134, *Emission Banking and Trading Program* ("Regulation 1134") was developed to establish a voluntary emission banking and trading program. ERCs do not have an expiration date, and they are retired after use. In accordance with the CAA Section 173(c)(1)-(2), Offsets:

> *"(1) The owner or operator of a new or modified major stationary source may comply with any offset requirement in effect under this part for increased emissions of any air pollutant only by obtaining emission reductions of such air pollutant from the same source or other sources in the same nonattainment area, except that the State may allow the owner or operator of a source to obtain such emission reductions in another nonattainment area if*
>
> *(A) the other area has an equal or higher nonattainment classification than the area in which the source is located and*
>
> *(B) emissions from such other area contribute to a violation of the national ambient air quality standard in the nonattainment area in which the source is located. Such emission reductions shall be, by the time a new or modified source commences operation, in effect and enforceable and shall assure that the total tonnage of increased emissions of the air pollutant from the new or modified source shall be offset by an equal or greater reduction, as applicable, in the actual emissions of such air pollutant from the same or other sources in the area…"*

### 6.2.1 Certification of Emission Reduction Credits

In accordance with 7 **DE Admin. Code** 1134, Section 4.0, facilities that would like to create ERCs from shutdowns of facilities and/or equipment are required to submit an application for certification of an emission reduction to DNREC's Division of Air Quality (AQ). AQ reviews each application to determine if the reductions are real, surplus, permanent, quantifiable, and enforceable as defined in Section 2.0 of Regulation 1134:

*"Real (reductions) means reductions in actual emissions released into the atmosphere."*

*"Surplus (reductions) means actual emission reductions below the baseline (see 6.0 of this regulation) not required by regulations or proposed regulations, and not used by the source to meet any state or federal regulatory requirement."* [19]

*"Enforceable means any standard, requirement, limitation or condition established by an applicable federal or state regulation or specified in a permit issued or order entered thereunder, or contained in a SIP approved by the Administrator of the U.S. Environmental Protection Agency (EPA), and which can be enforced by the Department and the Administrator of the EPA."*

*"Permanent (reductions) means that the actual emission reductions submitted to the Department for certification have been incorporated in a permit or a permit condition or, in the case of a shutdown, the permit to operate for the emission unit or units has been voided."*

*"Quantifiable (reductions) means that the amount, rate and characteristics of emission reductions can be determined by methods that are considered reliable by the Department and the Administrator of the EPA."*

### 6.2.2 Status of Credits

The current status of Delaware's New Castle County ERCs certified by the Department pursuant to 7 **DE Admin. Code** 1134, Emission Banking and Trading Program, since its inception are shown in Table 6-1:

[19] In order to establish the amount of an emission reduction that is surplus and thus eligible for credit, an ozone season and a non-ozone season emission baseline must be established for each emission unit or units associated with a particular emission reduction. The formula for calculation of the ozone season and non-ozone season emission baselines can be found in 7 **DE Admin. Code** 1134, Section 6.3.

**Table 6-1 - Current ERCs in New Castle and Kent Counties*, Delaware.**

| **Held By** | **VOC (tons)** | | **$NO_X$ (tons)** | |
|---|---|---|---|---|
| | **Ozone Season** | **Non-Ozone Season** | **Ozone Season** | **Non-Ozone Season** |
| *1734 LLC* | 117 | 78 | 9 | 20 |
| *Calpine* | 0 | 0 | 27 | 19 |
| *Delaware City Industries (DCI)* | 4 | 2 | 1 | 1 |
| *Diamond State Port Corporation* | 34 | 24 | 9 | 7 |
| *DuPont* | 0 | 0 | 0 | 0 |
| *Lafarge* | 3 | 2 | 0 | 0 |
| *NRG Energy Center* | 0 | 0 | 121 | 147 |
| *Veolia* | 4 | 2 | 4 | 5 |
| *VPI* | 6 | 4 | 1 | 1 |
| *Division of Small Business* | 86 | 51 | 31 | 22 |
| **Total ERCs Currently in New Castle and Kent Counties** | **254** | **163** | **203** | **222** |

* Kent County ERCs are included in this table, as they are also used for calculating Reasonable Further Progress (see Section 8.2.2.1.3).

# 7.0 Delaware 2017 Base Year Emissions Inventory

40 CFR 51.1310(b), 51.1315(a), and 51.1315(b) require that this SIP revision must include a base year inventory (BYI). This section contains a revision of Delaware's 2017 base year inventory (originally submitted to EPA on November 6, 2020) for the 2015 8-hour ozone NAAQS SIP for use in the RFP demonstration.

## 7.1 Introduction

The Department finalized the 2017 base year inventory entitled, *2017 Base Year Emissions Inventory State Implementation Plan for VOC, NOX, and CO For Areas of Marginal Nonattainment of the 2015 Ozone NAAQS in Delaware* (Appendix A) in November 2020 to satisfy the marginal NAA SIP inventory requirement of the CAA. This document was originally submitted to EPA Region III to fulfill the SIP inventory requirement. The inventory includes CO, NOx, and VOC emissions for all anthropogenic, human caused, sources in the NAA, New Castle County, for 2017. The 2017 base year inventory provides the source categories and descriptions, methodologies, controls, seasonal allocations, and example calculations and can be referenced in Appendix A.

The 2017 base year inventory is the starting point for calculating the emission reductions needed to demonstrate RFP, which is required for moderate NAAs for ozone by the CAA and EPA. This SIP revision updates the Original 2017 base year inventory to include emission estimates using the most recent and EPA mandated model for the Onroad and Nonroad sector. Additional updates are to the Nonpoint sector.

## 7.2 Background and Requirements

Sections 182(a)(1) and 172(c)(3) of the CAA require all ozone NAAs to establish a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutant or pollutants in the area by August 3, 2020 (i.e., two years after designation as non-attainment). This inventory is referred to as the base year inventory. Delaware has previously been designated non-attainment for ozone under the 1979 1-hour, 1997 8-hour, and 2008 8-hour ozone NAAQS, and has therefore been subject to this emission inventory requirement since the 1990 amendments to the CAA.

Delaware has developed emission inventories that meet the criterion of CAA 182(a)(1) and 172(c)(3) every three years since 1990. At the time of the marginal designation for the 2015 8-hour ozone NAAQS, Delaware's latest comprehensive, accurate inventory of actual emissions from all sources of VOC, $NO_X$, and CO in the State covered calendar year 2017. Delaware's November 2020 SIP revision, *2017 Base Year Emissions Inventory* (Appendix A), established the 2017 calendar year emissions inventory as its base year inventory under the 2015 8-hour ozone NAAQS.

The inventory parameters defined by the base year emissions inventory requirements for the 2015 8-hour ozone NAAQS include the following:

- **Inventory year** – 2017
- **Pollutants**[20] – VOC, NOx, and CO as precursors to ozone
- **Source coverage** – All sources, including Point, Nonpoint, Nonroad, and Onroad mobile sources
- **Spatial resolution** – County level emissions
- **Geographic coverage** – New Castle County
- **Seasonal Allocation** – Annual and summer season weekday (SSWD) daily emissions.
    - The summer season is defined as the months June, July, and August. Weekday is defined as the days Monday, Tuesday, Wednesday, Thursday, and Friday.

EPA requires states to update their base year inventory with the latest emission estimates as directed. This SIP revision updates the Onroad emissions to include emission estimates using the latest available EPA Motor Onroad Vehicle Emissions Simulator model, MOVES3. The EPA mandated use of MOVES3 for SIPs and Transportation Conformity in their January 7, 2021 Notice of Availability.[21]

In addition, the revision updates the Nonpoint sector for a more comprehensive and accurate baseline inventory as recommended in EPA's May 2017 Inventory Guidance, "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter NAAQS and Regional Haze Regulations"[22] (hereafter referred to as "EPA's 2017 Inventory Guidance"). The updated inventory will be referenced in this document as the "Adjusted 2017 base year inventory".

## 7.3 Delaware Adjusted 2017 Base Year Emission Inventory Summary

The Adjusted 2017 base year inventory for New Castle County is summarized in Table 7-1 by source sector emissions, which include Point, Nonpoint, Nonroad, and Onroad. Each sector will be described in detail in the following subsections. Throughout Section 7 of this document, annual emissions are reported in tons per year (tpy) and SSWD emissions in tons per day (tpd). The totals may not match the sum of the individual values due to independent rounding.

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[20] Per 40 CFR 51.1315, a base year inventory only requires emissions from sources of VOC and $NO_X$. However, Delaware included sources of CO to be consistent with past base year inventory reports.

[21] Official Release of the MOVES3 Motor Vehicle Emissions Model for SIPs and Transportation Conformity. EPA Notice of Availability. 86 FR 1106. January 7, 2021. https://www.govinfo.gov/content/pkg/FR-2021-01-07/pdf/2021-00023.pdf

[22] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA. May 2017. Retrieved July 2023 from https://www.epa.gov/sites/default/files/2017-07/documents/ei_guidance_may_2017_final_rev.pdf

**Table 7-1 Adjusted 2017 Base Year Inventory for New Castle County by Source Sector**

| Source Sectors | 2017 Annual Emissions (tpy) | | | 2017 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Point | 1,766 | 2,504 | 747 | 10.42 | 14.53 | 3.12 |
| Nonpoint | 3,678 | 1,445 | 3,184 | 7.46 | 2.51 | 9.59 |
| Nonroad | 23,844 | 3,152 | 2,262 | 92.89 | 9.27 | 7.69 |
| Onroad | 26,302 | 5,105 | 1,693 | 83.23 | 16.06 | 5.37 |
| **All Sectors** | **55,590** | **12,206** | **7,886** | **194.00** | **42.38** | **25.76** |

### 7.3.1 Point Sources

The Point source inventory represents facility-specific data for larger stationary sources. Emissions data for all other source categories are reported at the county level. Point sources typically include large industrial, commercial, and institutional facilities. Manufacturing facilities, within the industrial sector, comprise the majority of all reporting Point sources. The institutional sector includes hospitals, universities, prisons, military bases, landfills, and wastewater treatment plants.

The following criteria were established for defining the universe of facilities to be surveyed for 2017:

- Facilities that held a Title V permit in 2017; and
- Facilities that held a Synthetic Minor permit in 2017.

There are 82 facilities located within New Castle County that were included in the Original 2017 base year inventory.

For the list of facilities, emission estimates, methodologies, and season allocations refer to Delaware's *2017 Base Year Emissions Inventory* (Appendix A). In this SIP revision no changes were made to the Point source emissions from the Original 2017 base year inventory.

### 7.3.2 Nonpoint Sources

Stationary Nonpoint sources represent a large and diverse set of individual emission source categories. A Nonpoint source category is either: 1) represented by small facilities too numerous to individually inventory, such as commercial cooking at restaurants and fuel combustion at a variety of small businesses; or 2) a common activity, such as residential open burning.

For Nonpoint sources, the first task involved gathering activity data for each source category. In many cases, these data were obtained from Delaware-specific sources. In some cases, the activity data were developed through the allocation of a portion of a national activity dataset (*i.e.*, national off-road equipment populations) to Delaware. Basic demographic data were also used for some source categories and are presented in Table 7-2. Once activity data were obtained, spreadsheets were developed to manage the data and combine the activity data with the selected emission factors to obtain uncontrolled emissions.

**Table 7-2 2017 Demographic Data for New Castle County**

| Demographic Parameter | New Castle County |
|---|---|
| Population[23] | 564,193 |
| Households | 207,325 |
| Land Area (square miles) | 439 |
| Annual Vehicle Miles Traveled (VMT) (million miles) | 6,095 |

Finally, for those sources where controls were applied, emissions were adjusted to account for control efficiency, rule effectiveness, and rule penetration. These terms are defined as:

- Control efficiency - represents the typical emissions reduction achieved as compared to the otherwise uncontrolled emissions.
- Rule effectiveness - reflects the ability of the regulatory program to achieve all emissions reductions that could have been achieved by full compliance with the applicable regulations at all sources at all times.
- Rule penetration - represents the percent of sources within a source category that are subject to the rule that requires control.

Table 7-3 lists the Nonpoint source categories for which CO, NOx, and VOCs for New Castle County were estimated. For source category listings and descriptions, methods and data sources, emission factors, and seasonal allocations refer to Delaware's *2017 Base Year Emissions Inventory* (Appendix A).

[23] Delaware Population Consortium. (2018). Annual Projections from the Delaware Population Consortium. Retrieved on Sep 17, 2018 from https://stateplanning.delaware.gov/demography/dpc.shtml

**Table 7-3 2017 Base Year Inventory for Nonpoint Categories**

| VOC Emissions Only | Emissions of VOC, NOx, and CO |
|---|---|
| Agricultural Pesticides | Agricultural Burning |
| AIM Coatings* | Commercial Cooking |
| Asphalt Paving | Commercial Fuel Combustion |
| Autobody Refinishing | Industrial Fuel Combustion |
| Commercial & Consumer Products | Land Clearing Debris Burning |
| Degreasing | Prescribed Burning |
| Dry Cleaning | Residential Fuel Combustion |
| Gasoline (Petroleum) Marketing | Residential Open Burning |
| Graphic Arts | Residential Wood Combustion |
| Industrial Adhesives | Structure Fires |
| Industrial Surface Coatings | Vehicle Fires |
| Traffic Markings | Wildfires |

*AIM: Architectural and Industrial Maintenance

#### 7.3.2.1 Nonpoint Sources Emission Revisions

Delaware evaluated the Nonpoint emissions from the Original 2017 base year inventory and identified revisions needed for its use as the RFP base year inventory. This SIP revision updates the Nonpoint section of the Original 2017 Base Year Emissions Inventory.

According to *EPA's 2017 Inventory Guidance*, the EPA recommends updating emissions for a more comprehensive and accurate baseline inventory when better information is available. During the evaluation of the Nonpoint inventory, Delaware identified errors that were made during the compilation of the inventory. For accuracy, the categories with errors were corrected in the Adjusted 2017 base year inventory. Descriptions of the compilation errors can be found in more detail in *Adjusted 2017 Nonpoint Inventory Excel Spreadsheet*, (Appendix B, tab "Nonpoint Categories").

In addition to small corrections, Delaware included several categories that were omitted from the Original 2017 Base Year Emissions Inventory to be consistent with the categories provided in EPA's 2017 National Emissions Inventory (NEI) and modeling platforms. For the omitted categories, Delaware used EPA's calculated emissions from the 2017 NEI. The SSWD factors for these source categories are calculated internally and included in the *Adjusted 2017 Nonpoint Inventory* (Appendix B, tab "SSWD Variations").

One source category, Lighter Fluid (from the Consumer & Commercial Products category), was a new category added to the 2020 NEI. Delaware calculated the 2017 adjusted base year emissions for Lighter Fluid by growing EPA's most recent modeling platform (2016v3) data with EPA's growth rate. The calculation details are included in (Appendix B, tab "Lighter Fluid").

Table 7-4 lists the Nonpoint categories that are being revised/added. The table compares the emission totals from the Original 2017 base year inventory to the revised totals in the Adjusted 2017 base year inventory.

**Table 7-4 Original vs Adjusted 2017 Base Year Inventory Nonpoint Annual Category Totals**

| Source Categories | Original 2017 Base Year Inventory | | | Adjusted 2017 Base Year Inventory | | |
|---|---|---|---|---|---|---|
| | Annual Emissions (tpy) | | | Annual Emissions (tpy) | | |
| | CO | NOx | VOC | CO | NOx | VOC |
| Agricultural Pesticides | - | - | 117 | - | - | 30 |
| AIM[4] Coatings | - | - | 403 | - | - | 390 |
| Animal Cremation[1] | - | - | - | <1 | <1 | <1 |
| Animal Husbandry[1] | - | - | - | - | - | 35 |
| Auto Refinishing | - | - | 29 | - | - | 22 |
| Human Cremation[1] | - | - | - | <1 | <1 | <1 |
| Lighter Fluid (C&CP[2]) [1] | - | - | - | - | - | 12 |
| POTWs[1,3] | - | - | - | - | - | 12 |
| Residential Grilling[1] | - | - | - | 150 | 3 | 8 |
| Retail Gasoline Stations | - | - | 402 | - | - | 240 |
| **Total** | **-** | **-** | **951** | **150** | **3** | **749** |

1) New Category
2) C&CP: Consumer and Commercial Products
3) POTWs: Publicly Owned Treatment Works
4) AIM: Architectural and Industrial Maintenance

Table 7-5 includes the revisions to the Nonpoint SSWD emissions by source categories. It is noted some source categories required only an adjustment to the annual emissions or the SSWD emissions. Adjusted SSWD factor calculations are shown in *Adjusted 2017 Nonpoint Inventory* (Appendix B, tab "SSWD Variations").

**Table 7-5 Original vs Adjusted 2017 Base Year Inventory Nonpoint SSWD Category Totals**

| Source Categories | Original 2017 Base Year Inventory SSWD Emissions (tpd) | | | Adjusted 2017 Base Year Inventory SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Agricultural Pesticides | - | - | 0.32 | - | - | 0.11 |
| Animal Cremation[1] | - | - | - | <0.01 | <0.01 | <0.01 |
| Animal Husbandry[1] | - | - | - | - | - | 0.10 |
| Commercial Fuel | 0.43 | 0.73 | 0.04 | 0.43 | 0.52 | 0.03 |
| Human Cremation[1] | - | - | - | <0.01 | <0.01 | <0.01 |
| Lighter Fluid (C&CP[2]) [1] | - | - | - | - | - | 0.05 |
| Portable Fuel Containers | - | - | 0.33 | - | - | 0.42 |
| POTWs[1,3] | - | - | - | - | - | 0.03 |
| Residential Grilling[1] | - | - | - | 0.66 | 0.01 | 0.04 |
| Residential Fuel | 0.12 | 0.28 | 0.02 | 0.10 | 0.22 | 0.01 |
| Retail Gasoline Stations | - | - | 1.91 | - | - | 0.78 |
| **Total** | **0.55** | **1.01** | **2.62** | **1.19** | **0.76** | **1.57** |

1) New Category
2) C&CP: Consumer and Commercial Products
3) POTWs: Publicly Owned Treatment Works

The total Nonpoint emissions of the Adjusted 2017 base year inventory compared to the Original 2017 base year inventory are shown in Table 7-6.

**Table 7-6 Original vs Adjusted 2017 Base Year Inventory Nonpoint Emission Totals**

| 2017 Nonpoint Emissions | 2017 Annual Emissions (tpy) | | | 2017 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Original BYI | 3,527 | 1,444 | 3,387 | 6.76 | 2.76 | 10.63 |
| Adjusted BYI | 3,678 | 1,445 | 3,184 | 7.46 | 2.51 | 9.59 |

*BYI: Base Year Inventory

### 7.3.3 Onroad Sources

The 2017 Onroad mobile source inventory is an estimate of vehicle emissions based on actual vehicle miles traveled (VMT) on Delaware roadways in 2017 using EPA's MOVES model. The model requires activity data imported as input databases. For any type of data used by the model for which Delaware-specific data did not exist, the model used the system defaults. Activity data used in the input databases include the following:

- Road Type Distribution
- Source Type Population
- Vehicle Miles Traveled
- Inspection and Maintenance Program
- Age Distribution
- Average Speed Distribution
- Fuel
- Meteorology Data

Delaware used the input files submitted for EPA's 2017 NEI with EPA's MOVES to estimate Onroad emissions. The MOVES model version used for the Original 2017 base year inventory was MOVES2014b. For more detail on the Onroad emissions see Delaware's *2017 Base Year Emissions Inventory* (Appendix A).

#### 7.3.3.1 Onroad Sources Emission Revisions

This SIP revision updates the Onroad emissions to include emission estimates using the latest available EPA MOVES model, MOVES3.1.0. The EPA mandated use of MOVES3 for SIPs and Transportation Conformity in their January 7, 2021 Notice of Availability.[24] MOVES3.1.0 was the most up to date version available during this analysis and is the version the Department used to calculate future emissions for RFP. As indicated in Section 3.4.2 of *EPA's 2017 Inventory Guidance:*

> *"It would be inconsistent to compare estimates from a new mobile model at the end of a 6-year period to estimates using an old model at the beginning of that 6-year period, and so the EPA could be unable to determine whether a 15 percent reduction (or subsequent 3 percent reductions) can be (or has been) achieved by an ROP/RFP plan. Thus, an updated ROP/RFP baseline NAA inventory may need to be created using the updated mobile model to appropriately meet the requirements of the Ozone Implementation Rule."*

[24] Official Release of the MOVES3 Motor Vehicle Emissions Model for SIPs and Transportation Conformity. EPA Notice of Availability. 86 FR 1106. January 7, 2021. https://www.govinfo.gov/content/pkg/FR-2021-01-07/pdf/2021-00023.pdf

The MOVES 2014b input database was converted to MOVES3 formatting using the MOVES2014 to MOVES3 conversion tool and guidance.[25] The county-specific input data types created for the 2017 inventory include VMT (by vehicle and roadway type), vehicle registration data (vehicle populations and age distributions), average speeds in the form of speed bin fractions (weekday versus weekend and by roadway type), and I/M program specifications. Table 7-7 lists the updated inputs and assumptions for MOVES3 used to calculate the mobile emissions for the Adjusted 2017 base year inventory.

**Table 7-7 Onroad Adjusted 2017 Base Year Inputs and Assumptions**

| Data Item | 2017 Newcastle County Inputs and Assumptions |
|---|---|
| **MOVES RunSpec** | |
| Emission Model | MOVES3.1.0 (default database: MOVESDB20221007) |
| Scale/Calculation Type | County Scale Inventory Run |
| Analysis Years | 2017 |
| Analysis Months | June, July, August (Peak Ozone Season) |
| Analysis Days | Weekdays |
| Analysis Hours | All |
| Geographic Bounds | New Castle, DE (10003) |
| Pollutants | VOC, NOx + Necessary Precursors |
| Fuel Types | Compressed Natural Gas (CNG), Diesel, Electricity, Ethanol (E-85), Gasoline |
| **Traffic Data** | |
| VMT Growth Forecast | Not applicable |
| Vehicle Population Growth Forecast | Not applicable |
| **MOVES Inputs** | |
| SourceTypeYearVMT | Use 2017 Highway Performance Monitoring System (HPMS) data from DELDOT. Used the distribution as was used in the EPA draft data set for the 2017NEI. This distribution was applied to the 5 HPMS vehicle types to allocate the VMT. |
| Month VMT Fractions | Used the month VMT from the 2017 MOVES Defaults & CRCA100 Data Sets |
| Day VMT Fractions | Used the day VMT from the 2017 MOVES Defaults & CRCA100 Data Sets |
| Hourly VMT Fractions | Used the hourly VMT from the 2017 MOVES Defaults & CRCA100 Data Sets |
| I/M Parameters | Used the enhanced plan prior to the amendments finalized in January 2023 to regulations 1126 and 1131 |
| Road Type Distribution | Used the analysis of the 2017 Delaware Department of Transportation (DelDOT) tables: https://deldot.gov/Publications/reports/hpms/index.shtml As well as yielding VMT, this data also yields road type distributions |

[25] MOVES3 Database Conversion Tool Help. EPA. Revised November 6, 2020. Retrieved July 2023 from Tools menu in MOVES3.1.0 Interface.

| Data Item | 2017 Newcastle County Inputs and Assumptions |
|---|---|
| SourceTypeYear (Population) | Using Vehicle Population data (R45CAM07) for 2017 |
| Vehicle Age Distribution | Analysis of 2017 R45CAM07 data. |
| Average Speed Distribution | Used the CRCA100 data set |
| Fuel Supply | MOVES3.1 default tables |
| Fuel Formulation | MOVES3.1 default tables |
| Fuel Usage Fraction | MOVES3.1 default tables, Set ethanol Fraction to 0 |
| Alternative Vehicle Fuels and Technologies (AVFT) | MOVES3.1 default Tables |
| ZoneMonthHour | Average hourly data by month from years 2015, 2016 and 2017 meteorological datasets maintained by NOAA |
| **MOVES Inputs - Advanced** | |
| Early National Low Emission Vehicle (NLEV) | Used MOVE3_DE_LEV_IN table. Added as an advanced feature in the MOVES3 interface. This was developed per EPA guidance and when invoked, replaces the EmissionRateByAge table |

The Onroad emissions from the MOVES3 model for the Adjusted 2017 base year inventory are compared to the MOVES2014b emissions from the Original 2017 base year inventory in Table 7-8. Detailed results of the MOVES run results are shown in *Adjusted 2017 Onroad MOVES Output Results* (Appendix C).

**Table 7-8 Original vs Adjusted 2017 Base Year Inventory Onroad Emission Totals**

| 2017 Onroad Emissions | EPA MOVES Model Version | 2017 Annual Emissions (tpy) | | | 2017 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|---|
| | | CO | NOx | VOC | CO | NOx | VOC |
| Original BYI | MOVES2014b | 28,807 | 5,184 | 2,213 | 87.23 | 15.70 | 6.23 |
| Adjusted BYI | MOVES3 | 26,302 | 5,105 | 1,693 | 83.23 | 16.06 | 5.37 |

*BYI: Base Year Inventory

### 7.3.4 Nonroad Sources

Nonroad mobile sources represent a large and diverse set of off-road vehicles and non-stationary equipment. Emission estimates of VOCs, NOx, and CO for this source sector account for exhaust emissions from engine fuel combustion.

Nonroad vehicles and equipment are grouped into four source category types for the purpose of developing emission estimates. These include:

- Aircraft – Commercial, military, and private aircraft.
- Locomotives (or Rail) – Commercial line haul and yard locomotives.
- Commercial Marine Vessels (CMVs) – Various types of vessels that navigate the Delaware Bay and River and the Chesapeake and Delaware Canal are included under this source category. Recreational boats are included in the next category.
- Other Off-road Vehicles and Equipment – All other off-road emission sources are accounted for through the use of EPA's MOVES model in Nonroad mode. The model compiles off-road equipment pertinent to Delaware into the following subcategories:

#### 7.3.4.1 Marine, Aircraft and Rail (MAR) Sources

Marine, Aircraft, and Rail (MAR) emissions were estimated by multiplying an indicator of collective activity within the inventory area for a source category by a corresponding emission factor. The activity for MAR sources include landing and take-offs (LTOs), vessel port-of-calls, time-in-mode (TIMs, which are pertinent to aircraft and CMVs), gross ton miles (locomotives), equipment populations, and economic activity (both pertinent to Nonroad equipment) that can be correlated with the emissions from that source. The corresponding emission factors are amount of pollutant (either grams or pounds) per unit of fuel used (locomotives and military/commercial aircraft), per LTO (air taxi and general aviation), or per unit of power output in brake horsepower or kilowatt-hours (Nonroad equipment and CMVs, respectively).

For the list of emission estimates, methodologies, and seasonal allocations refer to Delaware's *2017 Base Year Emissions Inventory* (Appendix A). In this SIP revision no changes were made to the MAR source emissions from the Original 2017 base year inventory.

#### 7.3.4.2 Other Off-road Vehicles and Equipment Sources

The MOVES Nonroad model estimates emissions from equipment such as recreational marine vessels, recreational land-based vehicles, farm and construction machinery, lawn and garden equipment, aircraft ground support equipment and rail maintenance equipment. This equipment is powered by diesel, gasoline, compressed natural gas or liquefied petroleum gas engines

The Department used MOVES2014b to develop 2017 annual and SSWD daily emission estimates for the Original 2017 base year inventory. For more detail on Nonroad emissions see Delaware's *2017 base year inventory* (Appendix A).

#### 7.3.4.2.1 Other Off-road Vehicles and Equipment Sources Emission Revisions

Similar to Onroad emissions, EPA mandated the use of MOVES3 for Nonroad emissions as it is the most state-of-the-art model. Estimating 2017 emissions with MOVES3 is also required to match the Nonroad model used in the future year inventory for RFP.

Delaware ran MOVES3.1.0 in Nonroad mode for New Castle County with the same assumptions used in the Original 2017 base year inventory. Detailed results of the model run are shown in *Adjusted 2017 Nonroad MOVES Output Results* (Appendix D).

As shown in Table 7-9, there are minimal differences in the MOVES3.1.0 Nonroad emissions compared to the Original 2017 base year inventory nonroad emissions.

**Table 7-9 Original vs Adjusted 2017 Base Year Inventory Nonroad Emission Totals**

| 2017 Nonroad Emissions | EPA MOVES Model Version | 2017 Annual Emissions (tpy) | | | 2017 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|---|
| | | CO | NOx | VOC | CO | NOx | VOC |
| Original BYI | MOVES2014b | 23,112 | 1,110 | 2,090 | 90.89 | 3.68 | 7.25 |
| Adjusted BYI | MOVES3.1.0 | 23,112 | 1,110 | 2,106 | 90.89 | 3.68 | 7.26 |

*BYI: Base Year Inventory

# 8.0 Reasonable Further Progress

40 CFR 51.1310(a) and 51.1310(a)(2)(i) require that this SIP revision must include a RFP demonstration.

## 8.1 Introduction

RFP is required by the CAA under Part D, Title I to ensure that the air quality in NAAs makes steady and incremental progress toward attaining air quality standards.[26] SIP revisions for moderate NAAs are required to include an RFP demonstration. Listed in 40 CFR 51.1310(a)(2), moderate NAA requirements for RFP state that the area must provide 15% emission reduction from the baseline year within 6 years. It also states that the reduction relies on either NOx or VOC (or combination) depending on criteria in CAA 182(c)(2)(C).

The EPA provides additional RFP guidance in their 2005 Phase 2 Implementation Rule.[27] This ruling indicates Delaware must achieve 15% VOC and/or NOx emission reduction in New Castle County from their combined 2017 baseline level, before the end of 2023. RFP can be shown with either VOC or NOx or a combination of the two pollutants since New Castle County had a 15% VOC Rate-of-Progress (ROP) plan approved by EPA under the 1-hour ozone standard.

Section 8.3 describes the methodology the Department used to show RFP has been satisfied.

## 8.2 Reasonable Further Progress 2023 Projected Inventory

To demonstrate RFP, the Department must show appropriate emissions reductions have occurred from the Adjusted 2017 base year inventory (Section 7.0) to an attainment year inventory. The attainment year inventory is a projected inventory based on the attainment date of the NAA. While New Castle County has an attainment date of August 3, 2024, the area is required to demonstrate attainment by the end of the last full ozone season prior to the designated date, which is the end of the 2023 ozone season. Therefore, the attainment year inventory (hereafter referred to as "2023 Projected Attainment Inventory") is for future year 2023.

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[26] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA. May 2017. Retrieved July 2023 from https://www.epa.gov/sites/default/files/2017-07/documents/ei_guidance_may_2017_final_rev.pdf

[27] Final Rule To Implement the 8-Hour Ozone National Ambient Air Quality Standard—Phase 2; Final Rule To Implement Certain Aspects of the 1990 Amendments Relating to New Source Review and Prevention of Significant Deterioration as They Apply in Carbon Monoxide, Particulate Matter and Ozone NAAQS; Final Rule for Reformulated Gasoline. EPA Final Rule. 70 FR 71612. November 29, 2005. https://www.govinfo.gov/content/pkg/FR-2005-11-29/pdf/05-22698.pdf.

### 8.2.1 Background

Department staff developed the 2023 Projected Attainment Inventory by applying appropriate growth factors to the Adjusted 2017 base year inventory. EPA's May 2017 Inventory Guidance *"Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter NAAQS and Regional Haze Regulations*" (hereafter referred to as *"EPA's 2017 Inventory Guidance")* was used in the development of the 2023 Projected Attainment Inventory. As indicated in the guidance, the goal of the projected inventory is to make a "reasonable and technically credible estimate of future-year emissions that accounts for key variables".[28] These variables include changes to activities, emission controls, fuel types, and/or regulations.

The EPA periodically develops modeling platforms with a set of future year inventories and detailed documentation of the approaches used to develop the inventories. Section 5 of *EPA's 2017 Inventory Guidance* suggests air agencies use EPA's modeling platforms "to develop and improve their own emissions projections". As a recommended resource in the guidance, Delaware relied on EPA's most recent modeling platform, 2016v3, which included future year 2023, for selecting projection methods. This ensured that Delaware's 2023 Projected Attainment Inventory was grown using the most up-to-date methods. The Technical Support Document (TSD) for EPA's 2016v3 platform[29] is referred to as "*EPA's 2016v3 TSD*" in this document. Deviations from EPA's 2016v3 modeling platform methodology will be discussed in detail in the sections below.

### 8.2.2 Growth Projection Methodology

The following section describes the methods used to develop each sector of the 2023 Projected Attainment Inventory for RFP. The four sectors grown for the inventory are Point, Nonpoint, Onroad, and Nonroad.

#### 8.2.2.1 Point Sources Growth Projection Methodology

Delaware Point sources were grown following the methods from *EPA's 2016v3 TSD*, except for the Electricity Generating Units (EGUs) and ERCs. For EGUs the Department used the Mid Atlantic Regional Air Management Association's (MARAMA's) projections from the Eastern Regional Technical Advisory Committee (ERTAC) EGU Projection Tool. The ERTAC EGU Projection Tool was developed by a regional team, and the calculated future emission estimates are more representative of DE's future EGU emissions than the emissions from EPA's Integrated Planning Model (IPM). The Emission Reduction Credits are Point emissions from closed or curtailed facilities that are not currently emitting pollutants into the air, but have the potential; therefore, they are required in the RFP inventory.

Table 8-1 summarizes the Point sources for the 2023 Projected Attainment Inventory by annual and SSWD emissions. Annual emissions are shown in tons per year (tpd) and SSWD emissions are shown in tpd.

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[28] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA. May 2017. Retrieved July 2023 from Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations (epa.gov)

[29] Technical Support Document (TSD): Preparation of Emissions Inventories for the 2016v3 North American Emissions Modeling Platform. EPA. January 2023. Retrieved July 2023 from https://www.epa.gov/system/files/documents/2023-03/2016v3_EmisMod_TSD_January2023_1.pdf

**Table 8-1 2023 Projected Attainment Inventory - Point Source Emissions**

| 2023 Point Source Projections | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Emission Reduction Credits (ERCs) 1,2,3 | - | 425 | 417 | - | 1.16 | 1.14 |
| Projected Point w/o ERCs | 1,619 | 2,218 | 449 | 9.22 | 13.63 | 2.42 |
| Total Project Point w/ ERCs | 1,619 | 2,643 | 866 | 9.22 | 14.80 | 3.56 |

1) ERCs: Emission Reduction Credits as of 2021 Audit Report; *Delaware Regulation 1134 Emission Banking and Trading Program, Final August 2022 Emission Reduction Credit Audit*
2) Verified with DE Compliance Manager that no other facilities are pursuing credits as of May 2023
3) TPD for ERCs are calculated from annual emissions since seasonal factors are not available; calculation conservative because it is known that the majority of credits will not be applied in 2023

#### 8.2.2.1.1 Non-EGU Point Sources Growth Projection Methodology

Non-EGU sources are Point Sources that are not EGUs. For all non-EGU Point sources, Delaware followed EPA's projection method for the 2016v3 platform. Emissions from the most recent EPA inventory were used to be representative of future emissions. The most recent emissions data available is dependent on the type of facility. Delaware organizes Point sources into two main categories; facilities that hold a Title V (TV) permit and facilities that hold a Synthetic Minor (SM) permit. Facilities that meet and exceed Delaware's major source potential to emit thresholds are considered major sources and assigned a TV permit. Delaware requires these TV permit facilities (major sources) to submit an emissions inventory on an annual basis. Facilities who voluntarily limit their potential to emit below the major source potential to emit thresholds are assigned a SM permit. Delaware requires these SM permit facilities to submit an emissions inventory on a triennial basis.

EPA's triennial inventory is called the NEI and is compiled every three years with the 2017 NEI being the last triennial inventory finalized at the time this inventory was developed. As a result, Delaware used the 2017 NEI emissions to represent all SM permit facilities in New Castle for the 2023 Projected Attainment Inventory.

For TV permits, the last annual emission inventory finalized during the development of the projected inventory was the 2020 inventory; however, the 2020 emissions were not considered representative of future years because of the impact Coronavirus Disease (COVID-19) had on businesses. Delaware used emission data from EPA's finalized 2019 inventory to represent the TV facilities' 2023 projected emissions. This was in line with the EPA's 2016v3 modeling platform inventory selections.

Delaware reviewed the facilities emissions to determine if changes had occurred since the 2017 or 2019 inventory (dependent on permit type). New/changed processes, new/changed controls, and closures/startups were accounted for to ensure accurate 2023 projections. Based on the review, there were eight updates made to the Point inventory. Table 8-2 summarizes the updates.

**Table 8-2 Adjustments made to the 2023 Point Source Inventory**

| Facility | Permit Type | Facility Action: | Inventory Update: |
|---|---|---|---|
| Printpack | Title V | Closed in 2023 | Removed emissions from 2023 inventory |
| Dassault Falcon Jet-Wilmington Corp | Title V | Closed in 2021 | Removed emissions from 2023 inventory |
| Delaware City Refinery | Title V | Updated VOC calculation for one process in 2021 | Used the 2021* emission estimates for that one process |
| Datwyler Pharma | Synthetic Minor | Newly permitted facility in 2021 | Used 2021* emission estimates |
| United Cocoa Processor, Inc. | Synthetic Minor | Newly permitted facility in 2020 | Used 2020 NEI emissions |
| Delaware Health & Social Services – Herman Holloway Campus | Synthetic Minor | Newly permitted facility in 2020 | Used 2020 NEI emissions |
| New Haven Packaging, LLC | Synthetic Minor | Closed in 2021 | Removed emissions from 2023 inventory |
| IKO Production Wilmington Inc. | Synthetic Minor | Closed in 2021 | Removed emissions from 2023 inventory |

*2021 emissions data was not finalized at the time the 2023 Projected Inventory was developed although it was submitted by the facility and reviewed by Delaware personnel.

Annual and SSWD emissions for the 76 non-EGU facilities located within New Castle County are summarized in Table 8-3. A more detailed summary is provided in *RFP Inventory and Analysis* (Appendix E, tab “Point”). The SSWD emissions were calculated using the same method described in Section 2.1 of Delaware’s *2017 Base Year Emissions Inventory* (Appendix A), although the operation data was updated to match the year the inventory emissions were reported (e.g., 2019 operations were used for most Title V permitted facilities).

## Table 8-3 2023 Non-EGU Facility-Level Emissions for New Castle County

| Facility Name | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| 1007 Market | 4 | 5 | <1 | 0.03 | 0.03 | 0.00 |
| Aearo Technologies LLC | <1 | <1 | 3 | <0.01 | <0.01 | 0.01 |
| Alfred I. Dupont Hospital for Children | 10 | 14 | 1 | 0.09 | 0.27 | 0.01 |
| Allan Myers Delaware, Inc. - Wilmington | 5 | 2 | 1 | 0.03 | 0.01 | 0.01 |
| American Air Liquide | <1 | <1 | 1 | <0.01 | <0.01 | <0.01 |
| Amtrak Wilmington Maintenance Facility | - | - | 1 | - | - | 0.01 |
| Astrazeneca Pharmaceuticals, LLC-Newark | 5 | 6 | <1 | 0.02 | 0.02 | <0.01 |
| Bank of America - Bracebridge | 1 | 2 | <1 | 0.01 | 0.03 | <0.01 |
| Bank Of America - Christiana Complex | <1 | <1 | <1 | <0.01 | 0.02 | <0.01 |
| Bank Of America - Deerfield | <1 | 1 | <1 | <0.01 | 0.02 | <0.01 |
| BASF Colors & Effects, Newport | 15 | 13 | 20 | 0.06 | 0.06 | 0.09 |
| Bilcare Research Inc. | 2 | 2 | 2 | 0.01 | 0.01 | 0.01 |
| Chestnut Run Plaza - Dupont Specialty Products USA, LLC | 10 | 8 | 2 | 0.05 | 0.04 | 0.01 |
| Christiana Care - Wilmington Hospital | 5 | 7 | 1 | 0.02 | 0.06 | <0.01 |
| Christiana Care Health Services - Christiana Hospital | 19 | 15 | 4 | 0.16 | 0.21 | 0.02 |
| Christiana Energy Center | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Christiana Materials | 14 | 4 | 2 | 0.09 | 0.03 | 0.01 |
| Clean Earth of New Castle | - | - | 1 | - | - | <0.01 |
| Contractors Materials LLC Hot Mix Plt | 11 | 2 | 3 | 0.05 | 0.01 | 0.01 |
| Corrado Construction Co LLC | - | - | - | - | - | - |
| Croda Inc. | 15 | 22 | 8 | 0.09 | 0.15 | 0.03 |
| Dana Railcare | <1 | <1 | <1 | <0.01 | <0.01 | 0.02 |
| Datwyler Pharma Packaging USA, Inc. | <1 | <1 | <1 | - | - | 0.00 |
| DE Solid Waste Authority Cherry Island | 42 | 13 | 6 | 0.16 | 0.05 | 0.02 |
| Delaware City Refinery | 1,046 | 1,206 | 198 | 5.40 | 5.01 | 1.35 |
| Delaware City Sales Terminal | 1 | <1 | 6 | <0.01 | <0.01 | 0.03 |
| Delaware Health & Social Services - Herman Holloway Campus | 2 | 3 | <1 | 0.01 | 0.04 | <0.01 |
| Delaware Park Racetrack & Casino | <1 | <1 | <1 | 0.03 | 0.02 | 0.01 |
| Delaware Recyclable Products Inc | 22 | 5 | 4 | 0.07 | 0.02 | 0.01 |
| Diamond Materials LLC | 13 | 2 | 1 | 0.07 | 0.01 | 0.01 |
| Dupont Experimental Station - Dupont Specialty Products USA, LLC | 32 | 50 | 8 | 0.24 | 0.44 | 0.04 |
| Dupont Nutrition USA, Inc. | 33 | 24 | 2 | 0.11 | 0.09 | 0.01 |
| Eastern Shore Natural Gas Delaware City | 1 | 6 | 3 | 0.01 | 0.03 | 0.01 |
| Edge Moor Energy Center | 3 | 4 | 1 | 0.02 | 0.06 | <0.01 |
| First State Investors 5200 | <1 | <1 | <1 | 0.01 | 0.03 | <0.01 |
| FMC Stine Research Center | 10 | 12 | 3 | 0.08 | 0.17 | 0.03 |
| Ge Aviation - Newark, DE | <1 | <1 | 3 | <0.01 | <0.01 | 0.02 |
| GT USA Wilmington - Port of Wilmington | 9 | 43 | 2 | 0.08 | 0.33 | 0.01 |
| Hay Road Energy Center | - | - | <1 | - | - | <0.01 |
| Hercules LLC Research Center | 4 | 2 | 1 | 0.01 | 0.01 | 0.02 |
| Holland Mulch, Inc. | 7 | 5 | 1 | 0.14 | 0.11 | 0.02 |
| Honeywell/City of Wilmington | 6 | 6 | 6 | 0.02 | 0.02 | 0.02 |

| Facility Name | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Howard R. Young Correctional Institution | 1 | 1 | <1 | <0.01 | 0.01 | <0.01 |
| James T. Vaughn Correctional Center | 4 | 5 | 1 | 0.01 | 0.01 | <0.01 |
| JP Morgan Chase - 4001 Gov Printz Blvd | 1 | 6 | 1 | 0.02 | 0.08 | 0.02 |
| JP Morgan Chase - Bear Christiana Road | 1 | 7 | 1 | 0.01 | 0.03 | 0.00 |
| JP Morgan Chase - Morgan Christiana Center | 1 | 6 | <1 | 0.11 | 0.63 | 0.01 |
| Kuehne Chemical Company Inc | <1 | 2 | <1 | <0.01 | 0.01 | <0.01 |
| Magco Inc. | 3 | 2 | 0 | 0.01 | 0.01 | <0.01 |
| Magellan Terminals Holdings, L.P. | 6 | 4 | 21 | 0.23 | 0.08 | 0.05 |
| Marcus Hook Industrial Complex | - | - | <1 | - | - | <0.01 |
| Mcconnell Johnson | <1 | <1 | <1 | 0.01 | 0.05 | <0.01 |
| Medal A Div of Air Liquide Adv Tech Us | 3 | 3 | 16 | 0.01 | 0.01 | 0.05 |
| Micropore, Inc. | - | - | 4 | - | - | 0.01 |
| Middletown Materials | 1 | 5 | <1 | 0.01 | 0.05 | <0.01 |
| Newark Data Center | <1 | 1 | <1 | 0.01 | 0.06 | <0.01 |
| News Journal Company | - | - | 1 | - | - | <0.01 |
| Noramco | 2 | 1 | 1 | 0.01 | <0.01 | 0.01 |
| Polymer Technologies, Inc. | <1 | <1 | 1 | <0.01 | <0.01 | 0.01 |
| Port Of Wilmington - Fumigation | - | - | 51 | - | - | 0.01 |
| Prince Minerals LLC | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Ps-5 LLC | 11 | 13 | 1 | 0.04 | 0.05 | <0.01 |
| R & M Recycling | <1 | 1 | <1 | <0.01 | 0.02 | <0.01 |
| Refined Products Company Inc. | 1 | 3 | <1 | <0.01 | 0.01 | <0.01 |
| Rogers Corporation - Bear Facility | 2 | 2 | 4 | 0.01 | 0.01 | 0.02 |
| Rohm And Haas Electronic Materials Cmp, Inc. | 4 | 3 | 6 | 0.02 | 0.02 | 0.03 |
| Siemens Healthcare Diagnostics - Glasgow | 6 | 8 | <1 | 0.03 | 0.08 | <0.01 |
| St. Francis Hospital | 3 | 3 | <1 | 0.01 | 0.02 | <0.01 |
| Stratis Visuals LLC | - | - | 2 | - | - | 0.01 |
| Transflo Terminal Services, Inc. | - | - | <1 | - | - | <0.01 |
| United Cocoa Processor, Inc. | 1 | 1 | 6 | <0.01 | <0.01 | 0.02 |
| University Of Delaware Newark | 28 | 20 | 8 | 0.08 | 0.10 | 0.03 |
| Veolia - Red Lion Plant | <1 | 17 | 1 | <0.01 | 0.07 | <0.01 |
| Verisign (6 Generators Of 2250 Kw Each) | <1 | <1 | <1 | 0.02 | 0.02 | <0.01 |
| Veterans Administration Hospital | 2 | 3 | <1 | 0.01 | 0.01 | <0.01 |
| Wilmington Wastewater Treatment Plant | 4 | 5 | 1 | 0.01 | 0.02 | 0.00 |
| **Grand Total** | **1,435** | **1,608** | **425** | **7.82** | **8.86** | **2.19** |

### 8.2.2.1.2 EGU Point Sources Growth Projection Methodology

Emissions from EGUs are reported in this section. Delaware deviated from EPA's 2016v3 methodology for EGUs to follow a more regionally specific approach.

EGUs are regulated under 40 CFR Part 75 to continuously measure emissions and report their data to the EPA. These units have electric generating capacities greater than 25 Megawatts (MW) and burn fossil fuels.[30] It is noted that these units are typically part of facilities that produce other emissions. These additional emissions are reported in the non-EGU section of this report (Section 8.2.2.1.1).

Emission patterns from the electric generating fleet and resulting power sector vary substantially over time based on changing economic conditions, fuel markets, and regulatory requirements.[31] As a result, future emissions must be derived from modeling that accounts for these variables.

ERTAC developed their EGU Emission Projection Tool to grow EGU emissions using EPA Clean Air Markets Division (CAMD) data, fuel-specific growth rates, and state provided information such as controls and retirements.[32] MARAMA developed EGU emissions for future year 2023 using the ERTAC EGU Growth tool.

ERTAC emissions were chosen over EPA's projections from the IPM to ensure emissions were regionally appropriate and accounted for Delaware specific controls/retirements. These emissions were obtained from MARAMA's spreadsheet, *ERTAC EGU Emissions "C3.0CONUSv16.2_2023-RCU_fs_ff10_future.csv"* (Appendix F).

Table 8-4 shows 2023 emissions from EGUs in New Castle County. The SSWD emissions were calculated using the same method described in Section 2.1 of Delaware's *2017 Base Year Emissions Inventory* (Appendix A), although the operation data was updated to match the year the inventory emissions were reported.

[30] CAMD's Power Sector Emissions Data Guide. EPA. July 2022. Retrieved from https://www.epa.gov/system/files/documents/2022-07/CAMD%27s%20Power%20Sector%20Emissions%20Data%20Guide%20-%2007182022.pdf

[31] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA. May 2017. Retrieved July 2023 from Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations (epa.gov)

[32] MARAMA (n.d.). ERTAC EGU. MARAMA.org. https://marama.org/technical-center/ertac-egu-projection-tool/#:~:text=ERTAC%20has%20developed%20the%20Energy%20Generating%20Unit%20%28EGU%29,assessment%20on%20both%20annual%20and%20episodic%20peak%20bases

**Table 8-4 2023 EGU Projection Emissions for New Castle County**

| Facility Name | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Christiana Energy Center | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Delaware City Energy Center | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Delaware City Refinery* | 77 | 88 | 4 | 0.28 | 0.32 | 0.01 |
| Edge Moor Energy Center | 27 | 62 | 5 | 0.55 | 1.22 | 0.10 |
| Hay Road Energy Center | 79 | 459 | 15 | 0.56 | 3.22 | 0.11 |
| West Energy Center | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| **Total** | **184** | **610** | **24** | **1.40** | **4.78** | **0.23** |

*Delaware City Refinery Power Plant

### 8.2.2.1.3 Emission Reduction Credits

The EPA also requires ERCs in the projected inventory.[33] An ERC is a credit earned by a company when it reduces its air emissions (Section 6.2). They are generated through facility shutdowns or curtailments. Since the credits can be sold to offset new emission sources, they must be considered as "in the air" for the projected inventory when demonstrating attainment.

Delaware's ERC program is regulated by 7 **DE Admin. Code** 1134, Emission Banking and Trading Program. The ERCs were last reported in the 2021 Audit Report and have not changed since, *Delaware Regulation 1134 Emission Banking and Trading Program Emission Reduction Credit Audit* (Appendix G).

As noted in Delaware's 2021 ERC Audit Report, "per the Clean Air Act Section 173c(1)-(2), emission offsets may be obtained from a NAA which 1) is equal or higher in classification; and 2) contributes to non-attainment in the area." Since New Castle County was classified as Severe under the 1979 1-hr ozone standard, facilities can only buy credits from other counties that are at that classification or higher. Kent County was classified as Severe for the 1979 1-hr ozone standard while Sussex County was only classified as marginal. As a result, New Castle County facilities can only procure credits that originated in New Castle or Kent County. Delaware did not include ERCs that originated in Sussex County in the projected inventory as they cannot be purchased by a New Castle facility.

All the potential emissions from ERCs included in the 2023 Projected Attainment Inventory are shown in Table 8-5.

[33] Phase 2 of the Final Rule To Implement the 8-Hour Ozone National Ambient Air Quality Standard—Notice of Reconsideration. EPA Proposed Rule. 71 FR 75902. December 19, 2006. https://www.govinfo.gov/content/pkg/FR-2006-12-19/pdf/FR-2006-12-19.pdf

**Table 8-5 Emission Reduction Credits for New Castle and Kent County**

| ERCs Held By[1] | Annual (tpy) | | SSWD[2] (tpd) | |
|---|---|---|---|---|
| | NOx | VOC | NOx | VOC |
| 1734 LLC | 29 | 195 | 0.08 | 0.53 |
| Calpine | 46 | 0 | 0.13 | 0.00 |
| Delaware City Industries (DCI) | 2 | 6 | 0.01 | 0.02 |
| Diamond State Port Corporation | 16 | 58 | 0.04 | 0.16 |
| DuPont | 0 | 0 | 0.00 | 0.00 |
| Lafarge | 0 | 5 | 0.00 | 0.01 |
| NRG Energy Center | 268 | 0 | 0.73 | 0.00 |
| Veolia | 9 | 6 | 0.02 | 0.02 |
| VPI | 2 | 10 | 0.01 | 0.03 |
| Division of Small Business | 53 | 137 | 0.15 | 0.38 |
| **Total in New Castle and Kent County** | **425** | **417** | **1.16** | **1.14** |

1) Sussex County Facilities removed because according to CAA guidelines, New Castle builds/modifications could not use Sussex credits, as Sussex County has a lower classification under the 1979 1-hr ozone standard.
2) Assumes no seasonal variation; which is conservative, as the credits are not anticipated to be used prior to the end of 2023 ozone season of September 30, 2023.

### 8.2.2.2 Nonpoint Sources Growth Projection Methodology

The Nonpoint sector consists of 30 unique categories, which require different projection approaches. While Delaware relied on EPA's 2016v3 platform methods described in *EPA's 2016v3 TSD*, Delaware specific growth factors were used in place of EPA's national growth factors where applicable. This section details the Nonpoint growth projection methods.

Nonpoint source categories in which 2023 VOCs, NOx, and CO emissions were estimated are shown in Table 8-6.

**Table 8-6 2023 Projected Attainment Year Inventory - Nonpoint Categories**

| VOC Emissions Only | Emissions of VOC, NOx, and CO |
|---|---|
| Agricultural Pesticides | Animal Cremation* |
| AIM Coatings | Agricultural Burning |
| Animal Husbandry* | Commercial Cooking |
| Asphalt Paving | Commercial Fuel Combustion |
| Autobody Refinishing | Human Cremation* |
| CMV EVAP | Industrial Fuel Combustion |
| Commercial & Consumer Products (Lighter Fluid*) | Land Clearing Debris Burning |
| Degreasing | Prescribed Burning |
| Dry Cleaning | Residential Fuel Combustion |
| Gasoline (Petroleum) Marketing | Residential Grilling* |
| Graphic Arts | Residential Open Burning |
| Industrial Adhesives | Residential Wood Combustion |
| Industrial Surface Coatings | Structure Fires |
| Public Water Treatment Plants (POTWs)* | Vehicle Fires |
| Traffic Markings | Wildfires |

*Categories added to the Adjusted 2017 Base Year Inventory in revised SIP

Nonpoint source projections are made using growth surrogates gathered from local information. Typically, the surrogate data is any parameter associated with the activity level of a source, such as production, employment, fuel usage, or population that can be correlated with the emissions from that source.

Table 8-7 lists the source category, activity data, and the source of the growth factor used to estimate 2023 emissions. For categories' dependent on population or employment data, Delaware used Delaware specific data for growth rates. Otherwise, the growth surrogates/methods from *EPA's 2016v3 TSD* were used.

Delaware used human population data from the Delaware Population Consortium (DPC) rather than from the Benefits Mapping and Analysis Program (BenMAP) model, EPA's population data source. The DPC populations and growth rate used in the analysis are shown in *Adjusted 2017 Nonpoint Inventory* (Appendix B, tab "DPC Growth Rate NC").

For categories that use employment data as a surrogate for growth, Delaware relied on Delaware's Department of Labor (DOL) Industry Forecasts for New Castle County. The growth factor was developed from the 2017 to 2023 employment projections per North American Industry Classification System's (NAICSs) code. DOL projections and growth rates are shown in *Adjusted 2017 Nonpoint Inventory* (Appendix B, tab "DOL Growth Rate NC).

For other categories that do not rely on population or employment, Delaware assessed the 2016v3 platform methods to determine if the surrogate growth factors were a reasonable assumption or if adjustments were needed. EPA's 2016v3 platform is primarily grown from 2016 emissions, but some categories are grown from 2017 emissions. Therefore, the growth rates could not always be used directly. Delaware used:

- EPA's growth factor (if the EPA base year was 2017 and matched the Adjusted 2017 base year inventory emissions),
- EPA's 2023 emissions (if EPA's base year was 2016 but emissions were back casted from Delaware's Adjusted 2017 base year inventory emissions),
- or an adjusted growth factor (if EPA used a different methodology and year, but the growth factor for the category was the best available.)

More details on the growth factors used for each category can be found in *Adjusted 2017 Nonpoint Inventory, tab "2017_2023 Inventory"* (Appendix B).

**Table 8-7 2023 Projected Attainment Year Inventory – Source of Growth Factors**

| Source Category | Activity Data | Source of Growth Factor |
|---|---|---|
| Agricultural Burning | Acreage and vegetation type | Assume No Growth: No SSWD Emissions |
| Agricultural Pesticides | Planted crop acreage | Assume No Growth |
| AIM Coatings | Solvents in U.S. paint shipments; U.S. Population | Delaware Population Consortium |
| Animal Cremation | Animal Population | Assume No Growth |
| Animal Husbandry | Animal population | National Projection Factors for Livestock |
| Asphalt Paving | Cutback and emulsified asphalt usage | Assume No Growth |
| Autobody Refinishing | Employment data; Autobody shop usage reports | DE DOL Industry Growth Forecast for New Castle County NAICS 811 |
| Commercial Cooking | Population | Delaware Population Consortium |
| CMV EVAP | Fuel | MARAMA AEO2019 Growth Factor |
| Commercial & Consumer Products | Population | Delaware Population Consortium |
| Commercial & Consumer Products (Lighter Fluid) | Population | Delaware Population Consortium |
| Commercial Fuel Combustion | Fuel consumption | MARAMA AEO2019 Growth Factor |
| Degreasing | Employment data | DE DOL Industry Growth for New Castle County NAICS 31-22_441_811 |
| Dry Cleaning | Employment data | DE DOL Industry Growth for New Castle County NAICS 812 |

| Source Category | Activity Data | Source of Growth Factor |
|---|---|---|
| Gasoline (Petroleum) Marketing<br>1. Portable Fuel Containers (PFC)<br>2. Retail<br>3. Aircraft Refueling | 1. Employment data<br>2. Gasoline fuel sales<br>3. Aircraft Fuel Sales | 1. Delaware Population Consortium<br>2. MARAMA growth AEO2019 gasoline<br>3. MARAMA growth AEO2019 Avgas |
| Graphic Arts | Employment data | Delaware Population Consortium |
| Human Cremation | Population | Delaware Population Consortium |
| Industrial Adhesives | Population | Delaware Population Consortium |
| Industrial Fuel Combustion | Fuel consumption | MARAMA AEO2019 Growth Factor |
| Industrial Surface Coatings | Employment data | DE DOL Industry Growth for New Castle County |
| Land Clearing Debris Burning | Acreage disturbed during road, commercial, and residential construction | Assume No Growth |
| Prescribed Burning | Acreage and vegetation type | Assume No Growth |
| Publicly Owned Treatment Works (POTWs) | Population | Delaware Population Consortium |
| Residential Fuel Combustion | Fuel consumption | MARAMA AEO2019 Growth Factor |
| Residential Grilling | Population | Delaware Population Consortium |
| Residential Open Burning | Rural households | Assume No Growth |
| Residential Wood Combustion | Occupied households | Derived using the MARAMA tool |
| Structure Fires | Number of structures fires | Assume No Growth |
| Traffic Markings | U.S. paint shipments; U.S. and State public road miles | Assume No Growth |
| Vehicle Fires | Number of vehicle fires | Assume No Growth |
| Wildfires | Acreage and vegetation type | Assume No Growth |

Another key factor to emission projections is applying appropriate control efficiencies. Since all control measures that were implemented during and before 2017 are included in the grown emissions, only controls that were applied after 2017 need to be included in the 2023 Projected Attainment Inventory.

After reviewing each Nonpoint category, Delaware determined there were four source categories that required additional controls. Table 8-8 lists the categories by source classification code (SCC) along with their total control efficiency. While total control efficiencies can be applied to raw emission data, the 2023 Projected Attainment Inventory emissions can have pre-2018 controls already applied. As a result, Delaware calculated the cumulative or phased in control efficiency required to achieve the total control efficiency. These calculations can be found in *Adjusted 2017 Nonpoint Inventory, tab "Cumulative Controls"* (Appendix B).

**Table 8-8 Control Efficiencies for Nonpoint Sources**

| Category | Total Control Efficiency | Cumulative or Phased In Control | Effective Date | Additional Controls |
|---|---|---|---|---|
| Gasoline Marketing - PFCs SCC: 2501011011 - 2501012015 | 57 | 12 | 1/1/2018 | PFC control efficiency increased from 51% in 2017 to 57% in 2018. |
| Gasoline Marketing - Stage 1 (Retail) SCC: 2501060053 | 97 | 5 | 12/31/2020 | Gas stations have until 2025 to add enhanced vapor control. Conservatively use 2020 control counts to account for some decommission. |
| Gasoline Marketing - Underground Tank: Breathing and Emptying (Retail) SCC: 2501060201 | 90 | 86 | Decommission of Stage II vapor recovery system by 12/31/21. | With the removal of stage II by the end of 2021, the control efficiency of underground tanks has increased. |
| Solvent Cleaning SCC: 2415000000 | 80 | 27 | 8/11/2022 | Implementation of 2022 OTC model rule increased control efficiency from 60% to 80%. |

Table 8-9 summarizes the 2023 annual and SSWD Nonpoint emissions for New Castle County, including controls. SSWD emissions were calculated using the same seasonal allocations applied to the Nonpoint categories in Delaware's *2017 Base Year Emissions Inventory* (Appendix A). All categories that were not included in the Original 2017 base year inventory have SSWD calculations included in *Adjusted 2017 Nonpoint Inventory, tab "SSWD Variations"* (Appendix B).

### Table 8-9 Summary of 2023 Nonpoint Emissions for New Castle County

| Category | 2023 Annual Emissions (tpy) | | | 2023 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| **SOLVENT USE** | | | | | | |
| Ag. Pesticides | - | - | 30 | - | - | 0.11 |
| AIM Coatings | - | - | 401 | - | - | 1.49 |
| Asphalt Paving | - | - | 0 | - | - | 0.00 |
| Auto Refinishing | - | - | 22 | - | - | 0.08 |
| Commercial & Consumer Products | - | - | 1,161 | - | - | 3.31 |
| Dry Cleaners | - | - | 2 | - | - | 0.01 |
| Graphic Arts | - | - | 264 | - | - | 1.02 |
| Industrial Adhesives | - | - | 110 | - | - | 0.42 |
| Industrial Surface | - | - | 78 | - | - | 0.30 |
| Solvent Cleaning | - | - | 66 | - | - | 0.21 |
| Traffic Markings | - | - | 2 | - | - | 0.01 |
| **Total Solvent Use** | **-** | **-** | **2,136** | **-** | **-** | **6.97** |
| **GASOLINE MARKETING** | | | | | | |
| CMV EVAP (Loading/Transport) | - | - | 98 | - | - | 0.27 |
| Gasoline Marketing - Retail | - | - | 164 | - | - | 0.56 |
| Gasoline Marketing - Aircraft Refueling | - | - | 3 | - | - | 0.01 |
| Gasoline Marketing - PFCs | - | - | 108 | - | - | 0.38 |
| **Total Gasoline Marketing** | **-** | **-** | **374** | **-** | **-** | **1.22** |
| **FUEL COMBUSTION** | | | | | | |
| Commercial Fuel | 330 | 443 | 24 | 0.49 | 0.60 | 0.03 |
| Fuel Comb - Residential - Wood | 2,475 | 44 | 362 | 5.34 | 0.09 | 0.78 |
| Industrial Fuel | 329 | 715 | 44 | 0.98 | 2.03 | 0.13 |
| Residential Fuel | 200 | 489 | 27 | 0.11 | 0.25 | 0.01 |
| **Total Fuel Combustion** | **3,334** | **1,691** | **457** | **6.92** | **2.98** | **0.95** |
| **OPEN BURNING** | | | | | | |
| Ag Burning | 8 | 0 | 1 | - | - | - |
| Land Clearing | - | - | - | - | - | - |
| Prescribed Burning | 273 | 4 | 65 | - | - | - |
| Structure Fires | 15 | 0 | 3 | 0.03 | 0.00 | 0.01 |
| Vehicle Fires | 3 | 0 | 1 | 0.01 | 0.00 | 0.00 |
| Wildfires | - | - | - | - | - | - |
| Residential Open Burning | 15 | 1 | 2 | 0.01 | 0.00 | 0.00 |
| **Total Open Burning** | **315** | **6** | **71** | **0.05** | **0.00** | **0.01** |
| **MISCELLANEOUS SOURCES** | | | | | | |
| Animal Cremation | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Animal Husbandry | - | - | 36 | - | - | 0.10 |
| Commercial Cooking | 98 | - | 36 | 0.27 | - | 0.10 |
| Human Cremation | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| POTW | - | - | 12 | - | - | 0.03 |
| Res Grilling | 154 | 3 | 8 | 0.68 | 0.01 | 0.04 |
| **Total Miscellaneous Sources** | **253** | **4** | **92** | **0.95** | **0.02** | **0.27** |
| | | | | | | |
| **NONPOINT TOTAL** | **3,901** | **1,701** | **3,130** | **7.93** | **3.00** | **9.41** |

#### 8.2.2.3 Onroad Sources Growth Projection Methodology

The 2023 Onroad emissions were created using EPA's most recent MOVES model, MOVES3.1.0. These annual and SSWD emissions are shown in Table 8-10. As indicated by *EPA's 2017 Inventory Guidance*, the Onroad portion of the projected inventory for RFP are the Motor Vehicle Emissions Budgets for Transportation Conformity. Therefore, a complete description of the methodology used to estimate the 2023 mobile emissions can be found in Section 9 of this report.

Detailed results of the model run are shown in *2023 Onroad MOVES Output Results* (Appendix H).

**Table 8-10 2023 Onroad Source Emissions**

| Analysis Year | Onroad Annual Emissions (tpy) | | | Onroad SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx* | VOC* |
| 2023 | 20,130 | 2,736 | 1,278 | 70.18 | 8.53 | 4.57 |

*Includes 10% Safety Margin. See Section 9.2.2

#### 8.2.2.4 Nonroad Sources Growth Projection Methodology

Nonroad sources include the following categories: Commercial Marine Vessels, Aircrafts, Locomotives (or Rail), and Other Off-road Vehicles and Equipment. Commercial Marine Vessels, Aircrafts, and Rail sources were projected to 2023 using EPA's 2016v3 methodology, while the Off-road Vehicles and Equipment category was forecasted using EPA's MOVES model.

Table 8-11 summarizes the total 2023 Projected Attainment Inventory emissions from Nonroad sources. The projection methodology for each source category is discussed in detail in this section.

**Table 8-11 2023 Nonroad Source Emissions for New Castle**

| Source Sector | 2023 Annual Emissions (tpy) | | | 2023 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Nonroad - MOVES3.1 | 25,024 | 936 | 1,720 | 100.02 | 3.06 | 6.23 |
| Marine, Aircraft, Rail | 800 | 1,786 | 159 | 2.19 | 4.88 | 0.45 |
| **Total** | **25,824** | **2,721** | **1,879** | **102.20** | **7.94** | **6.67** |

#### 8.2.2.4.1 Marine, Air, Rail Sources Growth Projection Methodology

Commercial Marine Vessels, Aircrafts, and Rail sources, referred to as "MAR" sources, were primarily grown using EPA's 2016v3 modeling platform methodology. This method was appropriate because the MAR base year emissions are the same for EPA's 2016v3 modeling platform and Delaware's Adjusted 2017 base year inventory. The growth methodologies for each category are as follows:

Commercial Marine Vessels (CMV) are split into two groups; category 1 and 2 vessels, and category 3 vessels. Category 1 and 2 vessels are typically smaller vessels with engines less than 30 liters per cylinder. The EPA projected category 1 and 2 vessel emissions using national factors derived from *the Regulatory Impact Analysis Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinders*.[34] Category 3 vessels are larger vessels with engines greater than 30 liter per cylinder. EPA used an EPA report on projected bunker fuel and Regulatory Impact Assessment data to calculate the appropriate growth factors. More detail on the CMV growth methodologies can be found in Section 4.2.3.2 of *EPA's 2016v3 TSD*.

For Aircraft emissions, Delaware used EPA's 2023 aircraft emissions directly from EPA's 2016v3 modeling platform. Large aircrafts were grown using Terminal Area Forecast data from the Federal Aviation Administration; smaller crafts were grown using state default factors, and military aircraft emissions were kept flat to account for the uncertainty in this category. More information on the 2023 aircraft growth methodology can be found in Section 4.2.3.7 of *EPA's 2016v3 TSD*.

Rail emissions are based primarily on EPA's 2023 emissions from EPA's 2016v3 modeling platform. Base year emissions for the Class I/II/III railroads and passenger rails were grown with factors derived from the fuel use values from the Energy Information Administration's 2018 Annual Energy Outlook (AEO) freight rail energy use growth rate projections. However, Delaware deviated from EPA's 2016v3 modeling platform by including additional rail yard emissions in the base year and future year inventory. Delaware's rail yard data was grown using national factors from the 2018 AEO growth rates for rail subgroups summarized in *EPA's 2016v3 TSD*. More information on the 2023 rail growth methodology can be found in Section 4.3.3 of *EPA's 2016v3 TSD*. The rail yard calculation that deviated from EPA's method is found in *RFP Inventory and Analysis* (Appendix E, tab "MAR").

Table 8-12 summarizes the final 2023 Projected Attainment Inventory emissions for the Marine, Aircraft, and Rail categories. SSWD emissions were calculated using the same seasonal factors applied to the Original 2017 base year inventory emissions at the SCC level, except the aircraft seasonal factor was applied at the category level. A breakdown of MAR projections and seasonal allocations are found in *RFP Inventory and Analysis* (Appendix E, tab "MAR").

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[34] Regulatory Impact Analysis: Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters Per Cylinder. EPA. March 2008. Retrieved July 2023 from https://nepis.epa.gov/Exe/ZyPDF.cgi/P10023S4.PDF?Dockey=P10023S4.PDF

**Table 8-12 2023 Emissions for CMV, Aircrafts, and Rail**

| Category | 2023 Annual Emissions (tpy) | | | 2023 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOX | VOC |
| Aircrafts | 502 | 71 | 43 | 1.38 | 0.19 | 0.12 |
| CMV | 224 | 1,279 | 88 | 0.60 | 3.50 | 0.24 |
| Rail | 74 | 436 | 28 | 0.21 | 1.19 | 0.08 |
| **Total** | **800** | **1,786** | **159** | **2.19** | **4.88** | **0.45** |

#### 8.2.2.4.2 Other Off-road Vehicles and Equipment Sources Growth Projection Methodology

Delaware developed the 2023 other off-road vehicles and equipment source emissions for New Castle County using MOVES3.1.0 in Nonroad mode. Most off-road equipment covered by the MOVES Nonroad model is powered by diesel-fueled compression-ignition engines or gasoline-fueled spark-ignition engines. Engines fueled by compressed natural gas (CNG) and liquefied petroleum gas (LPG) are also included in the Nonroad model. Equipment covered by the model include the following:

- Recreational (land-based);
- Construction;
- Industrial;
- Lawn and Garden;
- Agricultural;
- Commercial;
- Logging;
- Airport Ground Support;
- Recreational Marine; and
- Railway Maintenance.

To mirror the Adjusted 2017 base year inventory, the MOVES3.1.0 Nonroad model was run with national default assumptions for analysis year 2023. Table 8-13 summarizes the annual and SSWD outputs. Detailed results of the Nonroad model run outputs are included in *2023 Nonroad MOVES Output Results* (Appendix I).

**Table 8-13 2023 Nonroad MOVES3 Results**

| Category | 2023 Annual Emissions (tpy) | | | 2023 SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| Nonroad - MOVES3 | 25,024 | 936 | 1,720 | 100.02 | 3.06 | 6.23 |

### 8.3 Reasonable Further Progress Demonstration

To demonstrate RFP, the Department must show appropriate emissions reductions have occurred from a base year inventory to a future inventory. The Department followed EPA's 2017 Inventory Guidance, "*Emissions Inventory Guidance for Implementation of EPA's 2017 Inventory Guidance"* in the development of these inventories.

Delaware submitted their marginal NAA base year inventory, "*2017 Base Year Emissions Inventory State Implementation Plan for VOC, NOX, and CO For Areas of Marginal Nonattainment of the 2015 Ozone NAAQS in Delaware*", to Region III EPA in November 2020. This SIP document can be found in Appendix A and remains in place to fulfill the SIP inventory requirement.

While typically the NAA 2017 Base Year Emissions Inventory is used as the RFP base year inventory, the guidance indicates that adjustments are needed to the inventory to be comparable to future years. The primary changes made to the Original 2017 base year inventory include re-estimating Onroad and Nonroad emissions with EPA's most recent model, MOVES3.1.0. Changes were also made to the Nonpoint sector to improve accuracy and comprehensiveness as recommended by *EPA's 2017 Inventory Guidance*. Section 7 of this report details these revisions and summarizes the inventory used as the RFP base year inventory (referred to as the "Adjusted 2017 base year inventory").

The future inventory required for RFP was for attainment year 2023. The Department developed the 2023 Projected Attainment Inventory for both CO, VOC and NOx following *EPA's 2017 Inventory Guidance*. The methodology and summary of the RFP future year inventory (referred to as the "2023 Projected Attainment Inventory") is detailed in Section 8.2.

Section 11 of this document presents details of control measures that Delaware has adopted, and the 2023 Projected Attainment Inventory has those controls in place.

This section describes the methodology the Department used to demonstrate the RFP has been satisfied.

#### 8.3.1 Reasonable Further Progress Calculations

The first step of showing RFP is to calculate the amount of emission reductions required of NOx and VOC from the Adjusted 2017 base year inventory. As previously mentioned, EPA provides states discretion on how to apportion the 15% requirement between NOx and VOC. The Department chose a combination of both NOx and VOC pollutants to achieve 15% RFP required emission reductions – 11% for NOx and 4% for VOC. Emission reductions required for RFP were calculated as shown in the following equations.

**Equation 8-1**

*RFP Emission Reductions = % RFP Reduction x Adjusted 2017 Base Year Inventory Emissions*

**Equation 8-2**

*RFP NOx Reductions = 11% x Adjusted 2017 Base Year Inventory NOx Emissions*

**Equation 8-3**

*RFP VOC Reductions = 4% x Adjusted 2017 Base Year Inventory VOC Emissions*

With the RFP reductions, the Department was able to calculate a "2023 Target Level", that is the emissions level needed to achieve 4% VOC and 11% NOx reductions. This is calculated by subtracting the RFP reductions from the Adjusted 2017 base year inventory emission levels. The emissions in the 2023 Projected Attainment Inventory will need to meet or be lower than the 2023 Target Level emissions to demonstrate RFP.

According to the 1990 Clean Air Act Amendment (CAAA) – 42 U.S.C. §7545 and 7546, reductions necessary to meet the RFP requirement must exclude the effects of the noncredible Federal Motor Vehicle Control Program (FMVCP) and Reid Vapor Pressure (RVP) programs. EPA proposed in their SIP Requirements for the 2008 ozone NAAQS that states no longer needed to calculate and deduct emissions related to these measures. [35] As a result, these reductions were not included in the 2023 Target Level calculations. The general 2023 Target Level Equation is shown in Equation 8-4:

**Equation 8-4**

*2023 Target Level* = Adjusted *2017 Base Year Inventory Emissions – RFP Emission Reductions*

The 2023 NOx and VOC Target Level equations are shown below:

**Equation 8-5**

*2023 NOx Target Level =Adjusted 2017 Base Year Inventory NOx – RFP NOx Reductions*

**Equation 8-6**

*2023 VOC Target Level = Adjusted 2017 Base Year Inventory VOC–RFP VOC Reductions*

The VOC and NOx 2023 Target Levels are calculated in Table 8-14 and Table 8-15. Emissions are shown as SSWD emissions in tpd. Details on the RFP calculations and inventory summaries can be found in *RFP Inventory and Analysis* (Appendix E, tab "RFP Calculation").

[35] Final Rule To Implement the 8-Hour Ozone National Ambient Air Quality Standard—Phase 2; Final Rule To Implement Certain Aspects of the 1990 Amendments Relating to New Source Review and Prevention of Significant Deterioration as They Apply in Carbon Monoxide, Particulate Matter and Ozone NAAQS; Final Rule for Reformulated Gasoline. EPA Final Rule. 70 FR 71612. November 29, 2005. https://www.govinfo.gov/content/pkg/FR-2005-11-29/pdf/05-22698.pdf

**Table 8-14 Reasonable Further Progress Calculations for NOx**

| NOx Target Level for 2023 Milestone<br>New Castle Non-attainment Area<br>Emissions in Tons per Day | | | |
|---|---|---|---|
| | | Formula | Tpd |
| A | Adjusted 2017 Base Year Inventory | | 42.38 |
| B | Biogenic Emissions (Not included in BYI) | | 0.00 |
| C | Adjusted 2017 Base Year Inventory | A - B | 42.38 |
| D | FMVCP/RVP Reductions Between 2017 and 2023[1] | | 0.00 |
| E | Adjusted 2017 Base Year Inventory Relative to 2023 | C - D | 42.38 |
| F | Ratio | | 11.0% |
| G | Emissions Reductions Required Between 2017 and 2023 | E * F | 4.66 |
| H | 2023 Target Level for NOx | C - D - G | 37.72 |
| | Emission Level from 2023 Projected Attainment Inventory[2] | | 34.26 |
| J | Surplus Emissions for NOx (tpd) | | 3.45 |

1) FMVCP/RVP reductions are considered negligible by EPA Guidance and are no longer required.
2) Mobile emissions include safety margin for Motor Vehicle Emissions Budget

**Table 8-15 Reasonable Further Progress Calculations for VOC**

| VOC Target Level for 2023 Milestone<br>New Castle Non-attainment Area<br>Emissions in Tons per Day | | | |
|---|---|---|---|
| | | Formula | Tpd |
| A | Adjusted 2017 Base Year Inventory | | 25.76 |
| B | Biogenic Emissions (Not included in BYI) | | 0.00 |
| C | Adjusted 2017 Base Year Inventory | A - B | 25.76 |
| D | FMVCP/RVP Reductions Between 2017 and 2023[1] | | 0.00 |
| E | Adjusted 2017 Base Year Inventory Relative to 2023 | C - D | 25.76 |
| F | Ratio | | 4.0% |
| G | Emissions Reductions Required Between 2017 and 2023 | E * F | 1.030 |
| H | 2023 Target Level for VOC | C - D - G | 24.73 |
| | Emission Level from 2023 Projected Attainment Inventory[2] | | 24.22 |
| J | Surplus Emissions for VOC (tpd) | | 0.51 |

1. FMVCP/RVP reductions are considered negligible by EPA Guidance and are not longer required.
2. Mobile emissions include safety margin for Motor Vehicle Emissions Budget

### 8.3.2 Reasonable Further Progress Results

As shown in Table 8-16, the NOx and VOC emission levels for the 2023 Projected Attainment Inventory are below the NOx and VOC target emission levels. This indicates Delaware has met the RFP requirements for NOx and VOC reductions.

**Table 8-16 New Castle County RFP 2023 Target Levels to Projected Inventory**

| Description | NOx Emissions (tpd) | VOC Emissions (tpd) |
|---|---|---|
| **2023 Target Levels** | 37.72 | 24.73 |
| **2023 Projected Inventory** | 34.26 | 24.22 |

# 9.0 Mobile Budgets for Transportation Conformity

Section 176 of the CAA requires that highway transportation activities in ozone NAAs must not impair progress in air quality improvements.

## 9.1 Introduction to Transportation Conformity

In general, Section 176 specifies that (1) states establish, in their SIP, mobile source VOC and NOx emission budgets for each of the milestone years up to the attainment year, and submit the mobile budgets to EPA for approval, (2) upon adequacy determination or approval of EPA, states must conduct transportation conformity analysis for their Transportation Improvement Programs (TIPs) and long range transportation plans to ensure that future highway vehicle emissions will not exceed relevant mobile budgets, and (3) failure of demonstrating such transportation conformity in TIPs and long range plans will lead to conformity lapse(s), resulting in freezing of federal highway funds and all federal highway projects in the lapsed area.

New Castle County's Metropolitan Planning Organization (MPO), the Wilmington Area Planning Council (WILMAPCO), is responsible for planning, coordinating, and programming transportation investments with federal funds. They develop a TIP and a Regional Long-range Transportation Plan (RTP) in cooperation with state, county, and local governments, and transportation providers. They must also show that the RTP and TIP conform to the transportation emission budgets set forth in this section of the SIP. If emissions generated from the projects programmed in the TIP and RTP are equal to or less than the emission budgets in the SIP, then conformity has been demonstrated. [36]

## 9.2 Motor Vehicle Emissions Budget

According to EPA's Phase 2 Implementation Rule,[37] Delaware is required to establish mobile budgets for the attainment year, 2023. The emissions budget, otherwise known as the Motor Vehicle Emissions Budget (MVEB), is set by the Department in this section as required by New Castle County's moderate reclassification of the 2015 Ozone NAAQS.

MVEB is defined in 40 CFR 93.101 as "that portion of the total allowable emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan for a certain date for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS, for any criteria pollutant or its precursors, allocated to highway and transit vehicle use and emissions." For New Castle County the MVEB is the level of Onroad emissions for attainment year 2023 that still allows the county to show reasonable further progress. The emission budget becomes the mobile source emissions for the 2023 Projected Attainment Inventory (shown in Section 8) and directly limits mobile emissions from future transportation projects.

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[36] Air Quality Conformity Determination For the New Castle County, Delaware Portion of the PA-NJ-MD-DE 8-hour Ozone Nonattainment Area & PA-NJ-DE Fine Particulate Matter (PM2.5) Maintenance Area. WILMAPCO. May, 2022. Retrieved on http://www.wilmapco.org/Aq/NCC_Conformity_FY23_TIP.pdf

[37] Ibid 36.

As part of the development of the SIP, on February 23, 2023 the Department consulted with WILMAPCO and the Delaware Department of Transportation on the inputs used to establish the budgets. Since New Castle County is in non-attainment for ozone, the SIP includes MVEB for ozone's precursors, NOx and VOC. The modeling and established budget are reported below.

### 9.2.1 Motor Vehicle Emissions Budget Modeling

The 2023 mobile emissions were estimated using EPA's MOVES3.1.0 with Delaware specific activity. The three parameters that significantly affect the model outputs include 1) VMT), 2) age distribution, and 3) source type population. VMT is the total miles traveled by all vehicles in Delaware and is reported by the Federal Highway Administration (FHWA). Age distribution is the fleet's model year profile that accounts for fleet turnover and is determined through an analysis of vehicle registration data. Source type population is also determined through vehicle registration data and is the number of vehicles per MOVES vehicle class. More detail about MOVES input databases can be found in Delaware's *2017 Base Year Emissions Inventory* (Appendix A).

Each parameter described above was grown to year 2023 to estimate future mobile emissions. Delaware grew 2019 VMT data to 2023 using FHWA's national Onroad growth factor. The 2022 age distribution was grown using EPA's projection tool: moves3-age-distribution-projection-tool-20210405.xls.[38] Source type population was grown via a linear regression from 2017 to 2022. All other inputs and assumptions used to estimate the MVEB are shown in Table 9-1. Detailed results of the MOVES run are shown in *2023 Onroad MOVES Output Results* (Appendix H).

[38] EPA (2021, April 4) Age Distribution Projection Tool for MOVES3. https://www.epa.gov/moves/tools-develop-or-convert-moves-inputs

**Table 9-1 2023 Newcastle County MVEB Inputs and Assumptions**

| **Data Item** | **2023 Newcastle County MVEB Inputs and assumptions** |
|---|---|
| MOVES RunSpec | |
| Emission Model | MOVES3.1.0 (default database: MOVESDB20221007) |
| Scale/Calculation Type | County Scale Inventory Run |
| Analysis Years | 2023 |
| Analysis Months | June, July, August (Peak Ozone Season) |
| Analysis Days | Weekdays |
| Analysis Hours | All |
| Geographic Bounds | New Castle, DE (10003) |
| Pollutants | VOC, NOx + Necessary Precursors |
| Fuel Types | Compressed Natural Gas (CNG), Diesel, Electricity, Ethanol (E-85), Gasoline |
| Traffic Data | |
| VMT Growth Forecast | Used the Federal Highway Administration (FHWA) forecast growth rate for 2019 to 2049 (1.007733). Applied this to the 2019 data to get the projected 2023 VMT. https://www.fhwa.dot.gov/policyinformation/tables/vmt/ |
| Vehicle Population Growth Forecast | Using Vehicle Population from 2017 to 2022, projected to 2023 using a linear model |
| MOVES Inputs | |
| SourceTypeYearVMT | Grow the 2019 VMT data to 2023, using a growth factor of 1.00733 per annum. Used the same distribution as was used in the EPA draft data set for the 2020NEI. This distribution was applied to the 13 MOVES vehicle types to allocate the VMT. |
| Month VMT Fractions | Used the month VMT from the 2017 NEI |
| Day VMT Fractions | Used the day VMT from the 2017 NEI |
| Hourly VMT Fractions | Used the hourly VMT from the 2017 NEI |
| I/M Parameters | Used the unified statewide plan adopting the January 2023 changes to regulations 1126 and 1131 |
| Road Type Distribution | Used the analysis of the 2020 DelDOT tables: https://deldot.gov/Publications/reports/hpms/index.shtml As well as yielding VMT, this data also yields road type distributions |
| SourceTypeYear (Population) | Using Vehicle Population data (R45CAM07), we collected the data from years 2017 to 2022, and projected this data forward to 2023 using a linear regression model |
| Vehicle Age Distribution | Analysis of 2022 R45CAM07 data. The distribution was grown to 2023 using the EPA's spreadsheet tool: moves3-age-distribution-projection-tool-202104051.xls |
| Average Speed Distribution | Used the CRCA100 data set |
| Fuel Supply | MOVES3.1 default tables |
| Fuel Formulation | MOVES3.1 default tables |
| Fuel Usage Fraction | MOVES3.1 default tables, Set ethanol Fraction to 0 |
| AVFT | MOVES3.1 Default Tables, edited by using Delaware's EV registration data from 2010 to 2022. We used the same EV proportions for future years. MOVES3.1 only accepts Electric vehicles for Source Use Types 21,31 and 32. |

| Data Item | 2023 Newcastle County MVEB Inputs and assumptions |
|---|---|
| ZoneMonthHour | Average hourly data by month from years 2020, 2021 and 2022 meteorological datasets maintained by NOAA |
| MOVES Inputs - Advanced | |
| Early NLEV | Used MOVE3_DE_LEV_IN table. Added as an advanced feature in the MOVES3 interface. This was developed per EPA guidance and when invoked, replaces the EmissionRateByAge table |

### 9.2.2 Motor Vehicle Emissions Budget for 2023

The 2023 MVEB is based on the MOVES3 results for New Castle County, which includes all mobile control measures plus a safety margin. EPA regulation allows for a safety margin to be applied to the mobile emissions to account for unknowns in future modeling as long as Delaware can still show RFP with the new mobile emissions. To account for the uncertainty in VMT projections/modeling, the Department added a 10% safety margin in the mobile vehicle emissions budget. The safety margin was chosen as it adequately allows for future uncertainty while also allowing Delaware to satisfy RFP requirements. The safety margin was selected with consultation from Region III EPA and WILMAPCO.

The MVEB shown in Table 10-2 contains safety margins of 10% for VOC and NOx emissions.

**Table 9-2 2023 Mobile Vehicle Emission Budgets for New Castle County**

| Pollutant | SSWD NOx Emissions (tpd) | SSWD VOC Emissions(tpd) |
|---|---|---|
| **2023 Motor Vehicle Emission Budget*** | 8.53 | 4.57 |

*Safety margin included

## 9.3 Trends in Motor Vehicle Emissions Budget

The 2023 MVEB in this revised SIP replaces the MVEB established in 2009. The 2023 budget for VOCs and NOx is about 55% lower than the 2009 budget as shown in Table 10-3. This is a reduction of about 4% per year and is in line with the emission reductions found in neighboring states. These reductions are primarily due to new motor vehicles meeting the much lower tailpipe emissions. Fleet turnover whereby newer cleaner cars replace older dirtier ones has led to substantial total emission reductions even though the total vehicle population and VMT have increased between 2009 and 2023. These reductions demonstrate the benefits of federal tailpipes standards combined with Delaware’s Low Emission Vehicle Program. A small part of the reduction is due to the adoption of electric vehicles.

Another factor is that between 2009 and 2023 there have been multiple changes to the emissions model. The 2009 budget was set using Mobile 6. Since then, the model has been changed multiple times; first to EPA’s MOVES model, then to MOVES2010, MOVES2014a, MOVES2014b, and most recently, MOVES4 is being projected to be released by the year’s end.

The EPA develops new versions of the MOVES model to reflect real-life conditions and current vehicle emission standards more accurately. An example of this shift was shown when Delaware re-modeled their 2017 New Castle County Onroad emissions (which were previously modeled with MOVES2014b), with the new MOVES3.1.0 model. The results showed a small decrease in NOx and a ~20% decrease in VOC. The major changes that were made to MOVES3.1.0 from the MOVES2014b model include the following:

- Updated Onroad exhaust emission rates, including Heavy Duty (HD) Greenhouse Gas (GHG) Phase 2 and Safer Affordable Fuel Efficiency (SAFE) rules
- Updated Onroad activity, vehicle populations and fuels
- Added gliders and off-network idle
- Revised inputs for hoteling and starts[39]

This demonstrates that the reduction in emissions from 2009 to 2023 are expected and are due to fleet turnover from high performing vehicles; however, model changes also have an effect.

**Table 9-3 2023 MVEB vs 2009 MVEB**

| Pollutant | SSWD NOx Emissions (tpd) | SSWD VOC Emissions(tpd) |
|---|---|---|
| **2023 Motor Vehicle Emission Budget*** | 8.53 | 4.57 |
| **2009 Motor Vehicle Emission Budget** | 19.23 | 9.89 |

*Safety margin included

[39] EPA (2021, March) Overview of EPA's Motor Vehicle Emission Simulator (MOVES3). Retrieved on July 2023 from https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1011KV2.pdf

# 10.0 Control Measures and Emission Reductions for Attainment

40 CFR 51.1308(d) requires that this SIP revision must include control measures needed for attainment. This chapter is divided into three sections.

Section 10.1 identifies the control measures that were adopted and in place in New Castle County, as reflected in the development of the 2017 base year inventory for the Delaware Nonattainment Area. Some of the control measures were instituted as part of the 1-Hour Ozone SIP for the Delaware Nonattainment Area (2002) and/or part of the 8-Hour Ozone reasonable further progress demonstration (2008). These regulations/control measures continue to be in existence and continue to reduce emissions in the region.

Section 10.2 of this chapter identifies measures implemented in New Castle County after 2017 that were not part of the 2017 base year inventory and are giving specific emission reductions to the region's 2015 8-hour Ozone NAAQS reasonable further progress demonstration.

Section 10.3 describes in more detail, how the control measures in Section 10.2 reduced emissions after 2017. These post-2017 emission reductions were used to demonstrate the 15% emission reductions for VOCs/NOx required for RFP (Section 8.3). These controls were implemented or have effective dates after 2017 and are not accounted for in the 2017 base year inventory. Specifically, these controls included additional, more stringent emission reductions, which were used to demonstrate the 15 % RFP emissions reduction between the 2017 base inventory year and the 2023 attainment year.

Delaware-specific regulations listed in the following sections are from 7 **DE Admin. Code** – Natural Resources and Environmental Control and will be referred to below by Regulation number, i.e. "Regulation 1144". Unless otherwise noted, all Delaware regulatory actions have been accepted into the Delaware SIP.

## 10.1 CONTROL MEASURES INCLUDED IN THE 2017 BASE YEAR INVENTORY

### 10.1.1 Electric Generating Units

**Table 10-1 Delaware Specific EGU Controls, Pre-2017**

| Regulation | Title | Pollutant(s) | Effective Date | EPA SIP Approval |
|---|---|---|---|---|
| 1144 | Control of Stationary Generator Emissions | VOC/NOx | 1/11/06 | August 11, 2010 [75 FR 48566] [40] |
| 1146 | EGU Multi-Pollutant Regulation | NOx | 12/11/06 | August 11, 2010 [75 FR 48566] [41] |
| 1148 | Control of Stationary Combustion Turbine Electric Generating Unit Emissions | NOx | 7/11/07 | August 11, 2010 [75 FR 48566] [42] |

### 10.1.2 Non-EGUs

**Table 10-2 Delaware Specific Non-EGU Controls, Pre-2017**

| Regulation | Title | Pollutant(s) | Effective Date | EPA SIP Approval |
|---|---|---|---|---|
| 1124 - 46.0 | Crude Oil Lightering Operations | VOC | 5/11/07 | August 11, 2010 [75 FR 48566] [43]) |
| 1142 – 2.0 | Control of NOx Emissions from Industrial Boilers and Process Heaters at Petroleum Refineries* | NOx | 12/1/01, 7/11/07, 4/11/11 | May 15, 2012 [77 FR 28489] [44] |

*Delaware City Refinery, enforceable emission cap for NOx

[40] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Administrative and Non- Substantive Amendments to Existing Delaware SIP Regulations. EPA Direct Final Rule. 75 FR 48566. August 11, 2010. https://www.govinfo.gov/content/pkg/FR-2010-08-11/pdf/2010-19571.pdf
[41] Ibid 40.
[42] Ibid 40.
[43] Ibid 40.
[44] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Amendments to the Control of Nitrogen Oxides Emissions From Industrial Boilers and Process Heaters at Petroleum Refineries. EPA Final Rule. 77 FR 28489. May 15, 2012. https://www.govinfo.gov/content/pkg/FR-2012-05-15/pdf/2012-11656.pdf

### 10.1.3 Area Sources

**Table 10-3 Delaware Specific Area Source Controls, Pre-2017**

| Regulation | Title | Pollutant(s) | Effective Date | EPA SIP Approval |
|---|---|---|---|---|
| 1113 | Open Burning | VOC/NOx | 4/11/07 | August 11, 2010 [75 FR 48566] [45] |
| 1124 - 11.0 | Mobile Equipment Repair and Refinishing | VOC | 10/11/10 | August 11, 2010 [75 FR 48566] [46] |
| 1141 - 1.0 | Architectural and Industrial Maintenance Coatings | VOC | 11/11/06 | August 11, 2010 [75 FR 48566] [47] |
| 1141 - 1.0 | Architectural & Industrial Maintenance Coating | VOC | 3/1/2017 | Not included in Delaware's SIP |
| 1141 - 2.0 | Consumer Products | VOC | 4/11/09 | October 20, 2010 [75 FR 64673] [48] |
| 1141 - 2.0 | Consumer Products | VOC | 1/1/2017 | Not included in Delaware's SIP |
| 1141 - 3.0 | Portable Fuel Containers | VOC | 4/11/10 | December 14, 2010 [75 FR 77758] [49] |
| 1141 - 4.0 | Adhesives and Sealants | VOC | 4/11/09 | December 22, 2011 [76 FR 79537] [50] |

[45] Ibid 40.
[46] Ibid 40.
[47] Ibid 40.
[48] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Limiting Emissions of Volatile Organic Compounds From Consumer Products. EPA Final Rule. 75 FR 64673. October 20, 2010. https://www.govinfo.gov/content/pkg/FR-2010-10-20/pdf/2010-25314.pdf
[49] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Limiting Emissions of Volatile Organic Compounds From Portable Fuel Containers. EPA Direct Final Rule. 75 FR 77758. December 14, 2010. https://www.govinfo.gov/content/pkg/FR-2010-12-14/pdf/2010-31220.pdf
[50] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Adhesives and Sealants Rule. EPA Final Rule. 76 FR 79537. December 22, 2011. https://www.govinfo.gov/content/pkg/FR-2011-12-22/pdf/2011-32646.pdf

### 10.1.4 Nonroad Sources

**Federal Regulations**

- Aircraft: Exhaust Emission Standards (40 CFR Part 87)
- Nonroad Compression-Ignition Engines: Exhaust Emission Standards (40 CFR 1039, 40 CRF 89.112)
- Nonroad Large Spark-Ignition Engines: Exhaust and Evaporative Emission Standards (40 CRF 1048)
- Locomotives: Exhaust Emission Standards (40 CRF 1033.101)
- Federal Marine Compression-Ignition (CI) Engines: Exhaust Emission Standards (40 CFR 1042)
- Marine Spark-Ignition Engines and Vehicles: Exhaust Emission Standards (40 CFR Part 91 and 1045)
- Nonroad Recreational Engines and Vehicles: Exhaust Emission Standards (40 CRF 1051)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below: Exhaust Emission Standards (40 CRF Part 90 & 1054)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below, Recreational Engines and Vehicles, and Marine Spark-Ignition Engines: Evaporative Emission Standards (40 CRF Part 1045, 1051,1054, and 1060)[51]

### 10.1.5 Onroad Sources

**Table 10-4 Delaware Specific Onroad Controls, Pre-2017**

| Regulation | Title | Pollutant(s) | Effective Date | EPA SIP Approval |
|---|---|---|---|---|
| 1131 | Low Enhanced Inspection and Maintenance Program | NOx | 10/11/01 | November 26, 2003 [68 FR 66343] [52] |
| 1132 | Transportation Conformity Regulation | NOx | 11/11/07 | August 11, 2010 [75 FR 48566] [53] |
| 1140 | Delaware Low Emission Vehicle Program | NOx | 10/11/99 | October 14, 2015 [80 FR 61752] [54] |
| 1145 | Excessive Idling of Heavy Duty Vehicle | NOx | 4/11/05 | August 11, 2010 [75 FR 48566] [55] |

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[51] EPA (2022) EPA Emission Standards for Nonroad Engines and Vehicles retrieved on August 2023 from https://www.epa.gov/emission-standards-reference-guide/epa-emission-standards-nonroad-engines-and-vehicles

[52] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Revisions to Delaware's Motor Vehicle Emissions Inspection Program and Low Enhanced Inspection and Maintenance Program. EPA Direct Final Rule. 68 FR 66343. November 26, 2003. https://www.govinfo.gov/content/pkg/FR-2003-11-26/pdf/03-29427.pdf

[53] Ibid 40.

[54] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Low Emission Vehicle Program. EPA Direct Final Rule. 80 FR 61752. October 14, 2015. https://www.govinfo.gov/content/pkg/FR-2015-10-14/pdf/2015-25954.pdf

[55] Ibid 40.

**Federal Regulations**

- 40 CFR Parts 80, 85, and 86 Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards , NOx emission control
- 40 CFR Parts 69, 80, and 86 Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards , NOx emission control

## 10.2 CONTROL MEASURES POST 2017 BASE YEAR INVENTORY

### 10.2.1 Area Sources

**Table 10-5 Delaware Specific Area Source Controls, Post-2017**

| Regulation | Title | Pollutant | Effective Date | EPA SIP Approval |
|---|---|---|---|---|
| 1124 - 26.0 and 36.0 | Gasoline Dispensing Facility Stage I Vapor Recovery, and Vapor Emission Control at Gasoline Dispensing Facilities* | VOC | 7/11/20 | July 11, 2022 [87 FR 35423][56] |
| 1124 - 33.0 | Solvent Cleaning and Drying | VOC | 8/11/21 | November 3, 2022 [87 FR 60102][57] |
| 1124 - 36.0 | Vapor Emission Control at Gasoline Dispensing Facilities | VOC | 4/11/21 | July 11, 2022 [87 FR 35423][58] |

*Stage II Vapor Recovery Decommissioning

### 10.2.2 Onroad Sources

**Table 10-6 Delaware Specific Onroad Controls, Post-2017**

| Regulation | Title | Pollutant(s) | Effective Date | EPA SIP Approval |
|---|---|---|---|---|
| 1140 | Delaware Low Emission Vehicle Program | NOx | 3/11/18 and 5/1/19 | October 14, 2015 [80 FR 61752] [59] |
| 1131 | Low Enhanced Inspection and Maintenance Program – Kent and New Castle Counties | NOx | 1/11/23 | Pending approval into the Delaware SIP (Submitted to EPA on March 13, 2023) |

[56] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Removal of Stage II Gasoline Vapor Recovery Program Requirements and Revision of Stage I Gasoline Vapor Recovery Program Requirements. EPA Final Rule. 87 FR 35423. June 10, 2022. https://www.govinfo.gov/content/pkg/FR-2022-06-10/pdf/2022-12236.pdf
[57] Air Plan Approval; Delaware; Control of Volatile Organic Compound Emissions From Solvent Cleaning and Drying. EPA Final Rule. 87 FR 60102. October 4, 2022. https://www.govinfo.gov/content/pkg/FR-2022-10-04/pdf/2022-21254.pdf
[58] Ibid 56.
[59] Ibid 54.

## 10.3 DETAILS OF CONTROL MEASURES FOR REASONABLE FURTHER PROGRESS

The following control measures are credited for New Castle County demonstrating RFP (see Section 8.3). These controls were implemented or have effective dates after 2017 and are not accounted for in the 2017 base year inventory. The controls contain new emission limits, that resulted in emission reductions that are included in the 2023 Projected Attainment Inventory (Section 8.2) used to show RFP.

### 10.3.1 Area Sources

**Solvent Cleaning 7 DE Admin. Code 1124, Section 33.0**

The Department amended the solvent cleaning control requirements based upon the 2012 OTC Model Rule and to reduce emissions of VOC from solvent cleaning operations, thus reducing the formation of ground-level ozone in Delaware. The rule became effective on August 11, 2022. Solvent cleaning is the process of using solvents to remove contaminants from various plastic, metal or other substrates (surfaces). These amendments reduced emissions of VOCs from cold solvent cleaning operations by: (1) eliminating the exemptions for cold cleaning machines containing one liter or less of solvent and with a VOC concentration of 5% by weight or less; (2) allowing cold cleaning machines to be heated to below boiling; (3) reducing the solvent VOC concentration from 800 grams per liter to 25 grams per liter for most applications; and (4) allowing higher VOC concentrations to be used in conjunction with a VOC capture and control device.

The Department estimated that the OTC model rule will increase the control efficiency from 60% to 80%. The new control measure resulted in 0.08 tpd of VOC emissions reductions as reflected in the 2023 Projected Attainment Inventory for New Castle County.

**Gas Station Vapor Recovery – Decommissioning Stage II Vapor Recovery Systems and Requiring Stage I Enhanced Vapor Recovery Systems at Gasoline Dispensing Facilities DE Admin. Code 1124 Sections 26 and 36;**

The Department updated requirements for GDFs: (1) to require all GDF's to decommission existing Stage II vapor recovery systems in light of the redundancy of on-board refueling vapor recovery canisters that exist in vehicles starting with model year 1998, (2) to remove the requirement that new GDFs must install Stage II systems, and (3) to update Stage I requirements to ensure all GDFs remain well controlled. The proposed amendments will also require regulated GDFs to monitor a vapor-tight status of its gasoline storage tanks by performing annual pressure decay tests or by installing a continuous pressure monitoring (CPM) system.

The decommissioning of Stage II systems was required by December 31, 2021, and installing Stage I EVR systems is required by December 31, 2025. These deadlines will (1) avoid incompatibility VOC emission of 71 tons in 2021, (2) provide 58 tons of VOC emission reduction after 2025, and (3) total 129 ton of long term VOC emission reductions for attaining and maintain the ozone air quality for the state of Delaware.

The implemented regulations resulted in 0.28 tpd of VOC emission reductions as reflected in the 2023 Projected Attainment Inventory for New Castle County.

**Phased in Reduction of Portable Fuel Containers (PFCs) – 7 DE Admin. Code 1141 Section 3.0**

Delaware adopted the OTC Model Rule for PFCs (based on the 2000 California Air Resources Board (CARB) rule), which became effective on January 1, 2003. This regulation was developed to reduce the amount of VOC emissions escaping PFCs via evaporation or permutation and applies to anyone who sells, supplies, offers for sale, or manufactures for sale portable fuel container (or containers) or spout (or spouts) or both portable fuel container (or containers) and spout (or spouts) for use in the State of Delaware. The rule had a total control of 65% when it was fully implemented after 10 years because turnover of the PFCs was estimated to take 10 years.

In 2009, the EPA approved the Federal Hazardous Air Pollutant Mobile Source Rule, which regulated PFCs in a manner similar to CARBs new 2006 amendments. The rule regulated PFCs permeability and evaporative losses to 0.3 grams of hydrocarbons per gallon per day and the controls were estimated to be fully implemented in 2018. Delaware adopted this rule (while removing the OTC model rule for PFCs), which became effective in April 11, 2010. EPA estimates about a 3% reduction in 2009 and approximately 6% per year thereafter; with a 57% reduction when fully implemented in 2018.

Delaware's PFC control efficiency increased from 51% to 57% in 2018. These phased in reductions resulted in 0.08 tpd of VOC emission reductions as reflected in the 2023 Projected Attainment Inventory for New Castle County.

### 10.3.2 Onroad Mobile Sources

Mobile source reductions are due to motor vehicles being produced to much lower tailpipe emissions as a result of Delaware's Low Emission Vehicle Program and federal tailpipe standards. Additional mobile reductions are a result of fuel standards. All emission reductions listed below were calculated using the MOVES3.1.0 model. The following regulations, along with fleet turnover, have contributed to mobile source reductions of 7.53 tpd of NOx and 0.80 tpd of VOC in New Castle County as reflected in the 2023 Projected Attainment Inventory.

### Motor Vehicle Emissions Inspection Program - Kent and New Castle Counties 7 DE Admin. Code 1131

Amendments to 7 **DE Admin. Code** 1131, "Low Enhanced Inspection and Maintenance Program – Kent and New Castle Counties," increases the applicability of the regulation to include vehicles that weigh 8,501 up to 14,000 pounds gross vehicle weight beginning with model year 2008 for the On-Board Diagnostic (OBD) test; modify the older vehicle testing requirements to include curb idle and gas cap tests for vehicles 1995 and older; and include language that prevents vehicle tampering. The amended inspection and maintenance program ensures cars and trucks are emitting emissions within legal limits and vehicles with high emissions are identified and repaired. For more information on the I/M program, see Section 4.0.

### Delaware Low Emission Vehicle 7 DE Admin. Code 1140

The Department has chosen to adopt California's Low Emission Vehicle (LEV) and GHG standards as part of the Delaware Code (7 **DE Admin. Code** 1140). These standards (7 **DE Admin. Code** 1140) became effective in Delaware for model year 2014 vehicles, significantly reducing a number of emissions including VOCs and NOx. The LEV III regulations include increasingly stringent emission standards for both criteria pollutants and greenhouse gases for new passenger vehicles through the 2025 model year. By adopting California's motor vehicle emission vehicle standards, Delaware joined a growing number of states, currently at 14 (including the District of Columbia), committed to reducing pollution from motor vehicles.[60]

### Reformulated Gasoline (40 CFR Part 80, Subpart D)

Reformulated Gasoline (RFG) was mandated by Section 211(k) of the federal CAA for metropolitan areas with the worst smog beginning in 1995. This includes New Castle and Kent County Delaware; and Sussex County which was opted in by the Governor in 1993. RFG is blended to burn more cleanly than conventional gasoline, reducing emissions of ozone-forming and toxic pollutants. The first phase of the RFG program began in 1995 and the second (current) phase began in 2000.[61]

### Federal Tier 3 Motor Vehicle Emission and Fuel Standards (79 FR 23414, Apr 28, 2014)

The program considers the vehicle and its fuel as an integrated system, setting new vehicle emissions standards and a new gasoline sulfur standard beginning in 2017. The vehicle emissions standards will reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. The gasoline sulfur standard will enable more stringent vehicle emissions standards and will make emissions control systems more effective.[62]

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[60] Division of Air Quality (n.d) Clean Vehicles and Fuels. Retrieved on August 14, 2023 from https://dnrec.alpha.delaware.gov/air/mobile-sources/clean-vehicles-fuels/
[61] Division of Air Quality (n.d) Mobile Sources. Retrieved on August 4, 2023 from https://dnrec.alpha.delaware.gov/air/mobile-sources/
[62] Final Rule for Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards Retrieved on August 2023 from https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-control-air-pollution-motor-vehicles-tier-3

### 10.3.3 Nonroad Sources

Nonroad sources include a variety of different mobile equipment (Aircrafts, Rail, Commercial Marine Vessels, and Other Off-road Vehicles and Equipment Sources). Federal regulations that address emissions standards of these sources and fuel composition have all contributed to Nonroad emission reductions. These regulations include the following:

- Aircraft: Exhaust Emission Standards (40 CFR Part 87)
- Nonroad Compression-Ignition Engines: Exhaust Emission Standards (40 CFR 1039, 40 CRF 89.112)
- Nonroad Large Spark-Ignition Engines: Exhaust and Evaporative Emission Standards (40 CRF 1048)
- Locomotives: Exhaust Emission Standards (40 CRF 1033.101)
- Federal Marine Compression-Ignition (CI) Engines: Exhaust Emission Standards (40 CFR 1042)
- Marine Spark-Ignition Engines and Vehicles: Exhaust Emission Standards (40 CFR Part 91 and 1045)
- Nonroad Recreational Engines and Vehicles: Exhaust Emission Standards (40 CRF 1051)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below: Exhaust Emission Standards (40 CRF Part 90 & 1054)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below, Recreational Engines and Vehicles, and Marine Spark-Ignition Engines: Evaporative Emission Standards (40 CRF Part 1045, 1051,1054, and 1060)[63]

Emission reductions from other off-road vehicles and equipment sources are modeled through EPA's MOVES in Nonroad mode. Delaware used the latest version of the model, MOVES3.1.0 to model emissions from 2017 and 2023 in New Castle County. The difference in emissions from these two model runs are based on the implementation of federal rules combined with equipment turnover. The emissions reductions of 1.03 tpd of VOC and 0.63 tpd of NOx contribute to Delaware demonstrating RFP for New Castle County, as reflected in the 2023 Projected Attainment Inventory.

Emission reductions from Commercial Marine Vessels, Rail, and Aircrafts are the difference of the 2017 and 2023 inventories. The inventories for these sectors are developed by the EPA, which is discussed in more detail in Section 7 and 8. The controls resulted in 0.71 tpd of NOx emission reductions as reflected in the 2023 Projected Attainment Inventory for New Castle County.

[63] EPA (2022). EPA Emission Standards for Nonroad Engines and Vehicles. Retrieved on August 2023 from https://www.epa.gov/emission-standards-reference-guide/epa-emission-standards-nonroad-engines-and-vehicles

# 11.0 Reasonably Available Control Technology (RACT)

40 CFR 51.1312(a)(1) requires that this SIP revision must include a RACT demonstration.

## 11.1 Background and Requirements

The EPA has defined the RACT as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. [64] Section 182 of the CAA sets forth two separate RACT requirements for ozone NAAs.

The first requirement, contained in section 182(a)(2)(A) of the CAA, and referred to as RACT fix-up, requires the correction of RACT rules for which EPA identified deficiencies before the Act was amended in 1990.

The second requirement, set forth in section 182(b)(2) of the CAA, applies to moderate or worse ozone NAAs as well as to marginal and attainment areas in OTRs established pursuant to section 184 of the CAA, and requires these NAAs to implement RACT controls on all major VOC and NOx emission sources and on all sources and source categories covered by a Control Technique Guideline (CTG) and Alternate Control Techniques (ACTs) issued by EPA.

Under section 183 of the CAA, EPA was required to issue by certain timeframes several guidance documents for RACT controls that would help states meet the requirements of section 182(b)(2). This requirement upon EPA includes developing (1) CTGs for controls of VOC emissions from stationary sources, and (2) ACTs for controls of VOC and NOX emissions from stationary sources.

In general, states meet the CAA's RACT requirements by imposing controls that meet the control requirements established in final CTG documents and considering the information in ACT documents to relevant VOC and NOx sources in their moderate or worse NAAs. Adoption of new RACT regulation(s) shall occur when states have new stationary sources not covered by existing RACT regulations, or when new data or technical information indicates that a previously adopted RACT measure does not represent a newly-available RACT control level.

Delaware submitted its RACT SIP for the 2015 Ozone NAAQS to EPA on August 3, 2020 (see Appendix J).

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[64] State Implementation Plans; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas-Supplement (on Control Techniques Guidelines. EPA General Preamble for proposed rulemaking-Supplement. 44 FR 53762. September 17, 1979. https://archives.federalregister.gov/issue_slice/1979/9/17/53760-53764.pdf#page=3

# 12.0 Reasonably Available Control Measure (RACM)

40 CFR 51.1312(c) requires that this SIP revision must include a RACM demonstration.

## 12. 1 Background and requirements

The 1990 CAAA and 40 CFR 51.912(d) impose a RACM requirement for areas designated non-attainment for the 8-hour NAAQS. According to this requirement, Delaware must demonstrate that it has adopted all RACM controls necessary to move toward attainment as expeditiously as practicable and to meet all RFP requirements.

RACM is defined by the EPA[65] as any potential control measure that meets the following criteria:

- Economically feasible;
- Technologically feasible;
- Does not cause "substantial widespread and long-term adverse impacts";
- Is not "absurd, unenforceable, or impracticable"; and
- Can advance the attainment date by at least one year.

The attainment deadline for areas designated moderate non-attainment is August 3, 2024, which requires the NAA's 3-year design value data for 2020-2023 to demonstrate attainment with the 2015 Ozone NAAQS. Therefore, the attainment year is 2023. To meet the requirements of RACM, the attainment date would have to be advanced to the end of the 2022 ozone season (September 30) in order to advance the attainment date by at least one year.

Some candidate RACM measures have the potential to cause substantial and widespread adverse impacts to a particular social group or sector of the economy, including communities with environmental justice concerns. Accordingly, measures that cause substantial or widespread adverse impacts will not be considered RACM.

## 12. 2 RACM Determination

**Advancement of Attainment Date By One Year Requirement**

The EPA did not issue its final rule for the Determinations of Attainment by the Attainment Date and Reclassification of Areas Classified as marginal for the 2015 Ozone NAAQS until October 7, 2022.[66] Consequently, by the time the rule was issued, the deadline of September 30, 2022 required by RACM to advance the attainment date by one year had already passed. In addition, it can take Delaware a year or more to finish the process of adopting a new regulation, especially when more stringent controls are involved. Therefore, Delaware would not have been able to adopt any new regulations before the "advancement of attainment date" deadline of September 30, 2022.

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[65] State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990. EPA General preamble for future proposed rulemakings. 57 FR 13498. Page 13560-13561. April 16, 1992. https://archives.federalregister.gov/issue_slice/1992/4/16/13412-13570.pdf#page=87

[66] Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as marginal for the 2015 Ozone National Ambient Air Quality Standards. EPA Final Rule. 87 FR 60897. October 7, 2022. https://www.govinfo.gov/content/pkg/FR-2022-10-07/pdf/2022-20460.pdf

## Ozone Transport Commission Model Rules

The OTC is a multi-state organization created under the CAA[67]. It is responsible for advising EPA on transport issues and for developing and implementing regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions.

The OTC has developed a number of Model Rules[68] that can be used by states as a template to adopt VOC emission reduction regulations. Some Model Rules have different Phases, or successively more stringent emissions controls. Delaware has already adopted the majority of applicable OTC model rules for Stationary and Area Sources: [69]

- Consumer Products, Phase I
- Consumer Products, Phase II
- Consumer Products, Phase III
- Consumer Products, Phase IV
- Architectural & Industrial Maintenance, Phase I
- Architectural & Industrial Maintenance, Phase II
- Asphalt Paving
- Portable Fuel Containers, Phase I, Federal
- Portable Fuel Containers, Phase II, Federal
- Mobile Equipment Repair & Refinishing, Phase I
- Mobile Equipment Repair & Refinishing, Phase II
- Solvent Degreasing, Phase I
- Solvent Degreasing, Phase II
- Industrial, Commercial & Institutional Adhesives & Sealants
- Industrial, Commercial & Institutional Boilers, Stationary Combustion Turbine, Stationary Reciprocating Engine
- Distributed Generation Standards
- Stationary Generators
- Electric Generating Units: High Electric Demand Days Combustion Turbines

In regard to applicable OTC Model Rules that Delaware has not yet adopted:

- Consumer Products Phase V – Delaware is using the Consumer Products Phase V rule as a VOC contingency measure (Section 14).
- Large Above Ground VOC Storage Tanks – Delaware is in the process of exploring the economic feasibility and potential emissions reductions of adopting the Tanks model rule.

Additional regulations that have been adopted by Delaware can be found in Section 10.0, Control Measures and Emission Reductions for Attainment.

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[67] CAA Section 176A
[68] Status of Adoption of OTC Model Rules/Regulatory & Technical Guidelines. Updated May 10, 2023 https://otcair.org/document.asp?fview=modelrules
[69] Ibid 68.

In conclusion, it is Delaware's position that it has met the requirements of RACM through its RACT submittal (Appendix J) and its adoption of many VOC and NOx emission reduction related regulations.

# 13.0 Attainment Demonstration Modeling

40 CFR 51.1308(a) and 51.1308(c) require that this SIP revision must include Attainment Demonstration Modeling.

## 13.1 Background and Objectives

As discussed in Section 1 of this document, the EPA designated one county in Delaware, New Castle County, as moderate non-attainment for the 8-hour ozone standard. New Castle County is part of a greater Philadelphia-Wilmington-Atlantic City (PA-NJ-MD-DE) moderate NAA for the 8-hour ozone standard. As shown in Figure 1-2, the counties within this NAA are:

| | |
|---|---|
| Delaware: | New Castle County |
| Maryland: | Cecil County |
| New Jersey: | Atlantic County, Burlington County, Camden County, Cape May County, Cumberland County, Gloucester County, Mercer County, Ocean County, Salem County; |
| Pennsylvania: | Bucks County, Chester County, Delaware County, Montgomery County, Philadelphia County. |

Ozone has been a chronic problem, particularly along the I-95 corridor from Washington, DC to Boston, Massachusetts. The ozone non-attainment in the Northeast and Mid-Atlantic regions is attributed not only to the anthropogenic emissions in the area but also to regional transport, which is a significant portion of ozone observed.

The EPA requires that the areas in non-attainment for the 8-hour ozone NAAQS demonstrate, by the use of photochemical grid modeling, that they would attain the NAAQS by August 3, 2024. The attainment demonstration requires the NAA's 3-year design value data for 2020-2023 to demonstrate attainment with the 2015 Ozone NAAQS. Therefore, the attainment year used for modeling is 2023.

The attainment demonstration assesses whether emissions reductions resulting from a set of selected control measures will result in ambient concentrations that meet the NAAQS. It predicts whether or not all estimated future 2023 design values will be less than or equal to the concentration level specified for the 2015 8-hour ozone NAAQS.

The objective of this section (i.e., Attainment Demonstration Modeling) is to evaluate the efficacy of proposed/adopted control strategies, and to demonstrate that such measures will result in attainment of the ozone standard by August 3, 2024. This SIP shows that progress is being made to improve air quality in the PA-NJ-MD-DE moderate NAA, that all necessary steps are being taken to attain the 8-hour ozone NAAQS by 2023, and that New Castle County will comply with the 8-hour ozone NAAQS by the August 3, 2024 attainment date.

The basis for Delaware's attainment demonstration for the 2015 8-hour ozone standard is the *Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2016 Based Modeling Platform Support Document;* January 31, 2023 (Appendix K). This modeling document (V1) was subsequently updated with an addendum that incorporated a new, updated modeling platform V2/V3, *Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2016 Based Modeling Platform Technical Support Document: OTC V2/V3 Modeling Platform Update;* July 14, 2023 (Appendix L). The purpose of these reports is to document the results and technical details of SIP quality modeling efforts undertaken by the OTC/Mid-Atlantic Northeast Visibility Union (MANEVU) to support member state SIP submittals for the 2008 and 2015 ozone standards.

The PA-NJ-MD-DE's modeling runs were performed in coordination with the OTC modeling centers. The OTC Modeling Centers are the state staff and academics that perform modeling and conduct analyses of modeling results. They include New York State Department of Environmental Conservation, New Jersey Department of Environmental Protection, Virginia Department of Environmental Quality, University of Maryland College Park via the Maryland Department of the Environment, and Office of Research Commercialization at Rutgers University via New Jersey Department of Environmental Protection.

## 13.2 OTC Modeling Methodology

### Ozone Conceptual Model

The interaction of meteorology, chemistry, and topography lead to a complex process of ozone formation and transport. Ozone episodes in the OTR often begin with an area of high pressure setting up over the southeast United States. These summertime high-pressure systems can stay in place for days or weeks. This scenario allows for stagnant surface conditions to form in the OTR, and, in turn, the transported pollution mixes with local pollution in the late morning hours as the nocturnal inversion breaks down. With a high-pressure system in place, the air mass, which is characterized by generally sunny and warm conditions, exacerbates ozone concentrations.

This meteorological setup promotes ozone formation, as sunlight, warm temperatures, and ozone precursors NOx and VOCs interact chemically to form ozone. In addition, ozone precursors and ozone are transported into the OTR during the late night and/or early morning hours from the areas to the southeast of the OTR by way of the nocturnal low-level jet (NLLJ), a fast-moving river of air that resides approximately 1,000 meters above the surface. All this local and transported polluted air can, in some instances, accumulate along the coastal OTR areas as the air is kept in place due to onshore bay and sea breezes.

Some ozone is natural, or transported internationally, leading to ozone that is not considered attributed to U.S. human activity. This U.S. background ozone in the eastern United States is estimated to be in the range of 30 to 35 ppb, though it can be as high as 50 ppb in the Intermountain West. [70]

To address the complexity of ozone formation and transport that occurs in the OTR, the 2016-based modeling year was selected as representative of the conceptual model as described in “The Nature of the Ozone Air Quality Problem in the Ozone Transport Region: A Conceptual Description”. [71]

**Models**

The OTC used two different models in its analysis: Community Multi-scale Air Quality model (CMAQ) and the Comprehensive Air Quality Model with Extensions (CAMx), the two photochemical models most used by the air quality modeling community.

CMAQ is a numerical atmospheric chemistry/air quality model that simulates the physics and chemistry of the atmosphere at relatively high spatial and seasonal resolution. CAMx is a multi-scale, three dimensional photochemical grid model designed to simulate the formation and fate of oxidant precursors, primary and secondary particulate matter concentrations, and deposition over regional and urban spatial scales.

**Base Year Selection**

The Base Year Selection Workgroup of the 2016 Inventory Collaborative examined several candidate base years, including 2014, 2015, and 2016. In practical terms, 2014 would have been a top choice since it aligns with the triennial NEI cycle and the 2014 NEI could have readily served as the basis for the modeling inventories. However, the meteorological conditions during the summer of 2014 were least conducive to ozone formation, making the year 2014 a poor choice as the basis of a modeling platform for ozone formation.

Ultimately, the Base Year Selection Workgroup recommended that both 2015 and 2016 be used as base years, but that 2016 should be the focus if time and resource constraints allow for only one. This was decided for simplicity and to keep all portions of the country working with the same period of data. Therefore, 2016 was ultimately selected as the base year due to these restraints. More details can be found in the document “Base Year Selection Workgroup Final Report”[72] produced by the Inventory Collaborative Base Year Selection Workgroup, December 12, 2017.

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[70] US EPA 2014, Policy Assessment for the Review of the O3 National Ambient Air Quality Standards, Research Triangle Park, NC, https://www.epa.gov/sites/default/files/2020-05/documents/o3-final_pa-05-29-20compressed.pdf

[71] The Nature of the Ozone Air Quality Problem in the Ozone Transport Region: A Conceptual Description, Downs et al., August 2010, https://www.nescaum.org/documents/2010_o3_conceptual_model_final_revised_20100810.pdf

[72] Base Year Selection Workgroup Final Report, www.wrapair2.org/pdf/2017-12-12_Base_Year_Selection_Report_V1.1.pdf

**Future Year Selection**

The New York Metropolitan moderate NAA for the 2015 ozone NAAQS, which includes Long Island and parts of Connecticut and New Jersey, has a deadline of August 2024 to attain the 2015 ozone NAAQS. Because attainment is based on the most recent complete ozone season, attainment is based on 2023 design values. It was expected that marginal NAAs in Connecticut, Delaware, Maryland, New Jersey, Pennsylvania, and perhaps the District of Columbia, would be reclassified to moderate nonattainment and therefore face the same August 2024 deadline for attaining the 2015 $O_3$ NAAQS. Therefore, a future analysis year of 2023 was selected to best meet the attainment planning needs of these jurisdictions.

### 13.3 OTC Modeling Results

Air quality models such as CMAQ and CAMx are used to simulate current and future air quality, and model estimates are used in a "relative" rather than "absolute" sense to estimate future year design values. That is, one calculates the ratio of the model's future to current "baseline" predictions at ozone monitors. These ratios, the fractional changes in ozone concentrations, are called relative response factors (RRF). For each existing monitoring site, the future ozone design value is estimated by multiplying the RRF at the location by the observation-based monitor-specific "baseline" ozone design value. The projected future ozone design values are compared to the NAAQS to determine whether attainment will be reached or not.

EPA guidance recommends the use of the RRF approach to demonstrate attainment of the 8- hour O3 NAAQS, [73] however occasionally model grid cells code coastal monitors as in water cells which can be problematic for model to observation comparison. The OTC Modeling Committee compared several approaches to assess modeled attainment including two modified approaches that excluded grid cells identified as majority water.

Results were presented based on the standard 3x3 method, as well as a modified 3x3 method in which all grid cells identified as water were excluded ("3x3 No Water 1 method"), as per the EPA guidance. More details about the specific OTC modeling methodology can be found in Appendices K and L.

In this document, Delaware is presenting a subset of the OTC modeling results, Delaware monitors in New Castle County (Table 13-1). The modeling results show all of Delaware's New Castle County monitors in attainment with the 70 ppb NAAQS for the 2023 attainment year. Full modeling results can be found in Appendix C of the July 14, 2023 *OTC Modeling Technical Support Document* (Appendix L).

[73] US EPA, 2018. "Air Quality Modeling Technical Support Document for the Updated 2023 Projected Ozone Design Values", accessed at https://www.epa.gov/sites/default/files/2018-06/documents/aq_modelingtsd_updated_2023_modeling_o3_dvs.pdf

**Table 13-1 2023 Future Design Values for Delaware Ozone Monitors in the Philadelphia Non-attainment Area*.**

| | | | | CAMx v7.10 | | | | CMAQ v5.3.1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3x3 | | 3x3 No Water 1 | | 3x3 | | 3x3 No Water 1 | |
| **Site ID** | **State** | **Monitor** | **County** | **AVG** | **MAX** | **AVG** | **MAX** | **AVG** | **MAX** | **AVG** | **MAX** |
| 100031010 | DE | Brandywine Creek State Park | New Castle | 65.4 | 65.7 | 65.4 | 65.7 | 65.5 | 65.8 | 65.5 | 65.8 |
| 100031013 | DE | Bellevue State Park | New Castle | 62.6 | 63.5 | 62.6 | 63.5 | 62.8 | 63.7 | 62.8 | 63.7 |
| 100032004 | DE | MLK | New Castle | 62.9 | 63.5 | 62.9 | 63.5 | 63.1 | 63.7 | 63.1 | 63.7 |
| 100031007 | DE | Lums Pond | New Castle | 59.4 | 60.3 | 59.4 | 60.3 | 58.9 | 59.8 | 58.9 | 59.8 |

* 2023 modeling future predicted design values (DVFs) for 3x3 and 3x3 No Water 1 methodology for CAMx (green header) and CMAQ (blue header) used the V2/V3 inventory.

# 14.0 Contingency Measures

The CAA Section 172(c)(9) requires that this SIP revision must include contingency measures.

## 14.1 Requirements on Contingency Measures

The CAAA requires States with NAAs to implement specific control measures if the area fails to make reasonable further progress, fails to meet any applicable milestone, or fails to attain the NAAQS by the applicable attainment date. The EPA has interpreted this CAAA provision as a requirement for States with moderate and above ozone NAAs to include sufficient contingency measures (CMs) in their RFP and attainment demonstration. Under the same provision of the CAAA, EPA also requires that the contingency measures must be fully-adopted control measures or rules, so that, upon failure to meet milestone requirements or to attain the standards, the contingency measures can be implemented without any further rulemaking activities by the States and/or EPA.

**EPA Draft Contingency Measure Guidance**

On March 17, 2023, EPA released the document, entitled, *Draft Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter* (Appendix M).

The purpose of the guidance document is to assist air agencies that are required to prepare non-attainment plan submissions under Part D of Title I of the CAA. Specifically, in the document the EPA provides guidance to air agencies for the preparation of ozone and particulate matter (PM) plans, and focuses on the requirement for those plans to include CMs. CMs are control requirements that would take effect if an area fails to attain a NAAQS by an applicable attainment date, or fails to make RFP toward attainment.

These CM requirements are specified in CAA section 172(c)(9) for NAAs generally, and in section 182(c)(9) for Serious or higher ozone NAAs. The document addresses application of the CM requirements for the ozone and PM NAAQS. It does not address contingency provisions required for maintenance plans in section 175A(d), nor does it address specific contingency provisions for anticipated control measures in Extreme ozone NAAs under section 182(e). It also does not address CM requirements for pollutants other than PM and ozone, where existing CM guidance remains in effect.

EPA is issuing the guidance document because recent court decisions – discussed later in the document – have invalidated key aspects of EPA's historical approach to implementing the CM requirement. These court decisions had the effect of prohibiting an approach that many air agencies have historically used to meet the CM requirement, i.e., the reliance on implemented control measures as CMs (particularly the commonly used approach of relying on surplus reductions from mobile source fleet turnover from already-implemented federal or state control measures).

EPA has received feedback from some air agencies that this constraint, together with the evolution toward more stringent control programs in the 30 years since EPA first articulated its CM guidance (explained in Section 2 of the guidance), has increased the difficulty that they face in identifying measures sufficient to meet the CM requirement. Some air agencies, particularly those with longstanding non-attainment problems that have implemented progressively more stringent control measures over time to meet more stringent NAAQS, have stated that the scarcity of remaining unimplemented control measures poses a significant challenge to meeting CM requirements. EPA intends the guidance to address that increased challenge by clarifying and explaining approaches available to air agencies to meet the CM requirement, while still meeting the CAA as interpreted by the courts.

The guidance focuses on three key aspects of EPA's CM guidance. First, the guidance addresses the method that air agencies should use to calculate EPA-recommended amount of emissions reductions that CMs should provide. Longstanding EPA guidance, discussed in Section 2 of the document guidance, has recommended that CMs provide reductions approximately equal to or greater than the amount needed to meet the requirement for RFP in the relevant area for 1 year. In the guidance EPA continues to recommend an annual progress-based approach for calculating the recommended amount of reductions for CMs but changes the metric to be more closely tied to the air quality improvement needs of the area when the CMs are triggered. (The term "triggered" for CMs refers to the effective date of EPA's final determination that a NAA has failed to attain a NAAQS by the applicable attainment date or has failed to meet RFP. The CAA establishes time frames for EPA to make such determinations.)

Second, the guidance addresses the situation where an air agency cannot identify feasible CMs in sufficient quantity to produce the recommended amount of reductions using the updated metric. Previous EPA policy has indicated that states could provide a "reasoned justification" to have CMs that result in less than the recommended one year's worth (OYW) of RFP. The guidance provides air agencies with specific recommendations about how to develop such reasoned justifications to support SIP submissions for which the submitting agency is asserting that it cannot provide for the recommended amount of CM reductions due to a lack of feasible measures.

Finally, the guidance addresses the time period within which reductions from CMs should occur. EPA previously recommended that CMs take effect within 60 days of being triggered, and that the resulting reductions generally occur within 1 year of the CMs being triggered. In instances where there are insufficient CMs available to achieve the recommended amount of emissions reductions within 1 year, EPA provides recommendations for how air agencies could include CMs that provide reductions within up to 2 years of being triggered. The guidance does not alter the 60-day recommendation for the measures to take effect. While the guidance document focuses on these three aspects of CM guidance that EPA is updating, it also provides additional information to summarize EPA's existing guidance for CMs more broadly, including aspects that EPA is not updating, to ensure clarity and national consistency.

### 14.2 EPA's Contingency Measures Calculation Methodology

OYW of Progress Calculation Described: EPA recommends that air agencies use the following equation to calculate OYW of progress for the purpose of assessing the adequacy of the reductions provided by the submitted CMs:

$$\frac{(base\ year\ EI - attainment\ year\ EI)}{(attainment\ year - base\ year)} \div base\ year\ EI\ x\ attainment\ year\ EI = OYW\ of\ Progress$$

The OYW of progress calculation is based on anthropogenic emissions. All uses of the term "emissions," including "base year EI" and "projected attainment EI," refer to anthropogenic emissions.

States should use this approach for ozone and PM non-attainment plans and should perform the calculation separately for each relevant pollutant and precursor. This calculation can be broken down into three steps.

**Step 1:** Calculate the average annual emissions reductions needed to attain. For each relevant precursor, determine the amount of emissions reductions between the base year and the projected attainment year and divide by the number of years between the base year and the attainment year. Note: for PM, this typically represents the RFP annual average reduction, but for ozone, this will likely be different from the 3 percent annual requirement for RFP.

**Step 2:** Calculate the annual percentage reduction needed to attain. Determine what percentage of the base year inventory is represented by the annual average emissions reduction needed to attain by dividing the annual average reductions by the base year inventory for the NAA.

**Step 3:** Calculate the amount of emissions reductions needed for OYW of progress. Multiply the total emissions from the attainment projected inventory for the NAA by the annual percentage reduction needed to attain. This represents the amount of emissions reductions CMs should provide to meet OYW of progress.

EPA notes that this calculation depends on an approvable attainment demonstration, which could either be a modeled attainment demonstration or, where the model does not show attainment, one that relies on weight of evidence to demonstrate attainment. For reasons explained in Section 2, EPA believes it is appropriate to base the OYW of progress amount on the attainment projected inventory for the NAA. However, if EPA is unable to approve the attainment demonstration for reasons related to the adequacy of the modeling or weight of evidence demonstration, then EPA would not be able to approve as adequate the amount of CMs the air agency provided.

To affirm that the CMs achieve OYW of progress, the SIP submission should provide documentation of the expected reductions from the CMs contained within the plan and should compare the expected emissions reductions to the OYW of progress amount calculated above. Air agencies should include all steps of these calculations in their SIP submissions. EPA expects that the CM requirement would be met if the expected reductions meet or exceed the OYW of progress amount for the relevant precursor(s) / pollutant(s), and the CMs meet all other applicable requirements and guidance.

If submitted CMs fall short of this amount, Section 4 of this guidance addresses the potential for an infeasibility justification for a lesser amount. Air agencies should ensure that other CM requirements and guidance unrelated to the amount of reductions are met (e.g., the measures are prospective and conditional and will take effect without further actions by the state or EPA as §172(c)(9) requires). Finally, we note that this OYW of progress approach is only for the purpose of calculating the amount for CM purposes and does not relieve an area from meeting other applicable CAA requirements (e.g., RFP, the milestone compliance demonstration requirements in CAA §182(g), or the quantitative milestone requirements of §189(c), which are separate and distinct from §172(c)(9) and §182(c)(9)).

OYW of progress is calculated for all relevant precursors to determine the amount of emissions reductions that CMs would need to provide to continue the annual percentage reduction, as applied to the attainment projected inventory. However, attainment demonstration modeling may provide a reasonable basis to identify ratios of the effectiveness of reductions of one precursor to reduce ambient concentrations relative to other precursors. If that is the case, then a state may use the ratio to substitute CM reductions of one precursor for a shortfall in CM reductions of another precursor. This applies to VOC and NOx for ozone and to the $PM_{2.5}$ plan precursors for $PM_{2.5}$. EPA recommends that an air agency intending to use such a substitution approach consult with its Regional Office concerning selection of a methodology for developing appropriate ratios.

## 14.3 Delaware's Contingency Measures Calculations

**Step 1:** Calculate the average annual emissions reductions needed to attain.
Step 1a: Determine the amount of emissions reductions between the base year and the projected attainment year
Step 1b: Divide by the number of years between the base year and the attainment year.

**Equation 1:**

$$\textit{Annual Avg. Reduction} = \frac{(\textbf{Adjusted 2017 base year EI} - \textbf{2023 attainment EI})}{(2023 - 2017)}$$

Table 14-1 Contingency Measure Step 1 for VOC and NOx

| *Step* | Value | Units |
|---|---|---|
| *Step 1a: VOC* | 25.76 - 24.22 = 1.54 | tpd |
| *Step 1b: VOC* | 1.54 ÷ (2023 - 2017) = 0.26 | tpd per year |
| *Step 1a: NOx* | 42.38 - 34.26 = 8.11 | tpd |
| *Step 1b: NOx* | 8.11 ÷ (2023 - 2017) = 1.35 | tpd per year |

**Step 2:** Calculate the annual percentage reduction needed to attain. Determine what percentage of the base year inventory is represented by the annual average emissions reduction needed to attain by dividing the annual average reductions by the base year inventory for the NAA.

**Equation 2:**

$$\textit{Annual \% Reduction} = \frac{(\textbf{Annual Avg. Reduction})}{(\textit{Adjusted } \textbf{2017} \textit{ base year EI})}$$

Table 14-2 Contingency Measure Step 2 for VOC and NOx

| *Step* | Value | Units |
|---|---|---|
| *Step 2: VOC* | 0.26 ÷ 25.76 = 1.0% | annual reduction (%) |
| *Step 2: NOx* | 1.35 ÷ 42.38 = 3.2% | annual reduction (%) |

**Step 3:** Calculate the amount of emissions reductions needed for OYW of progress. Multiply the total emissions from the attainment projected inventory for the NAA by the annual percentage reduction needed to attain.

**Equation 3:**

$$\boldsymbol{OYW of\ Progress = Annual\,\%\,Reduction\ x\ 2023\ attainment\ EI}$$

Table 14-3 Contingency Measure Step 3 for VOC and NOx

| *Step* | Value | Units |
|---|---|---|
| *Step 3: VOC* | 1.0% x 24.22 = 0.24 | tpd |
| *Step 3: NOx* | 3.2% x 34.26 = 1.09 | tpd |

## 14.4 Delaware's Proposed Contingency Measures

### 14.4.1 Volatile Organic Compounds

Delaware is proposing to implement the OTC model rule for Consumer Products Phase V.[74] Delaware will update 7 **DE Admin. Code** 1141, *Limiting Emissions of Volatile Organic Compounds from Consumer and Commercial Products*, Section 2.0 *Consumer Products*, to require Phase V to be automatically triggered if the Philadelphia NAA does not attain by the end of the 2023 Ozone Season. The regulatory amendments will allow at least one year for existing sources to comply, as the additional emission reductions within the amendments may require reformulation of products. The compliance period would also allow retailers addition time to transition to compliant product. New sources would be expected to comply upon the effective date of the amendments. Delaware estimates that these amendments would result in 0.30 tpd of VOC reductions for 2023 in New Castle County.

### 14.4.2 Nitrogen Oxides

Delaware is proposing to amend regulations 7 **DE Admin. Code** 1112, *Control of Nitrogen Oxides Emissions*, and/or 1142, *Specific Emission Control Requirements*, by reducing emission limits, to obtain the required NOx emission reductions of 1.09 tpd. Regulation 1112 applies to major stationary sources of NOx that have fuel burning equipment with a rated heat input capacity of 100 Million btu/hour or greater. Regulation 1142 applies to any person that owns or operates any combustion unit with a maximum heat input capacity of equal to or greater than 100 million btu per hour.

The amendments would automatically be triggered if the Philadelphia NAA does not attain by the end of the 2023 Ozone Season. The amendments will allow at least one year for existing sources to comply, as sources may require time to install or upgrade controls. New sources would be expected to comply upon the effective date of the amendments.

[74] Ozone Transport Commission. Retrieved on September 18, 2023. https://otcair.org/document.asp?fview=modelrules

### 14.5 Contingency Measure Implementation

Delaware may adopt additional or alternative rulemakings to replace or augment the proposed contingency measures mentioned above. These rulemakings would provide equivalent or greater emission reductions, as required to achieve EPA's total contingency measure emission reduction requirements for Delaware. The new rulemakings would include a public comment period and public hearing. The actions would subsequently be submitted to the Delaware SIP for review by EPA.

In the event that EPA's draft contingency measure emissions calculation methodology is revised, Delaware reserves the right to draft new contingency measures to meet EPA's revised emission reduction requirements for Delaware. These new contingency measures would also include a public comment period and public hearing and would be submitted to the Delaware SIP.

# ATTACHMENTS

## <u>FINAL Proposal</u>

**DELAWARE STATE IMPLEMENTATION PLAN REVISION MODERATE NON-ATTAINMENT PLAN FOR NEW CASTLE COUNTY FOR THE 2015 8-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD**

The New Castle County Portion of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Non-attainment Area

Submitted To
U.S. Environmental Protection Agency

By

Delaware Department of Natural Resources and
Environmental Control

**November 28, 2023**

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# Appendix A

# 2017 Base Year Emissions Inventory State Implementation Plan for VOC, $NO_X$, and CO

# For Areas of Marginal Nonattainment of the 2015 Ozone NAAQS in Delaware

# F I N A L

Submitted to:

**U.S. Environmental Protection Agency**

**Region 3 – Philadelphia, PA**

Prepared by:


**Department of Natural Resources & Environmental Control**

**Division of Air Quality**

**Airshed Planning & Inventory Program**

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**November 2020**

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# SECTION 1 - 2017 OZONE INVENTORY OVERVIEW AND SUMMARY

## 1.1 Introduction

This document contains Delaware's base year emissions inventory State Implementation Plan (SIP) revision under the 2015 8-hour ozone National Ambient Air Quality Standard (NAAQS) set forth by US Environmental Protection Agency (EPA).

## 1.2 Background and Requirements

Ground-level ozone, one of the principal components of "smog," is a serious air pollutant that harms human health and the environment. High levels of ozone can damage the respiratory system and cause breathing problems, throat irritation, coughing, chest pains, and greater susceptibility to respiratory infection. High levels of ozone also cause serious damage to forests and agricultural crops, resulting in economic losses to logging and farming operations. Ozone is generally not directly emitted to the atmosphere. It is formed in the atmosphere by photochemical reactions among volatile organic compounds (VOC), oxides of nitrogen ($NO_X$), and carbon monoxide (CO) in the presence of sunlight.

In October 2015, the EPA revised the 2008 8-hour ozone NAAQS of 0.075 parts per million (ppm) to 0.070 ppm (80 FR 65291). The 2015 ozone NAAQS of 0.070 ppm is expected to provide better protections of public health and environment. In a final rule dated June 4, 2018, the EPA designated 51 areas in the country as nonattainment for the 2015 ozone NAAQS.

New Castle County of Delaware was designated nonattainment as a part of the Philadelphia-Wilmington-Atlantic City Marginal Nonattainment Area (NAA) (83 FR 25776). Since this marginal NAA is centered by the City of Philadelphia, it is often referred to as "the Philadelphia NAA." In the same final rule, Kent and Sussex Counties were designated as attainment (83 FR 25776). The EPA made the designations of these three counties based on their 2014-2016 design values, and the effective date of the designations was August 3, 2018.

To facilitate planning, Sections 182(a)(1) and 172(c)(3) of the Clean Air Act (CAA) require all ozone NAAs to establish a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutant or pollutants in the area by August 3, 2020 (i.e., two years after designation as nonattainment). This inventory is commonly referred to as a base year inventory. Delaware has previously been designated nonattainment for ozone under the 1979 1-hour, 1997 8-hour, and 2008 8-hour ozone NAAQSs, and has therefore been subject to this emission inventory requirement since the 1990 amendments to the CAA.

Delaware has developed emission inventories that meet the criterion of CAA 182(a)(1) and 172(c)(3) every three years since 1990. Delaware's latest comprehensive, accurate inventory of actual emissions from all sources of VOC, $NO_X$, and CO in the State covered calendar year 2017. The purpose of this SIP revision is to establish Delaware's calendar year 2017 emissions inventory, described in this document, as its base year emissions inventory under the 2015 8-hour ozone NAAQS.[1]

[1] Per 40 CFR 51.1315, a base year inventory only requires emissions from sources of VOC and $NO_X$. However, Delaware included sources of CO to be consistent with past base year inventory reports.

## 1.3 Responsibilities

The agency with direct responsibility for developing and submitting this SIP revision is Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Air Quality (DAQ), under the Division Director, David F. Fees, P.E. The working responsibility for Delaware's air quality SIP planning falls within DAQ's Planning Section, with Acting Section Manager, Valerie Gray, and Airshed Planning and Inventory Program Manager, Renae Held. Shane Cone, Jacquelyn Cuneo, and Jolyon Shelton, of DAQ's Planning Section are the authors of this document.

## 1.4 Project Management

The Airshed Planning and Inventory (API) Program and the Greenhouse Gas, Mobile, and Air Toxics Program within the Planning Section of DAQ were responsible for preparing the 2017 Periodic Emission Inventory (PEI) for criteria pollutants to include emissions of VOC, $NO_X$, and CO summarized in this report. Internal planning began in September 2017, with focus on the 2017 point source inventory reporting cycle taking place in March and April of 2018.

The project manager was responsible for identifying overall inventory goals, objectives, and deadlines, initiating inventory planning, approving estimation methodologies recommended by staff, reviewing emissions development work, and preparing inventory reports and documentation.

### *1.4.1 Point Sources*

Point sources staff was responsible for the following:

- Identifying point source inventory goals, objectives, and deadlines;
- Establishing the universe of facilities to inventory;
- Providing training and guidance to industry representatives;
- Performing a technical review of emissions data submitted by facilities;
- Working with facility representatives to correct errors;
- Managing the point source inventory database; and
- Overseeing quality control of point sources data.

### *1.4.2 Nonpoint and Nonroad Sources*

Nonpoint and nonroad sources staff was responsible for the following:

- Researching and recommending emission estimation methodologies;
- Defining all simplifying assumptions;
- Obtaining 2017 activity data, current emission factors, and applicable control information;
- Using spreadsheets to calculate emissions;
- Providing data to the EPA for developing aircraft emissions;
- Reviewing emission calculations for accuracy and completeness;
- Preparing report documents; and
- Compiling supporting documentation.

### *1.4.3 Onroad Mobile Sources*

Onroad mobile sources staff was responsible for the following:

- Downloading EPA's Motor Vehicle Emission Simulator (MOVES) MOVES2014b model;
- Obtaining 2017 vehicle miles traveled (VMT), vehicle registration, and other mobile input data from the Delaware Department of Transportation (DelDOT);
- Obtaining other data for inclusion in the model inputs;
- Preparing the input files for running MOVES;
- Running MOVES and summarizing the model outputs;
- Reviewing emissions for accuracy and completeness;
- Preparing report documents; and
- Compiling supporting documentation.

As is noted in Section 5 of this report, DAQ is utilizing output from EPA's 2017 National Emission Inventory (NEI) run of the MOVES model.

## 1.5 Inventory Planning

Calendar year 2017 is a PEI year as defined by the Air Emissions Reporting Requirements (AERR). The AERR specifies the emissions data for criteria pollutants that are required to be reported to EPA's NEI. A PEI requires the development of emissions estimates from all sources within a state or local area for all criteria pollutants and their precursors. As such, the 2017 emissions inventory can provide the necessary data for the 2015 8-hour ozone NAAQS base year inventory.

### *1.5.1 Inventory Parameters*

The inventory parameters defined by the base year emissions inventory requirements for the 2015 8-hour ozone NAAQS include the following:

- **Inventory year** – 2017
- **Pollutants** – VOC, $NO_X$, and CO as precursors to ozone
- **Source coverage** – All sources, including point, nonpoint, nonroad, and onroad mobile sources
- **Spatial resolution** – County level emissions
- **Geographic coverage** – New Castle County
- **Temporal resolution** – Annual and summer season weekday (SSWD) daily emissions. The summer season is defined as the months June, July, and August. Weekday is defined as the days Monday, Tuesday, Wednesday, Thursday, and Friday.

### *1.5.2 Data Collection and Management*

For all source categories, the gathering of local activity data represented a major task spread over many months. For point sources, all facilities reported their emissions through the use of the State and Local Emissions Inventory System (SLEIS) on-line reporting application. Data entered into the on-line application was transferred to a DAQ database for review and correction.

Microsoft Excel® spreadsheets were employed for managing activity data and calculating emissions from stationary nonpoint sources and some nonroad categories. A consistent set of tabs within each source category spreadsheet included activity data, point source data (if applicable, for back outs), emission factors, controls, emission calculations, NEI input formats, and notes on QA/QC procedures.

Emissions for most of the nonroad vehicles and equipment categories were calculated using the MOVES Nonroad model. Aircraft engine emissions for landing and take-offs at airports in Delaware were calculated by the EPA after a review of this data by DAQ.

Emissions data were transferred from SLEIS (point sources), from the nonpoint and nonroad spreadsheets, and from the model outputs to staging tables in Microsoft Access® databases. These databases were then converted to XML files via the Emissions Inventory System (EIS) bridge tool, and then transmitted to the EIS via the Central Data Exchange (CDX) web client to meet EPA NEI deadlines.

## 1.6 Inventory Development

For point sources, DAQ developed a set of criteria to use in establishing the universe of facilities required to report. These criteria are presented in the point source section of this report (Section 2). A reporting structure was created within SLEIS for each facility meeting one or more of the reporting criteria. An extensive amount of review and follow up was performed on the point source data submitted by facilities.

For nonpoint sources, the first task involved gathering activity data for each source category. In many cases, these data were obtained from Delaware-specific sources. In some cases, the activity data were developed through the allocation of a portion of a national activity dataset (*i.e.*, national off-road equipment populations) to Delaware. Basic demographic data were also used for some source categories and are presented in Table 1-1. Once activity data were obtained, spreadsheets were developed to manage the data and combine the activity data with the selected emission factors to obtain uncontrolled emissions. Finally, for those sources where controls were applied, emissions were adjusted to account for control efficiency, rule effectiveness, and rule penetration.

**Table 1-1. 2017 Demographic Data for New Castle County**

| Demographic Parameter | New Castle County |
|---|---|
| Population[2] | 564,193 |
| Households[2] | 207,325 |
| Land Area (square miles) | 439 |
| Annual VMT (million miles) | 6,095 |

For onroad mobile and nonroad equipment, the MOVES model was used to develop emissions from these sources. In the use of the model, activity data was included in the model input files. For any type of data used by the model for which Delaware-specific data did not exist, the model used the system defaults. Details about Delaware-specific and default parameters are discussed in the nonroad and onroad and sections of this report (Sections 4 and 5, respectively).

[2] Delaware Population Consortium, 2017 estimate: https://stateplanning.delaware.gov/demography/dpc.shtml

## 1.7 Emissions Summary

The following emission summaries present the 2017 emissions inventory for VOC, $NO_X$, and CO for New Castle County by source sector. Throughout this document, annual emissions are reported in tons per year (tpy) and SSWD daily emissions in tons per day (tpd). The totals may not match the sum of the individual values due to independent rounding.

**Table 1-2. 2017 New Castle County Emissions by Source Sector**

| Source Sector | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | VOC | $NO_X$ | CO |
| Point | 747 | 2,504 | 1,766 | 3.11 | 14.53 | 10.42 |
| Nonpoint | 3,387 | 1,444 | 3,527 | 10.63 | 2.76 | 6.76 |
| Nonroad | 2,245 | 3,152 | 23,844 | 7.68 | 9.27 | 92.89 |
| Onroad | 2,213 | 5,184 | 28,807 | 6.23 | 15.70 | 87.23 |
| **All Sectors** | **8,592** | **12,284** | **57,944** | **27.65** | **42.26** | **197.30** |

# SECTION 2 - STATIONARY POINT SOURCES

The point source inventory represents facility-specific data for larger stationary sources. Emissions data for all other source categories are reported at the county level. Point sources typically include large industrial, commercial, and institutional facilities. Manufacturing facilities, within the industrial sector, comprise the majority of all reporting point sources. The institutional sector includes hospitals, universities, prisons, military bases, landfills, and wastewater treatment plants.

The planning and execution of the point source inventory was accomplished in the following chronological order:

- Establish the reporting criteria and list of facilities to survey;
- Obtain inventory data from facilities;
- Perform administrative and technical review of data received from facilities;
- Seek resubmissions/corrections from facilities based on data review;
- Perform internal data manipulation (*i.e.*, apply rule effectiveness, remove non-reactive VOCs, create SSWD daily emission values); and
- Prepare inventory data files, report, and supporting documentation.

A final activity is to provide point source back out data, if there is overlap between point sources and stationary nonpoint source categories. Point source back out data includes emissions, throughput, and/or employees, depending on the nonpoint source category methodology.

The following criteria were established for defining the universe of facilities to be surveyed for 2017:

- Facilities that held a Title V permit in 2017; and
- Facilities that held a Synthetic Minor permit in 2017.

Based on these criteria, 126 facilities statewide reported air emissions data for 2017. Only New Castle County has been designated as marginal nonattainment in Delaware for the 2015 8-hour ozone NAAQS. Therefore, only 82 facilities that are located within New Castle County will be presented in this report.

## 2.1 Emissions Estimation and Methodology

Unlike other source sector emissions which are estimated by DAQ, point source emissions data are submitted to DAQ by the facilities. Emissions are reported at the process level and include both confined (stack) emission points as well as unconfined (fugitive) emission sources. A key aspect of point source data is the inclusion of facility coordinates to accurately allocate emissions spatially within a county for purposes of performing air dispersion modeling.

The summer months of June, July, and August were used to calculate point source SSWD emissions. The first step in calculating SSWD emissions was to calculate the number of weekdays that each process operated during summer months, *Summer Season Weekdays*. The following parameters were utilized to calculate *Summer Season Weekdays*:

- *Summer Season Days*: Facilities reported the total number of days (including weekdays and weekends) that each process operated during the summer months (June, July, and August) in SLEIS.
- *Average Days / Week*: Facilities reported the average process operating schedule in days per week in SLEIS.

*Summer Season Weekdays* were calculated using the following assumptions:

- If *Average Days / Week* is less than or equal to 5 days, then *Summer Season Weekdays* = *Summer Season Days*.
- If *Average Days / Week* is greater than 5, but less than or equal to 6 days, then *Summer Season Weekdays* = (*Summer Season Days* * 5/6).
- If *Average Days / Week* is greater than 6, but less than or equal to 7 days, then *Summer Season Weekdays* = (*Summer Season Days* * 5/7).

To calculate SSWD emissions per process, the following equation was used:

$$\frac{\left(\frac{(June + July + August\ Throughput)}{Annual\ Throughput}\right) \ x \ \ Total\ Emissions}{Summer\ Season\ Weekdays}$$

where: June + July + August Throughput = A facility's reported monthly throughput for each process in SLEIS.
Annual Throughput = SLEIS calculated annual throughput for each process as the sum of reported monthly throughput.
Total Emissions = A facility's reported total emissions per pollutant for each process in SLEIS.
Summer Season Weekdays = Value calculated as described above.

The SSWD emissions per facility is the sum of the SSWD emissions for each process at that facility.

## 2.2 Emissions Summary

Annual and SSWD emissions for the 82 facilities located within New Castle County are summarized in Table 2-1 and provided in Appendix A.

## Table 2-1. 2017 Facility-Level Emissions for New Castle County

| | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| Facility Name | VOC | $NO_X$ | CO | VOC | NOx | CO |
| 1007 Market Condominium Association | <1 | 6 | 5 | <0.01 | 0.03 | 0.03 |
| Aearo Technologies LLC | 5 | <1 | <1 | 0.02 | <0.01 | <0.01 |
| Alfred I. duPont Hospital for Children | <1 | 18 | 11 | 0.03 | 0.59 | 0.19 |
| Allan Myers Delaware, Inc. - Wilmington | 1 | 2 | 5 | <0.01 | 0.01 | 0.03 |
| American Air Liquide - Glasgow | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Amtrak Wilmington Maintenance Facility | 1 | | | <0.01 | | |
| AstraZeneca Pharmaceuticals, LLC - Fairfax | <1 | 2 | <1 | <0.01 | 0.03 | <0.01 |
| AstraZeneca Pharmaceuticals, LLC - Newark | <1 | 6 | 5 | <0.01 | 0.02 | 0.02 |
| Bank of America - Bracebridge | <1 | 2 | 1 | <0.01 | 0.03 | <0.01 |
| Bank of America - Christiana Complex | <1 | <1 | <1 | <0.01 | 0.02 | <0.01 |
| Bank of America - Deerfield | <1 | 1 | <1 | <0.01 | 0.02 | <0.01 |
| BASF Colors & Effects, Newport | 22 | 17 | 31 | 0.07 | 0.08 | 0.11 |
| Bilcare Research, Inc | 2 | 2 | 2 | <0.01 | <0.01 | <0.01 |
| Boxwood Industrial Park, LLC | <1 | 2 | 1 | 0.00 | 0.00 | 0.00 |
| Calpine - Christiana Energy Center | <1 | <1 | <1 | <0.01 | 0.12 | <0.01 |
| Calpine - Delaware City Energy Center | <1 | <1 | <1 | <0.01 | 0.05 | <0.01 |
| Calpine - Edge Moor Energy Center | 8 | 97 | 76 | 0.16 | 1.81 | 1.53 |
| Calpine - Hay Road Energy Center | 30 | 498 | 120 | 0.14 | 2.33 | 0.56 |
| Calpine - West Energy Center | <1 | <1 | <1 | <0.01 | 0.05 | <0.01 |
| Christiana Care - Christiana Hospital | 4 | 15 | 24 | 0.02 | 0.10 | 0.10 |
| Christiana Care - Wilmington Hospital | <1 | 7 | 5 | <0.01 | 0.06 | 0.02 |
| Christiana Materials | 2 | 4 | 14 | 0.01 | 0.03 | 0.09 |
| Clean Earth of New Castle | <1 | 6 | 3 | <0.01 | 0.06 | 0.03 |
| Contractor's Materials | 3 | 2 | 11 | 0.01 | <0.01 | 0.05 |
| Corrado Construction | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Croda, Inc. | 9 | 18 | 13 | 0.04 | 0.10 | 0.05 |
| Dana Railcare | <1 | <1 | <1 | 0.02 | <0.01 | <0.01 |
| Dassault Falcon Jet - Wilmington Corp. | 11 | 1 | <1 | 0.05 | <0.01 | <0.01 |
| DE Solid Waste Authority - Cherry Island | 4 | 13 | 44 | 0.02 | 0.05 | 0.15 |
| Delaware City Refining Company - Delaware City | 341 | 1,456 | 1,067 | 1.47 | 5.99 | 5.75 |
| Delaware City Refining Company - Marketing Terminal | 23 | <1 | <1 | 0.10 | <0.01 | <0.01 |
| Delaware Park Horse Racing Track | <1 | <1 | <1 | <0.01 | 0.02 | 0.03 |
| Delaware Recyclable Products, Inc. | 4 | 5 | 22 | 0.01 | 0.02 | 0.07 |
| Department of Veterans Affairs Medical Center | <1 | 2 | 2 | <0.01 | 0.02 | 0.02 |
| Diamond Materials, LLC | 1 | 2 | 13 | <0.01 | 0.01 | 0.07 |
| Diamond State Port Corporation - Port of Wilmington | 52 | 52 | 11 | 0.08 | 0.45 | 0.07 |
| DuPont Chestnut Run | <1 | 9 | 11 | <0.01 | 0.03 | 0.04 |
| DuPont Experimental Station | 9 | 55 | 36 | 0.05 | 0.49 | 0.21 |
| DuPont Nutrition USA, Inc. | 3 | 21 | 90 | 0.01 | 0.12 | 0.44 |
| Eastern Shore Natural Gas - Delaware City | 3 | 6 | <1 | 0.01 | 0.03 | <0.01 |
| First State Investors 5200 | <1 | <1 | <1 | <0.01 | 0.03 | <0.01 |
| FMC Stine Research Center | 3 | 9 | 9 | 0.01 | 0.05 | 0.05 |
| Formosa Plastics Corporation | 47 | 29 | 20 | 0.17 | 0.14 | 0.08 |
| GE Aviation - Newark, DE | 3 | <1 | <1 | 0.02 | <0.01 | <0.01 |
| Hercules Inc., Research Center | <1 | 2 | 4 | 0.02 | <0.01 | 0.01 |
| Honeywell / City of Wilmington (REBF) | 4 | 2 | 4 | 0.03 | 0.02 | 0.03 |

| Facility Name | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | VOC | NOx | CO |
| Howard R. Young Correctional Institution | <1 | 1 | <1 | <0.01 | 0.01 | <0.01 |
| IKO Production Wilmington Inc. | 5 | 4 | 3 | 0.02 | 0.03 | 0.02 |
| James T. Vaughn Correctional Center | 1 | 5 | 4 | <0.01 | <0.01 | <0.01 |
| JP Morgan Chase - 4001 Gov Printz Blvd. | 1 | 6 | 1 | 0.02 | 0.08 | 0.02 |
| JP Morgan Chase - Bear Christiana Road | <1 | 7 | 1 | <0.01 | 0.03 | <0.01 |
| JP Morgan Chase - Morgan Christiana Center | <1 | 6 | 1 | 0.01 | 0.63 | 0.11 |
| Kuehne Chemical Company | <1 | 2 | <1 | <0.01 | <0.01 | <0.01 |
| Linde LLC | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Magco Inc. | <1 | 2 | 3 | <0.01 | <0.01 | 0.01 |
| Magellan Midstream Partners | 48 | 4 | 2 | 0.06 | 0.03 | <0.01 |
| McConnell Johnson | <1 | <1 | <1 | <0.01 | 0.05 | 0.01 |
| Medal L.P., Air Liquide | 16 | 3 | 3 | 0.05 | <0.01 | <0.01 |
| Micropore, Inc. | 4 | | | 0.01 | | |
| Middletown Materials | <1 | 5 | 1 | <0.01 | 0.05 | 0.01 |
| New Haven Packaging, LLC | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Newark Data Center | <1 | <1 | <1 | <0.01 | 0.06 | 0.01 |
| News Journal Company | 1 | | | <0.01 | | |
| Noramco Inc. | <1 | 1 | 2 | <0.01 | <0.01 | <0.01 |
| PGR Holdings, LLC | <1 | 3 | <1 | <0.01 | <0.01 | <0.01 |
| Polymer Technologies, Inc. | 1 | <1 | <1 | 0.01 | <0.01 | <0.01 |
| Prince Minerals, Inc. | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Printpack, Inc. | 9 | 2 | 2 | 0.03 | <0.01 | <0.01 |
| PS-5 LLC (Community Education Building) | <1 | 13 | 11 | <0.01 | 0.05 | 0.04 |
| R & M Recycling | <1 | <1 | <1 | <0.01 | 0.02 | <0.01 |
| Rogers Corporation - Bear Facility | 4 | 2 | 2 | 0.02 | <0.01 | <0.01 |
| Rohm and Haas Electronic Materials, Cmp, Inc. | 6 | 3 | 4 | 0.05 | 0.05 | 0.02 |
| Siemens Healthcare Diagnostics - Glasgow | <1 | 8 | 6 | <0.01 | 0.08 | 0.03 |
| St. Francis Hospital | <1 | 3 | 3 | <0.01 | 0.02 | <0.01 |
| Stratis Visuals, LLC | 2 | | | <0.01 | | |
| Sunoco Partners & Marketing Terminal | 39 | 4 | 18 | 0.12 | 0.01 | 0.06 |
| Transflo Terminal Services, Inc. | <1 | | | <0.01 | | |
| University of Delaware - Newark | 4 | 20 | 27 | 0.01 | 0.08 | 0.07 |
| Veolia - Red Lion Plant | <1 | 19 | <1 | <0.01 | 0.10 | <0.01 |
| Verisign | <1 | <1 | <1 | <0.01 | 0.02 | 0.02 |
| WDK Energy Partners | <1 | <1 | <1 | <0.01 | <0.01 | <0.01 |
| Wilmington Wastewater Treatment Plant | <1 | 5 | 4 | <0.01 | 0.02 | 0.01 |
| **New Castle County Total** | **747** | **2,504** | **1,766** | **3.11** | **14.53** | **10.42** |

# SECTION 3 - STATIONARY NONPOINT SOURCES

Stationary nonpoint sources represent a large and diverse set of individual emission source categories. A nonpoint source category is either: 1) represented by small facilities too numerous to individually inventory, such as commercial cooking at restaurants and fuel combustion at a variety of small businesses; or 2) a common activity, such as residential open burning. Emissions from the nonpoint source categories were estimated at the county level.

## 3.1 Source Categories

There are a number of nonpoint source categories which contribute emissions of ozone precursors. These categories can be grouped into several category types. These include:

- **Solvent Use** – Many products used by homeowners and businesses contain VOC solvents to achieve the intended purpose of the product. Paints, cleaners, pesticides, personal care products, and inks are a few examples of products that contain VOC solvents.

- **Gasoline Usage** – The distribution and use of gasoline in vehicles and other gasoline-powered engines result in emissions of VOCs whenever the volatile gasoline vapors are allowed to escape.

- **Fuel Combustion** – The combustion of fuels in industrial, commercial, institutional, and residential furnaces, engines, boilers, wood stoves, and fireplaces create emissions of VOCs, $NO_X$, and CO.

- **Open Burning** – Open burning creates emissions of VOCs, $NO_X$, and CO. Open burning categories include trash burning, prescribed burning, burning of land clearing debris, wildfires, building fires, and vehicle fires.

Individual facilities are typically grouped with other like sources into a source category. Source categories are grouped in such a way that emissions are estimated collectively using one methodology. For the 2017 inventory, the distinction between point and nonpoint was defined by an annual emission threshold based on recent point source data (see Section 2 for point source criteria). Table 3-1 lists the source categories for which VOCs, $NO_X$, and CO for New Castle County were estimated.

## 3.2 Emission Estimation Methodologies and Activity Data

The 2014 Delaware PEI served as the starting point for nonpoint source category selection and methodology development. New methods were applied to some existing source categories, and emission factors were updated where available. New methods and emission factors came primarily from current *Emission Inventory Improvement Program, Volume III* documents and documented projects performed by the California Air Resource Board (CARB).

Other sources of information included the *Compilation of Air Pollutant Emission Factors, Volume I* (AP-42), the *Factor Information Retrieval System* (FIRE), and several projects performed by the Mid-Atlantic Regional Air Management Association (MARAMA), the Eastern Regional Technical Advisory Committee (ERTAC), and EPA. Also, a number of categories used the most recent emission factors listed in Nonpoint Method Advisory (NOMAD) committee Nonpoint Emissions Methodology and Operator Instructions (NEMO) documents, and emission factors as listed in the most recent version of the EPA Wagon Wheel Tool.

**Table 3-1. Nonpoint Source Categories Inventoried**

| VOC Emissions Only | Emissions of VOC, $NO_X$, and CO |
|---|---|
| Agricultural Pesticides | Agricultural Burning |
| AIM Coatings | Commercial Cooking - EPA |
| Asphalt Paving | Commercial Fuel Combustion |
| Autobody Refinishing | Industrial Fuel Combustion |
| Commercial & Consumer Products | Land Clearing Debris Burning |
| Degreasing | Prescribed Burning |
| Dry Cleaning | Residential Fuel Combustion |
| Gasoline (Petroleum) Marketing | Residential Open Burning |
| Graphic Arts | Residential Wood Combustion |
| Industrial Adhesives | Structure Fires |
| Industrial Surface Coatings | Vehicle Fires |
| Traffic Markings | Wildfires - EPA |

A major portion of the work involved in creating the 2017 nonpoint source inventory was in collecting activity data for each source category. The activity data gathered was related to the type of emission factors available and, in many cases, obtained from local sources. Surveys, letters, e-mails, and phone calls to individual businesses to obtain representative data for a source category was a technique used for several source categories. The type of activity data and the data source for each category is provided in Table 3-2.

Emissions from most nonpoint source categories were estimated by multiplying an indicator of collective activity by a corresponding emission factor. An indicator is any parameter associated with the activity level of a source, such as production, employment, fuel usage, or population that can be correlated with the emissions from that source. The corresponding emission factors are per unit of production, per employee, per unit of commodity consumed, or per capita, respectively. The basic equation that was applied to emission development for most nonpoint source categories is as follows:

$$Emissions\ (E) = Activity\ Data\ (Q) \times Emission\ Factor\ (EF)$$

If a source category had a regulatory control placed on it at the Federal or State level, the equation expands to the following:

$$E = Q \times EF \times [1 - (CE)(RE)(RP)]$$

where: CE = control efficiency
RE = rule effectiveness
RP = rule penetration

The control efficiency (CE) represents the typical emissions reduction achieved as compared to the otherwise uncontrolled emissions. A control may be a piece of equipment, such as a condenser used to recover vaporized solvent, or it may be an operational control, such as the use of only low VOC content paints.

Rule effectiveness (RE) reflects the ability of the regulatory program to achieve all emissions reductions that could have been achieved by full compliance with the applicable regulations at all sources at all times. If a rule is not being followed by all of the regulated community, then emissions will be higher than would otherwise be if there was 100% compliance. As an example, while the burning of trash is illegal under any circumstances in Delaware, the practice of burning household trash in backyard burn barrels still takes place in many rural areas of the State.

Rule penetration (RP) represents the percent of sources within a source category that are subject to the rule that requires control. As an example, gas stations that dispense more than 10,000 gallons of gasoline in a month are required by Delaware regulations to place vapor recovery systems on their gas pumps.[3] Those dispensing less than 10,000 gallons are not required to install controls. Therefore, RP is less than 100%. In the case of the burning of trash or leaves, no person or business is exempt, and thus RP is 100%.

An alternative to the use of an emission factor is the mass balance approach. The mass balance approach is applicable to VOC source categories where all of the VOC content in the products used evaporates and is emitted as a result of the normal use of the product. Delaware used the mass balance approach for several source categories, such as adhesives, asphalt paving, and painting (commercial, consumer, autobody, and traffic markings). Raw material or product purchase records were used to quantify emissions. Emissions were then equated to the VOC content of the material usage minus amounts leaving the site as or in waste.

To avoid double counting of emissions between point and nonpoint sources, point source back out was performed for the industrial and commercial fuel combustion categories and many of the solvent usage categories. Point source fuel usage was backed out from fuel consumption data obtained from the U.S. Department of Energy's (DOE) Energy Information Administration (EIA).[4] Point source employment was backed out from employment data obtained from the Delaware Department of Labor.

Non-reactive VOCs were excluded from emission estimates. Emission factors specified as non-methane organic carbon (NMOC) in *AP-42* were used when available. In some instances, the *AP-42* emission factor was in terms of total organic carbon (TOC) and the percentage of the methane component was indicated in a footnote. In these cases, the emission factor was reduced by the

[3] DAQ is in the process of amending its vapor recovery regulations to phase out Stage II vapor recovery systems at Delaware gasoline dispensing facilities, and to set up effective controls on vapor emission from gasoline underground storage tanks after phasing out Stage II systems (7 DE Admin. Code 1124).

[4] The primary EIA data that is used is from the State Energy Data System, SEDS: https://www.eia.gov/state/seds/?sid=DE. Other reports and forms from EIA are also used.

percentage of methane to remove the non-reactive methane component in the emission total. For example, for evaporative emissions from crude oil, the methane component was 15 percent. The emission factor was reduced by 15 percent to remove methane from the calculation.

Source activity may fluctuate significantly on a seasonal basis. As an example, residential wood combustion is primarily performed outside the summer season. Paint usage, on the other hand, is used more often in the warmer months of the year. Because nonpoint source emissions are generally a direct function of source activity, seasonal changes in activity levels were examined closely.

Delaware's 2017 inventory includes annual and SSWD emission calculations. SSWD daily emissions were developed through the use of a temporal allocation factor (TAF) applied to the annual emissions. Monthly and weekly profiles were used to develop the TAF. The monthly profile for each source category was developed through the use of monthly activity data, when available, or through EPA guidance (*Procedures, Volume I* and EIIP documents[5]). Most weekly profiles were developed through EPA guidance which defines activity taking place five, six, or seven days per week. Through EPA guidance, all TAFs include the work week. A few TAFs were developed based on the exact dates of episodic activity, such as firefighting training burns and prescribed fires. A full table of DNREC TAF is available in Appendix B.

[5] Air emissions inventory improvement program documents: https://www.epa.gov/air-emissions-inventories/air-emissions-inventory-improvement-program-eiip

**Table 3-2. Summary of 2017 Nonpoint Source Activity Data**

| Source Category | Activity Data | Source of Activity Data |
|---|---|---|
| Agricultural Burning | Acreage and vegetation type | DAQ Area Source Compliance Program |
| Agricultural Pesticides | Planted crop acreage | Delaware Department of Agriculture |
| AIM Coatings | Solvents in U.S. paint shipments; U.S. Population | U.S. Census Bureau |
| Asphalt Paving | Cutback and emulsified asphalt usage | Delaware Department of Transportation |
| Autobody Refinishing | Employment data; Autobody shop usage reports | Delaware Department of Labor; Autobody shops |
| Commercial & Consumer Products | Population | Delaware Population Consortium |
| Commercial Cooking | Population | Delaware Population Consortium |
| Commercial Fuel Combustion | Fuel consumption | DOE Energy Information Admin. |
| Degreasing | Employment data | Delaware Department of Labor |
| Dry Cleaning | Facility-level solvent usage | DAQ Area Source Compliance Program |
| Gasoline (Petroleum) Marketing | Gasoline fuel sales; VMT through use of MOVES (Stage 2); employment data (comm. portable fuel containers) | FHWA Motor Fuel Tax Administration; DelDOT (VMT); Delaware Department of Labor (employment data) |
| Graphic Arts | Employment data | Delaware Department of Labor |
| Industrial Adhesives | Population | Delaware Population Consortium |
| Industrial Fuel Combustion | Fuel consumption | DOE Energy Information Admin. |
| Industrial Surface Coatings | Employment data | Delaware Department of Labor |
| Land Clearing Debris Burning | Acreage disturbed during road, commercial, and residential construction | DAQ data calculated for the construction dust categories |
| Prescribed Burning | Acreage and vegetation type | DAQ Area Source Compliance Program |
| Residential Fuel Combustion | Fuel consumption | DOE Energy Information Admin. |
| Residential Open Burning | Rural households | U.S. Census Bureau |
| Residential Wood Combustion | Occupied households | Delaware Population Consortium |
| Structure Fires | Number of structures fires | Delaware Fire Marshal and DAQ Area Source Compliance Program |
| Traffic Markings | U.S. paint shipments; U.S. and State public road miles | U.S. Census Bureau; FHWA highway statistics publication |
| Vehicle Fires | Number of vehicle fires | Delaware Fire Marshal |
| Wildfires | Acreage and vegetation type | Delaware Division of Forestry |

## 3.3 Emissions Summary

Table 3-3 provides a summary of the 2017 annual (tpy) and SSWD daily (tpd) emissions for each nonpoint source category for New Castle County.

## Table 3-3. Summary of 2017 Nonpoint Emissions for New Castle County

| Source Categories | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | VOC | $NO_X$ | CO |
| **SOLVENT USE** | | | | | | |
| Agricultural Pesticides | 117 | --- | --- | 0.32* | --- | --- |
| AIM Coatings | 403 | --- | --- | 1.45 | --- | --- |
| Asphalt Paving | <1 | --- | --- | <0.01 | --- | --- |
| Auto Refinishing | 29 | --- | --- | 0.08 | --- | --- |
| Commercial & Consumer Products | 1,118 | --- | --- | 3.17 | --- | --- |
| Dry Cleaning | 1 | --- | --- | 0.01 | --- | --- |
| Graphic Arts | 257 | --- | --- | 0.99 | --- | --- |
| Industrial Adhesives & Sealants | 107 | --- | --- | 0.41 | --- | --- |
| Industrial Surface Coating | 79 | --- | --- | 0.30 | --- | --- |
| Solvent Cleaning | 91 | --- | --- | 0.29 | --- | --- |
| Traffic Markings | 2 | --- | --- | 0.01 | --- | --- |
| **Solvent Use Total** | **2,205** | --- | --- | **7.04** | --- | --- |
| **GASOLINE MARKETING** | | | | | | |
| *Retail Gasoline Stations* | 402 | --- | --- | 1.91 | --- | --- |
| *Other Gasoline Marketing Activities* | | | | | | |
| Aircraft Refueling | 3 | --- | --- | <0.01 | --- | --- |
| Marinas | 0 | --- | --- | 0 | --- | --- |
| Portable Fuel Containers | 120 | --- | --- | 0.33 | --- | --- |
| CMV Loading and Transport | 117 | --- | --- | 0.32 | --- | --- |
| **Gasoline Marketing Total** | **642** | --- | --- | **2.57** | --- | --- |
| **FUEL COMBUSTION** | | | | | | |
| Commercial/Institutional | 21 | 384 | 289 | 0.04 | 0.73 | 0.43 |
| Industrial | 36 | 585 | 268 | 0.10 | 1.66 | 0.80 |
| Residential Fossil Fuel | 23 | 426 | 175 | 0.02 | 0.28 | 0.12 |
| Residential Wood | 353 | 40 | 2,385 | 0.76* | 0.09* | 5.15* |
| **Fuel Combustion Total** | **433** | **1,435** | **3,117** | **0.92** | **2.76** | **6.50** |
| **OPEN BURNING** | | | | | | |
| Agricultural Burning | 1 | <1 | 8 | <0.01 | <0.01 | <0.01 |
| Residential Open Burning | 2 | <1 | 15 | <0.01 | <0.01 | <0.01 |
| Land Clearing Debris Burning | 0 | 0 | 0 | 0 | 0 | 0 |
| Prescribed Burning | 65 | 5 | 273 | <0.01 | <0.01 | <0.01 |
| Structure Fires | 3 | <1 | 15 | <0.01 | <0.01 | <0.01 |
| Vehicle Fires | 1 | <1 | 3 | <0.01 | <0.01 | <0.01 |
| Wildfires | 0 | 0 | 0 | 0 | 0 | 0 |
| **Open Burning Total** | **72** | **9** | **314** | **<0.01** | **<0.01** | **<0.01** |
| **MISCELLANEOUS SOURCES** | | | | | | |
| Commercial Cooking | 35 | 0 | 96 | 0.10* | 0 | 0.26* |
| | | | | | | |
| **NONPOINT SECTOR TOTAL** | **3,387** | **1,444** | **3,527** | **10.63*** | **2.76*** | **6.76*** |

* These figures include EPA annual totals with Delaware-specific temporal profiles for SSWD calculation.

# SECTION 4 - NONROAD MOBILE SOURCES

Nonroad mobile sources represent a large and diverse set of off-road vehicles and non-stationary equipment. Emission estimates of VOCs, $NO_X$, and CO for this source sector account for exhaust emissions from engine fuel combustion.

Nonroad vehicles and equipment are grouped into four source category types for the purpose of developing emission estimates. These include:

- **Aircraft** – Commercial, military, and private aircraft.

- **Locomotives** – Commercial line haul and yard locomotives.

- **Commercial Marine Vessels (CMVs)** – Various types of vessels that navigate the Delaware Bay and River and the Chesapeake and Delaware Canal are included under this source category. Recreational boats are included in the next category.

- **Other Off-road Vehicles and Equipment** – All other off-road emission sources are accounted for through the use of EPA's MOVES2014b model in Nonroad mode. The model compiles off-road equipment pertinent to Delaware into the following subcategories:

    - Recreational (land-based);
    - Construction;
    - Industrial;
    - Lawn and Garden;
    - Agricultural;
    - Commercial;
    - Logging;
    - Airport Ground Support;
    - Recreational Marine; and
    - Railway Maintenance.

Individual equipment Source Classification Codes (SCCs) covered in the MOVES Nonroad model are further broken down by the fuel type, including 2-stroke gasoline, 4-stroke gasoline, diesel, liquefied petroleum gas (LPG), and compressed natural gas (CNG).

## 4.1 Emission Estimation Methodologies

The 2014 Delaware PEI served as the starting point for nonroad source category selection and methodology development. No new sources were added to Delaware's off-road mobile source inventory. However, EPA ran the Federal Aviation Administration's (FAA) new Aviation Environmental Design Tool (AEDT) in 2017, and Delaware is adopting these emission estimates.

Similar to the estimation of stationary nonpoint emissions, off-road equipment emissions were estimated by multiplying an indicator of collective activity within the inventory area for a source category by a corresponding emission factor. The indicators of activity for off-road sources include landing and take-offs (LTOs), vessel port-of-calls, time-in-mode (TIMs, which are pertinent to aircraft and CMVs), gross ton miles (locomotives), equipment populations, and economic activity (both pertinent to nonroad equipment) that can be correlated with the emissions from that source. The corresponding emission factors are amount of pollutant (either grams or pounds) per unit of fuel used (locomotives and military/commercial aircraft), per LTO (air taxi and general aviation), or per unit of power output in brake horsepower or kilowatt-hours (nonroad equipment and CMVs, respectively).

A major portion of the work involved in creating the 2017 nonroad source inventory was in collecting activity data for each source category. The activity data gathered was related to the type of emission factors available and, in many cases, obtained from local sources. More information about gathering activity data for each source category is presented below.

There are no point source data that must be backed out of the nonroad mobile source sector. Even though larger airports may report as a point source, their reported point source emissions do not include ground support equipment or aircraft engine emissions. Also, aircraft emissions are estimated only for LTOs that take place at a Delaware airport. Emissions from aircraft that transit Delaware airspace are not included in Delaware's inventory.

### 4.2 Emissions Summary

Table 4-1 provides the summary of the 2017 annual (tpy) and SSWD daily (tpd) emissions for New Castle County for aircraft, locomotives, commercial marine vessels, and all equipment emissions estimated using EPA's MOVES Nonroad model. The nonroad sector is a significant contributor to ozone precursors in Delaware.

**Table 4-1. Summary of 2017 Nonroad Emissions for New Castle County**

| | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| **Source Categories** | **VOC** | **$NO_X$** | **CO** | **VOC** | **$NO_X$** | **CO** |
| MOVES Nonroad Equipment | 2,090 | 1,110 | 23,112 | 7.25 | 3.68 | 90.89 |
| Aircraft | 47 | 78 | 463 | 0.13 | 0.21 | 1.27 |
| Locomotives | 28 | 432 | 70 | 0.08* | 1.18* | 0.19* |
| Commercial Marine Vessels | 80 | 1,532 | 199 | 0.22* | 4.20* | 0.54* |
| **TOTAL** | 2,245 | 3,152 | 23,844 | 7.68 | 9.27 | 92.89 |

* These figures include EPA annual totals with Delaware-specific temporal profiles for SSWD calculation.

### 4.3 MOVES 2014b Nonroad Model Equipment

DAQ used MOVES2014b to develop 2017 annual and SSWD daily emission estimates for New Castle County. Most equipment covered by the MOVES Nonroad model is powered by diesel-fueled compression-ignition engines or gasoline-fueled spark-ignition engines. Engines fueled by compressed natural gas (CNG) and liquefied petroleum gas (LPG) are also included in the Nonroad model. Table 4-2 lists general SCCs addressed by the model. Equipment categories are defined at the 7-digit SCC level (with recreational marine and railway maintenance being exceptions) and specific equipment are defined at the 10-digit SCC level.

To estimate pollutant emissions, the MOVES Nonroad model multiplies equipment populations and their associated activity by the appropriate emission factors. Geographic allocation factors (GAFs) are used to distribute national equipment populations to states/counties. These factors are based on surrogate indicators of equipment populations. For example, harvested cropland is the surrogate indicator used in allocating agricultural equipment. A national average engine activity (*i.e.*, load factor times annual hours of use) is used in the MOVES Nonroad model.

**Table 4-2. SCCs Addressed by the Nonroad Model**

| Nonroad SCCs | SCC Descriptions | Nonroad SCCs | SCC Descriptions |
|---|---|---|---|
| 2260xxxxxx | 2-stroke gasoline engines | 2268xxxxxx | CNG engines |
| 2260001xxx | - recreational vehicles | 2268002xxx | - construction equipment |
| 2260002xxx | - construction equipment | 2268003xxx | - industrial equipment |
| 2260003xxx | - industrial equipment | 2268005xxx | - agricultural equipment |
| 2260004xxx | - lawn & garden equipment | 2268006xxx | - light commercial equipment |
| 2260005xxx | - agricultural equipment | 226801xxxx | - oil field equipment |
| 2260006xxx | - light commercial equipment | 2270xxxxxx | Diesel engines |
| 2260007xxx | - logging equipment | 2270001xxx | - recreational vehicles |
| 2265xxxxxx | 4-stroke gasoline engines | 2270002xxx | - construction equipment |
| 2265001xxx | - recreational vehicles | 2270003xxx | - industrial equipment |
| 2265002xxx | - construction equipment | 2270004xxx | - lawn & garden equipment |
| 2265003xxx | - industrial equipment | 2270005xxx | - farm equipment |
| 2265004xxx | - lawn & garden equipment | 2270006xxx | - light commercial equipment |
| 2265005xxx | - agricultural equipment | 2270007xxx | - logging equipment |
| 2265006xxx | - light commercial equipment | 2270008xxx | - airport service equipment |
| 2265007xxx | - logging equipment | 2270009xxx | - underground mining equipment |
| 2265008xxx | - airport service equipment | 227001xxxx | - oil field equipment |
| 226501xxxx | - oil field equipment | 2282xxxxxx | Recreational marine equipment |
| 2267xxxxxx | LPG engines | 2285xxx015 | Railway maintenance equipment |
| 2267001xxx | - recreational vehicles | | |
| 2267002xxx | - construction equipment | | |
| 2267003xxx | - industrial equipment | | |
| 2267004xxx | - lawn & garden equipment | | |
| 2267005xxx | - agricultural equipment | | |
| 2267006xxx | - light commercial equipment | | |
| 2267008xxx | - airport service equipment | | |

MOVES Nonroad model option files were prepared to account for temperatures and fuel characteristics representative for each of the four seasons (winter, spring, summer, and fall). Temperature and fuel input values for each three-month period (December-February, March-May, June-August, and September-November) were averaged to estimate seasonal values. Minimum, maximum, and average temperatures per month were obtained from the National Weather Service for the New Castle County Airport. Table 4-3 presents a summary of county temperature and gasoline fuel characteristics data used for each season. A sulfur content of 15 ppm for nonroad diesel fuel was used for 2017 based on EPA requirements.

**Table 4-3. 2017 MOVES Nonroad Model Temperature and Fuel Characteristic Input Values by Season for New Castle County**

| Season | Reid Vapor Pressure (RVP) | Gasoline Sulfur ppm | Daily Average Temperature, °F | | |
|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average |
| Summer | 6.9 | 10 | 65 | 83 | 75 |
| Autumn | 9.75 | 10 | 42 | 77 | 60 |
| Winter | 11.31 | 10 | 31 | 51 | 39 |
| Spring | 9.75 | 10 | 36 | 60 | 54 |

A single MOVES Nonroad model run was used to compute both the SSWD emissions and the annual emissions. To achieve this, MOVES Nonroad was run by selecting all months, both day types, all hours, and the output time aggregation of "24-hour day". An Excel pivot table was created from the MOVES Output Table (provided in Appendix C, Tab 1. Pivot_SSWD & Annual) to select the summer months of June, July, and August and just the weekdays. The pivot table results were averaged to calculate average SSWD emissions for each pollutant.

The first step in calculating annual emissions was to calculate *Daily Emissions* from the MOVES Output Table. A new column was added to the same MOVES Output Table to calculate *Daily Emissions* using the following equation:

$$emissionQuant \;\; x \;\; (DayID / 7) \;\; x \;\; DaysInMonth$$

where:
- emissionQuant = MOVES model output, quantity of emissions (tons/day)
- DayID = MOVES model output, representing weekend (2) or weekday (5)
- DaysInMonth = number of days in a particular month

Then, an Excel pivot table was created from the MOVES Output table (provided in Appendix C, Tab 1. Pivot_SSWD & Annual), selecting all months and both DayID types. Table 4.4 summarizes the fields that were utilized in the pivot tables to calculate SSWD and annual emissions.

**Table 4.4. Calculation of SSWD and Annual Emissions Pivot Table Details**

| Pivot Table Fields | Emission Tally Type | |
|---|---|---|
| | SSWD | Annual |
| Columns | Pollutant | Pollutant |
| Rows | MonthID (Select 6,7,8) | MonthID (Select All) |
| | DayID (Select 5) | DayID (Select Both) |
| ∑ values | Sum of Emission Quant | Sum of Daily Emissions |
| Post Processing | Calculate Average | Use Grand Total Columns |

Table 4-5 provides the summary of the 2017 annual (tpy) and SSWD daily (tpd) emissions for New Castle County for all equipment emissions estimated using EPA's MOVES Nonroad model by fuel type.

**Table 4-5. 2017 New Castle County Emissions for Nonroad Equipment**

| | | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|---|
| **Fuel Type** | **Equipment Category** | **VOC** | **$NO_X$** | **CO** | **VOC** | **$NO_X$** | **CO** |
| Gasoline | All Equipment | 2,024.4 | 471.4 | 22,412.5 | 7.01 | 1.40 | 88.53 |
| Diesel | All Equipment | 50.7 | 559.4 | 247.4 | 0.19 | 2.03 | 0.92 |
| LPG | All Equipment | 10.9 | 71.9 | 413.1 | 0.03 | 0.23 | 1.32 |
| CNG | All Equipment | 4.2 | 7.7 | 39.3 | 0.01 | 0.02 | 0.13 |
| **All Fuels** | **Total** | **2,090** | **1,110** | **23,112** | **7.25** | **3.68** | **90.89** |

## 4.4 Aircraft

The aircraft source category includes emissions from commercial, air taxi, general aviation, and military aircraft. These sub-categories are described as follows:

- Military aircraft – used by the U.S. military in a wide range of missions;
- Commercial aircraft – used for scheduled service transporting passengers, freight, or both;
- General aviation – includes other non-military aircraft used for recreational flying, business, personal transportation, and various other activities; and
- Air taxis – used for scheduled service carrying passengers and/or freight, but are smaller aircraft that operate on a more limited basis than the commercial carriers.

Airport-specific emissions for all aircraft sub-categories were allocated to the county in which each airport is located. Where there are multiple airports in a given county, the emissions were summed to provide a county-level emissions estimate. Aircraft emissions are reported under the following SCCs:

**Table 4-6. SCCs for Aircraft**

| SCC | Descriptor 1 | Descriptor 3 | Descriptor 6 | Descriptor 8 |
|---|---|---|---|---|
| 2275001000 | Mobile Sources | Aircraft | Military Aircraft | Total |
| 2275020000 | Mobile Sources | Aircraft | Commercial Aircraft | Total: All Types |
| 2275050000 | Mobile Sources | Aircraft | General Aviation | Total |
| 2275060000 | Mobile Sources | Aircraft | Air Taxi | Total |

EPA estimated annual aircraft emissions using a combination of airport-specific activity data and FAA/EPA emission factors. Estimating aircraft emissions focuses on the “mixing zone,” which has a height (mixing height) equal to the thickness of the inversion layer. Air emissions within this zone are trapped by the inversion layer and ultimately affect ground-level pollutant concentrations. When aircraft are above the mixing zone, emissions tend to disperse and have no ground-level effects. The aircraft operations within the mixing zone are defined by the LTO cycle. Each LTO cycle consists of five specific operating modes:

- Approach – when the aircraft approaches the airport on its descent from the mixing height to when it lands on the runway.
- Taxi/idle-in – when the aircraft taxis from the runway to the gate and turns its engines off.
- Taxi/idle-out – from engine start-up to take-off as the aircraft taxis from the gate back out to the runway.
- Take-off – this mode is characterized primarily by full-throttle operation that typically lasts until the aircraft reaches between 500 and 1,000 feet above ground, which is when engine power is reduced.
- Climb-out – this mode begins right after the take-off mode and lasts until the aircraft passes out of the mixing height.

The operation time in each of these modes is dependent on the aircraft category, local meteorological conditions, and operational considerations at a given airport. The TIM for the take-off operating mode is the least variable.

The following are the general steps to be used to estimate aircraft emissions:

- Determine the mixing height to be used to define the LTO cycle;
- Define the fleet make-up for each airport;
- Determine airport activity in terms of the number of LTOs by aircraft/engine type;
- Select emission factors for each engine model associated with the aircraft fleet;
- Estimate the TIM for the aircraft fleet at each airport;
- Calculate emissions based on aircraft LTOs, emission factors for each aircraft engine model, and estimated aircraft TIM; and
- Aggregate the emissions across aircraft.

LTO data were obtained from DelDOT for all airports in New Castle County. Table 4-7 provides the LTO data by the four aircraft types for airports in New Castle County. Delaware reviewed LTO data and airport data that EPA provided. DAQ made changes to include the LTO counts in Table 4-7 in the EPA run of the FAA model and also verified the county location of each airport. The activity data for this category is not provided in a way that indicates the time the LTOs occurred. Therefore, DAQ final SSWD values are simple daily values, calculated from the annual total.

## Table 4-7. 2017 LTO Data for New Castle County

| Airport | Aircraft Type | LTOs |
|---|---|---|
| A.I. Dupont Children's Hospital | General Aviation, Piston | 18 |
| | General Aviation, Turbine | 33 |
| Bracebridge III | General Aviation, Piston | 18 |
| | General Aviation, Turbine | 33 |
| Christina Hospital | General Aviation, Piston | 18 |
| | General Aviation, Turbine | 33 |
| Duffy's | General Aviation, Piston | 110 |
| Full Throttle Farm | General Aviation, Piston | 114 |
| Greenville | General Aviation, Piston | 18 |
| | General Aviation, Turbine | 33 |
| Mckeown | General Aviation, Piston | 83 |
| New Castle County | Air Taxi, Piston | 653 |
| | Air Taxi, Turbine | 2,342 |
| | Commercial Aircraft, Total: All Types | 40 |
| | General Aviation, Piston | 22,945 |
| | General Aviation, Turbine | 8,901 |
| | Military Aircraft, Total | 6,372 |
| Okolona Plantation | General Aviation, Piston | 79 |
| Rollins Bldg | General Aviation, Piston | 18 |
| | General Aviation, Turbine | 33 |
| Scotty's Place | General Aviation, Piston | 83 |
| Spirit Airpark | General Aviation, Piston | 131 |
| Summit | General Aviation, Piston | 22,665 |
| | General Aviation, Turbine | 8,771 |
| | Military Aircraft, Total | 100 |
| Townsend A | General Aviation, Piston | 114 |

DAQ provided these data to EPA for their run of the most updated FAA model. The values in Table 4-7 were different from the EPA-supplied data, and were compiled with state-specific data from the airports in the state. The results for the 2017 annual emissions by aircraft category are presented in Table 4-8.

## Table 4-8. 2017 Annual Emissions of Aircraft in New Castle County

| SCC | Aircraft Category | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|---|
| | | VOC | $NO_X$ | CO | VOC | $NO_X$ | CO |
| 2275001000 | Military | 35 | 72 | 84 | 0.10* | 0.20* | 0.23* |
| 2275020000 | Commercial | <1 | <1 | <1 | <0.01* | <0.01* | <0.01* |
| 2275050011 | General Aviation - Piston | 3 | 2 | 279 | 0.01* | <0.01* | 0.76* |
| 2275050012 | General Aviation - Turbine | 6 | 3 | 86 | 0.02* | 0.01* | 0.24* |
| 2275060011 | Air Taxi - Piston | <1 | <1 | 9 | <0.01* | <0.01* | 0.03* |
| 2275060012 | Air Taxi - Turbine | 1 | <1 | 4 | <0.01* | <0.01* | 0.01* |
| **22750xxxxx** | **Total: Aircraft** | **47** | **78** | **463** | **0.13** | **0.21** | **1.27** |

* = These figures are using EPA annual totals with Delaware-specific temporal profiles for SSWD calculation.

## 4.5 Locomotives

Railroad locomotives are a combustion source of emissions with most significant emissions occurring where there is a concentration of railroad activity (such as a large switch yard). The primary fuel consumed by railroad locomotives is distillate oil (diesel fuel). Locomotives can perform two different types of operations: line haul and yard (or switch). Line haul locomotives generally travel between distant locations, such as from one city to another. Yard locomotives are primarily responsible for moving railcars within a particular railway yard. Locomotive emissions are reported under the SCCs provided in Table 4-9.

For 2017, DAQ coordinated efforts with the ERTAC Rail group to develop locomotive emission estimates. The ERTAC Rail line haul estimates represent the highest quality data available, as no fuel use information was provided to the State from Norfolk Southern (NS) or CSX Transportation (CSX). For line haul locomotives, ERTAC and DAQ calculated Class I operation emissions separately from Class II/III operations. Line haul locomotive emissions for passenger trains and commuter lines were estimated to be zero since rail service in Delaware (Amtrak and SEPTA) is electric powered. Fuel consumption was used to estimate locomotive engine emissions. Fuel consumption rates are usually known only for the entire interstate operating region, therefore, it is necessary to allocate the total amount of fuel consumed "system-wide" to Delaware and its counties.

**Table 4-9. SCCs for Locomotives**

| SCC | Descriptor 1 | Descriptor 3 | Descriptor 6 | Descriptor 8 |
|---|---|---|---|---|
| 2285002006 | Mobile Sources | Railroad Equipment | Diesel | Line Haul Locomotives: Class I Operations |
| 2285002007 | Mobile Sources | Railroad Equipment | Diesel | Line Haul Locomotives: Class II/Class III Operations |
| 2285002010 | Mobile Sources | Railroad Equipment | Diesel | Yard Locomotives |

### *4.5.1 Line Haul Locomotives – Class I Operations*

CSX operates Class I locomotives within New Castle County, while NS operates throughout the State. DAQ contacted these companies to obtain estimates of fuel consumption or data to calculate fuel consumption (*e.g.*, gross ton-miles (GTM) and gallons of fuel consumed per GTM). These companies did not provide fuel use to the DAQ. Therefore, ERTAC estimates were used for these categories. The ERTAC rail workgroup was able to obtain two high quality sets of data: national Class I fuel use and link-level rail activity density. Using these two datasets, they were able to estimate emissions for all counties in the US at a higher resolution than the DAQ previously achieved. However, because of the sensitive nature of the data, the DAQ does not have access to the raw data, and so only totals are provided in this document.

### *4.5.2 Line Haul Locomotives – Class II/III Operations*

Five railroads operate Class II/III locomotives within the State:

- Maryland & Delaware (MDDE) Railroad – New Castle County and Sussex County;

- Delaware Coast Line Railroad – Sussex County;
- Delmarva Central Railroad – All three counties of the State;
- East Penn Railroad – New Castle County (company did not provide data for 2017); and
- Wilmington and Western – New Castle County.

Each of these companies, with the exception of East Penn, provided DAQ with fuel used in each county of the State. The system-wide reported fuel use and track miles of each railroad is presented in Table 4-10.

**Table 4-10. 2017 Locomotive Fuel Consumption Data by County for Line Haul Operations**

| Railroad Company | Class | County | Track Miles | Fuel Consumed, gallons/year |
|---|---|---|---|---|
| Maryland & Delaware | II/III | New Castle | 11.25 | 0 |
| Delaware Coast Line | II/III | Sussex | 13 | 9,000 |
| Delmarva Central | II/III | New Castle | 122.3* | 52,202 |
| Delmarva Central | II/III | Kent | 122.3* | 99,731 |
| Delmarva Central | II/III | Sussex | 122.3* | 118,933 |
| East Penn | II/III | New Castle | No Data Provided | No Data Provided |
| Wilmington and Western | II/III | New Castle | 10 | 410 |

*Note: Track miles are system/state-wide

### *4.5.3 Yard Locomotives*

Table 4-11 provides a summary of switchyard operations and fuel consumption by rail company and county. MDDE and Delaware Central Railroad both provided fuel used at switchyard by county for 2017. No data was received from the Class I railroads for the 2017 inventory year. Therefore, a count of switchyard locomotives was done for each known switchyard in Delaware via Google Earth satellite imagery. Fuel consumed for these yard locomotives was calculated from the annual R-1 report provided by each respective Class I railroad company. The total US switcher fuel was apportioned to Delaware based on the proportion of the number of switcher locomotives counted in Delaware to the total number of US switchyard locomotives.

**Table 4-11. 2017 Switchyard Activity and Estimated Fuel Consumption**

| Switchyard | No. of Yard Locomotives | Fuel Consumed, gallons/year |
|---|---|---|
| MDDE | 2 | 1090 |
| Delaware Central | No Data Provided | 2610 |
| Norfolk Southern | 14 | 922,077 |
| CSX | 7 | 461,038 |

### *4.5.4 Locomotive age/Engine build*

Delaware Central Railroad and MDDE both provided the make and model of their locomotives. These are found in the table below.

**Table 4-12. Delaware Central Railroad and MDDE Locomotive Make and Model**

| Company | Tier | Locomotive Type | APU or Auto start/stop |
|---|---|---|---|
| DCR | 0 | No data Provided | ZTR AESS |
| DCR | 0+ | No data Provided | ZTR AESS |
| DCR | 0 | No data Provided | ZTR AESS |
| DCR | 0 | No data Provided | ZTR AESS |
| DCR | 0 | No data Provided | ZTR AESS |
| DCR | Pre-1973 | No data Provided | none |
| DCR | Pre-1973 | No data Provided | ZTR AESS |
| DCR | Pre-1973 | No data Provided | ZTR AESS |
| DCR | 0+ | No data Provided | APU |
| DCR | 0+ | No data Provided | APU |
| DCR | Pre-1973 | No data Provided | APU |
| DCR | Pre-1973 | No data Provided | APU |
| DCR | Pre-1973 | No data Provided | APU |
| MDDE | No Data Provided | RS3M | Unknown |
| MDDE | No Data Provided | RS3M | Unknown |
| MDDE | No Data Provided | RS3M | Unknown |
| MDDE | No Data Provided | SW900 | Unknown |
| MDDE | No Data Provided | CF7 | Unknown |

### *4.5.5 Sample Calculations and Results*

***Line Haul Locomotive***

To determine the amount of pollutant ***p*** at the county level:

$$E_p = FC \times EF_p$$

where:
- $E_p$ = amount of pollutant ***p*** emitted for the county in pounds
- $FC$ = fuel consumption for the county in gallons
- $EF_p$ = emission factor for pollutant ***p*** in pounds per gallon

***Yard Locomotive***

To determine the amount of pollutant ***p*** at the county-level:

$$E_p = Yd \times FC_{Yd} \times EF_p$$

where:
- $E_p$ = amount of pollutant ***p*** emitted for the county in pounds
- $Yd$ = number of yard locomotives in the county
- $FC_{Yd}$ = fuel consumption per yard locomotive in gallons per year
- $EF_p$ = emission factor for pollutant ***p*** in pounds per gallon

The results for the 2017 locomotive emissions by county are presented in Table 4-13. The activity data for this category is not provided in a way that indicates the time when activity occurred. Also, EPA has not provided seasonality in their estimations of line haul data. Therefore, DAQ final SSWD values are simple daily values, calculated from the annual total.

**Table 4-13. 2017 Locomotives Emissions in New Castle County**

| SCC | Category Description | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|---|
| | | VOC | $NO_X$ | CO | VOC | $NO_X$ | CO |
| 2285002006 | Class I Line Haul | 6 | 127 | 25 | 0.02* | 0.35* | 0.07* |
| 2285002007 | Class II/III Line Haul | 1 | 19 | 2 | <0.01* | 0.05* | 0.01* |
| 2285002010 | Yard Locomotives | 21 | 286 | 43 | 0.06 | 0.78 | 0.12 |
| **22850020xx** | | **28** | **432** | **70** | **0.08*** | **1.18*** | **0.19*** |

* = These figures are using EPA annual totals with Delaware-specific temporal profiles for SSWD calculation.

### 4.6 Commercial Marine Vessels

The CMV sector includes many types of vessels, such as large deep-draft vessels, barge towboats, harbor tugs, dredging vessels, ferries, excursion vessels, and commercial fishing vessels. In addition to the numerous vessel types, each vessel type engages in different activities such as hoteling, maneuvering within the port, and cruising.

In its 1999 final rule for commercial marine diesel engines, EPA defined three categories of marine diesel engines based on engine displacement, power and revolutions per minute (rpm). Table 4-14 presents the definitions for each category.

**Table 4-14. U.S. EPA Marine Engine Category Definitions**

| Category | Displacement per cylinder | Power range (kW) | RPM range |
|---|---|---|---|
| 1 | disp. < 5 liters and power ≥ 37 kW | 37 - 2,300 | 1,800 - 3,000 |
| 2 | 5 ≤ displacement < 30 liters | 1,500 - 8,000 | 750 - 1,500 |
| 3 | displacement ≥ 30 liters | 2,500 - 80,000 | 60 - 900 |

The EPA classifies CMV emissions by fuel type (residual and diesel) and by mode of operation (port and underway). CMVs often burn multiple types of fuel and may burn different fuels for different operating modes or locations (*i.e.*, near ports). DAQ used the port and underway SCCs to characterize the CMV emissions as listed in Table 4-15. The SCC classification is based on the most common type of fuel utilized by the vessel category. Beginning in 2015, International Maritime Organization (IMO) regulations required ships in emission control areas (ECAs) to limit sulfur content to 0.1%S.

### Table 4-15. SCCs for Commercial Marine Vessels

| SCC | Descriptor 1 | Descriptor 3 | Descriptor 4 |
|---|---|---|---|
| 2280002101 | Mobile Sources | Diesel | C1C2 Port emissions: Main Engine |
| 2280002102 | Mobile Sources | Diesel | C1C2 Port emissions: Auxiliary Engine |
| 2280002201 | Mobile Sources | Diesel | C1C2 Underway emissions: Main Engine |
| 2280002202 | Mobile Sources | Diesel | C1C2 Underway emissions: Auxiliary Engine |
| 2280002103 | Mobile Sources | Diesel | C3 Port emissions: Main Engine |
| 2280002104 | Mobile Sources | Diesel | C3 Port emissions: Auxiliary Engine |
| 2280002203 | Mobile Sources | Diesel | C3 Underway emissions: Main Engine |
| 2280002204 | Mobile Sources | Diesel | C3 Underway emissions: Auxiliary Engine |
| 2280003103 | Mobile Sources | Residual | C3 Port emissions: Main Engine |
| 2280003104 | Mobile Sources | Residual | C3 Port emissions: Auxiliary Engine |
| 2280003203 | Mobile Sources | Residual | C3 Underway emissions: Main Engine |
| 2280003204 | Mobile Sources | Residual | C3 Underway emissions: Auxiliary Engine |

There are four activity modes for CMV: cruise, reduced speed zone (RSZ), maneuver, and hotel. Underway emissions are estimated as the combined activity of cruise and RSZ modes. Port emissions are estimated as the combined activity of maneuvering and hoteling modes. Emissions from ferries and dredging are considered port emissions since these vessels operate primarily within the port area.

DAQ calculated emissions for ocean-going vessels, towboats, tug-assist vessels, ferries and vessels associated with dredging operations. CMV engine emissions are assumed to be a function of the following:

- Mode of operation;
- Vessel type (bulk carrier, tanker, towboat, etc.);
- Vessel dead weight tonnage (DWT);
- Type of engine (2-stroke, 4-stroke, or steam); and
- Length of waterway segment.

Therefore, DAQ accounted for these variations when estimating CMV activity. The four modes of operation that are performed by vessels are defined below:

**Cruise** – Assumed to begin 25 miles out from the port breakwater until the vessel reaches the breakwater. The breakwater is located at the mouth of the Delaware Bay. Cruise mode is only applicable to Sussex County.

**Reduced Speed Zone (RSZ)** – Begins at the breakwater and continues until the vessel is one to two nautical miles from the berth or anchorage. The vessel is assumed to have a speed of twelve knots during this mode. This mode is also referred to as transit, and escort for towboats and tug-assist vessels.

**Maneuvering** – Time the vessel slows to below four knots until the dock lines are secure. This mode is also referred to as assist mode for tug-assist vessels.

**Hoteling** – Time the vessel is at dock. During this mode, the vessel operates auxiliary engines for electrical power.

The waterway segment distances used to estimate activity and to allocate the activity to each county were estimated from the Google Earth website in 2017 by tracing the shipping channel. Segment distances are shown in Table 4-16. The distance South is given to the breakwater at the mouth of the Delaware Bay. The distance North is given to the Delaware-Pennsylvania border. The distance for the C&D Canal East is given from the Delaware-Maryland border to the entrance of the Delaware River (Reedy Point).

**Table 4-16. Waterway Segment Distances for the Delaware River Area**

| Waterway Segment | Distance (mi.) |
|---|---|
| **Point** | **South** |
| DE/PA Border | 83.8 |
| Oceanport | 83.3 |
| Port of Wilmington | 76.1 |
| Magellan Terminal | 75.6 |
| Delaware City Refinery | 66.0 |
| C&D Canal | 62.6 |
| Latitude 39°30' | 57.7 |
| New Castle Co/Kent Co | 48.5 |
| Kent Co/Sussex Co | 15.9 |
| **Point** | **North** |
| Port of Wilmington | 7.7 |
| C&D Canal | 21.2 |
| **Point** | **East** |
| C&D Canal | 13.0 |

The engine activity for each mode is calculated using the following equation:

$$Activity_{mode} = Power \ x \ Load\ Factor \ x \ Time_{mode} \ x \ Calls$$

where:
- $Activity_{mode}$ = activity by mode (kilowatt-hours)
- Power = rated engine power by vessel and engine type (kilowatts)
- Load Factor = load factor of the engine by vessel type and mode
- $Time_{mode}$ = time in mode per call by vessel type (hours)
- Calls = number of calls by vessel and engine type

This calculation must be performed for both propulsion and auxiliary engines and for each mode. Both propulsion engines and auxiliary engines are operating during cruise, RSZ, and maneuvering modes. Only auxiliary engines operate during hoteling. Once the activity is calculated, it is allocated to the county level using county allocation factors.

This approach to calculating activity of CMVs was used for all vessel types except vessels involved in dredging activity. For dredging, the activity data used for emissions calculations was the volume of material dredged. Details on the sources and development of activity data are provided in the following subsections.

### *4.6.1 Ocean-Going Vessels*

DAQ obtained vessel call data for ocean-going vessels (OGVs) during calendar year 2017 from the Maritime Exchange for the Delaware River and Bay. Data were obtained for vessels that traveled anywhere into or through the Delaware River. The data for the entire port area is required since the majority of vessels pass through Delaware waters en route to other ports. The vessel call data included the vessel name, ship type, DWT, pier, and the date of the call. The ship types calling on the Delaware River Area ports in 2017 are shown in Table 4-17.

Vessels may shift between piers during the same call on the Delaware River area. DAQ adjusted the vessel call data to remove shifts between piers, where possible, to avoid double counting using a methodology recommended by the staff of the Marine Exchange. Data on the engine power and engine type (2-stroke, 4-stroke, and steam) used on OGVs were not available through the Marine Exchange. Therefore, DAQ assigned engine power and engine type based on average engine data obtained from other sources.

For propulsion engines, the average engine power and the engine type were obtained from the EPA report *Commercial Marine Activity for Deep Sea Ports in the United States* (*Deep Sea Ports*). This report presents data for vessels that called on the Delaware River area ports during calendar year 1996. Note that the Delaware River area includes ports in Delaware, New Jersey and Pennsylvania, which are located on the Delaware River. The number of calls by vessel and engine type is presented for specific DWT ranges. The average engine power is also given.

**Table 4-17. Vessel Types Calling on Delaware River Area Ports in 2017**

| Codes | Main Vessel Type | Additional Vessel Types Included w/ Main Type |
|---|---|---|
| BU | Bulk | Bulk Cargo (BG), Chemical (CH), Bulk (HR) |
| CC | Container | Container/Bulk (CB), Part Container (PC) |
| GC | General Cargo | |
| MS | Miscellaneous | Livestock (LV), Tall Ship (TS) |
| PR | Passenger | |
| RF | Refrigerated Cargo (Reefer) | Container Reefer (CR) |
| RR | Roll on-Roll off (RORO) | RORO Container (RC) |
| TA | Tanker | Tanker (AS), Bulk Oil (BO), Chemical Oil Tanker (CO), Gas Carrier (PG and NG) |
| VE | Vehicle Carrier | |

In 2017, DAQ changed its methodology in calculating OGV emissions by ascertaining each ship trip segment between every location where an Automatic Identification System (AIS) "ping" occurs. There were 50 such locations. All other "ping" points in New Jersey and all ports in Pennsylvania are located north of the Delaware/Pennsylvania state line. Vessels calling on New Jersey and Pennsylvania ports must be included in underway emission calculations for Delaware since the vessels travel through the Delaware portion of the bay and river.

Table 4-18 presents the assigned propulsion engine power and the number of "pings" by vessel type, DWT range and engine type for calls on the Delaware River area in 2017. In addition to vessels traveling in the Delaware River Bay and River, 256 OGVs traversed the C&D Canal to or from the Chesapeake Bay.

**Table 4-18. Average Propulsion Engine Power and the 2017 ship "pings" for OGVs traversing the Delaware River Area (DE, NJ and PA)**

| Main Vessel Type | Rig Type Included | Average Propulsion Engine Power | Number of Ship "Pings" |
|---|---|---|---|
| BU | BU, BG, OR | <25K | 226 |
| BU | BU, BG, OR | 25K-35K | 156 |
| BU | BU, BG, OR | 35K-45K | 731 |
| BU | BU, BG, OR | >45K | 2 |
| CC | CC, CB, PC | <25K | 791 |
| CC | CC, CB, PC | 25K-35K | 921 |
| CC | CC, CB, PC | 35K-45K | 137 |
| CC | CC, CB, PC | >45K | 64 |
| GC | GC | <15K | 13 |
| GC | GC | 15K-30K | 14 |
| GC | GC | 30K-45K | 9 |
| MS | CL, HL, LV | <10K | 190 |
| PR | PR | <5K | 2 |
| PR | PR | 5K-10K | 3 |
| RF | RF, CR | 5K-10K | 168 |
| RF | RF, CR | 10K-15K | 136 |
| RF | RF, CR | 15K-25K | 49 |
| RR | RR, RC | <15K | 37 |
| RR | RR, RC | 15K-30K | 92 |
| RR | RR, RC | >30K | 285 |
| TA | TA, AS, BO, CH, CO, NP, PD, PG | <30K | 283 |
| TA | TA, AS, BO, CH, CO, NP, PD, PG | 30K-60K | 716 |
| TA | TA, AS, BO, CH, CO, NP, PD, PG | 60K-90K | 15 |
| TA | TA, AS, BO, CH, CO, NP, PD, PG | 90K-120K | 365 |
| TA | TA, AS, BO, CH, CO, NP, PD, PG | 120K-150K | 5 |
| TA | TA, AS, BO, CH, CO, NP, PD, PG | >150K | 21 |
| VE | VE | <12.5K | 27 |
| VE | VE | 12.5K-15K | 84 |
| VE | VE | 15K-17.5K | 666 |
| VE | VE | >17.5K | 2 |
| **ALL** | | **TOTAL** | **6,210** |

### *4.6.2 Towboats and Tug Assists*

Towboats are used to transport non-self-propelled vessels, either dry cargo or tanker barges, throughout the Delaware River area, including the C&D Canal. DAQ obtained data on the number of towboat trips during calendar year 2017 from *Waterborne Commerce of the United States*. DAQ subtracted the number of towboat trips for the Port of Wilmington (POW) and the C&D Canal from the number of trips on the Delaware River (PA to the Sea). For towboats traveling to and from the POW and traveling through the C&D Canal, DAQ assumed that half the vessels travel north and the other half travel south to/from the POW and the canal.

In 2017, 5,911 towboat trips transited Delaware waters on the Delaware River, with a trip defined as a one-way passage. 347 towboat trips entered or exited the POW, and 1,479 towboat trips transited the C&D Canal.

Tugs assist OGVs from the shipping channel to its intended berth and then back to the channel when the vessel leaves port. This activity is considered the maneuvering mode for OGVs. Two tugs are typically required to assist an OGV with a DWT greater than 20,000 tons; for smaller OGVs, one tug suffices. The number of tug assists (982 in 2017) is directly related to the number of OGVs calling to a Delaware port. Note that a tug assisting a vessel to Bermuda International in New Jersey and the piers at the oil refineries in Marcus Hook, PA will require a tug to pick up the OGV in Delaware waters, thus tug assists are included for these docks. The tug meeting time to the docking time is usually within one hour.

In addition to assisting OGVs to maneuver into port, tugboats escort gas carriers through the Delaware Bay and River. Other vessels typically do not utilize an escort. Tug escort trips are included in the number of towboat trips transiting Delaware waters presented above. DAQ did not estimate emissions from hoteling of towboats and tugs due to lack of activity data.

Vessel speeds, average maneuvering and hoteling time, propulsion and auxiliary engine horsepower ratings, and engine load factors for OGVs, towboats, and tugs were obtained from EPA's *Deep Sea Ports* and *Preparing Port Emission Inventories*. For RSZ mode, time-in-mode for each vessel was calculated based on vessel speeds and waterway segment distances provided in Table 4-15.

### *4.6.3 Dredging*

Maintenance dredging is performed routinely on the Delaware River to keep the channels to their required depths. Dredging involves multiple vessels, including dredges, assist tugs, and generator barges that provide additional power. Estimating emissions from dredging vessel engine activity is time-consuming. Therefore, DAQ developed emissions based on the volume of material dredged during calendar year 2017 rather than engine activity in kilowatt-hours.

DAQ obtained the dredging activity data from both the United States Army Corps of Engineers (USACE) and from within DNREC. The amount of material dredged by USACE contractors was obtained from the USACE report on dredging contracts awarded for the year 2017. DAQ also contacted the Delaware Division of Soil and Water Conservation to obtain the amount of material dredged by the Division. Table 4-19 presents the estimated amount of material dredged and the type of dredge used. DAQ assumed all the dredging activity is maintenance dredging. New cut dredging results in higher emissions, therefore this assumption may result in lower emission estimates than are actually occurring in the area.

**Table 4-19. Material Dredged in Delaware Waters during 2017**

| County | Type of Equipment | Total Material Dredged (cubic yards) |
|---|---|---|
| Kent | Hydraulic | 558,201 |
| New Castle | Hydraulic | 297,000 |
| Sussex | Hydraulic | 2,252,379 |
| Kent | Bucket/Clamshell | 558,201 |
| New Castle | Bucket/Clamshell | 297,000 |
| Sussex | Bucket/Clamshell | 909,879 |

*4.6.4 Ferries*

The only ferry in Delaware that operates in New Castle County is the Three Forts Ferry. This ferry travels from either Delaware City, DE or Fort Mott, NJ to Fort Delaware located on Pea Patch Island in the Delaware River. Monthly trip count data for the ferry was obtained by contacting the Delaware River & Bay Authority (DRBA). The Three Forts Ferry made 2,862 one-way trips in 2017. The DRBA also provided the engine and time-in-mode data for the Three Forts Ferry.

*4.6.5 Spatial Allocation*

DAQ developed county allocation factors for CMV activity data based on the location of the activity on the various waterways and length of the waterway segment. In developing county allocation factors, DAQ assumed that from latitude 39°30' to 25 miles beyond the mouth of the Delaware Bay, the activity is split evenly between Delaware and New Jersey since the ship channel roughly corresponds to the boundary between the two states. Above latitude 39°30', all emissions are allocated to Delaware since the entire breadth of the river is under Delaware's jurisdiction. Allocations were developed for each activity mode, since the activity takes place in different areas depending on the mode.

For OGV maneuvering and hoteling modes, the activity is allocated to the county in which the port is located. All large Delaware ports are located in New Castle County. Much of the maneuvering and hoteling activity thus takes place to New Castle County. OGVs will also hotel at one of the several anchorages along the shipping channel. Emissions are estimated for hoteling that takes place at Delaware's anchorages.

For the RSZ mode, county allocation factors were developed for the four ports in Delaware (Port of Wilmington, Magellan Terminal, Oceanport, and Delaware City Refinery), Bermuda International in New Jersey, and from the Pennsylvania-Delaware border to the breakwater (PA/DE to the Sea).

Allocating dredging to each county was based on the river miles in each county, and split between Delaware and New Jersey below latitude 39°30'. While the Three Forts Ferry travels to Fort Mott on the New Jersey side of the Delaware River, at that latitude, Delaware's jurisdictional waters extend the breadth of the river. Therefore, all activity for the Three Forts Ferry was allocated to New Castle County.

The results for the 2017 annual emissions by CMV category are presented in Table 4-20.

**Table 4-20. 2017 Commercial Marine Vessel Emissions for New Castle County**

| SCC | Category Description | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|---|
| | | VOC | $NO_X$ | CO | VOC | $NO_X$ | CO |
| 2280002101 | C1C2 Port emissions: Main Engine - Diesel | 2 | 18 | 1 | <0.01* | 0.05* | <0.01* |
| 2280002102 | C1C2 Port emissions: Auxiliary Engine- Diesel | 2 | 78 | 12 | 0.01* | 0.21* | 0.03* |
| 2280002201 | C1C2 Underway emissions: Main Engine – Diesel | 11 | 286 | 42 | 0.03* | 0.78* | 0.12* |
| 2280002202 | C1C2 Underway emissions: Auxiliary Engine – Diesel | 6 | 198 | 31 | 0.02* | 0.54* | 0.08* |
| 2280002103 | C3 Port emissions: Main Engine – Diesel | 8 | 45 | 8 | 0.02* | 0.12* | 0.02* |
| 2280002104 | C3 Port emissions: Auxiliary Engine – Diesel | 9 | 196 | 22 | 0.02* | 0.54* | 0.06* |
| 2280002203 | C3 Underway emissions: Main Engine – Diesel | 35 | 543 | 63 | 0.10* | 1.49* | 0.17* |
| 2280002204 | C3 Underway emissions: Auxiliary Engine – Diesel | 8 | 169 | 19 | 0.02* | 0.46* | 0.05* |
| 2280003103 | C3 Port emissions: Main Engine - Residual | 0 | 0 | 0 | 0.00* | 0.00* | 0.00* |
| 2280003104 | C3 Port emissions: Auxiliary Engine – Residual | 0 | 0 | 0 | 0.00* | 0.00* | 0.00* |
| 2280003203 | C3 Underway emissions: Main Engine – Residual | 0 | 0 | 0 | 0.00* | 0.00* | 0.00* |
| 2280003204 | C3 Underway emissions: Auxiliary Engine - Residual | 0 | 0 | 0 | 0.00* | 0.00* | 0.00* |
| **228000xxxx** | | 80 | 1,532 | 199 | 0.22* | 4.20* | 0.54* |

* = These figures are using EPA annual totals with Delaware-specific temporal profiles for SSWD calculation.

# SECTION 5 - ONROAD MOBILE SOURCES

The 2017 onroad mobile source inventory is an estimate of vehicle emissions based on actual VMT on Delaware roadways in 2017 using EPA's MOVES2014b model. DAQ used the input files submitted for the EPA's 2017 NEI run of the MOVES2014b model. These inputs files are organized in a county database (CDB), the details of which are outlined in Table 5-1. MOVES uses many more inputs; those not mentioned here would use the default tables from the MOVES database (movesdb20181022).

**Table 5-1. County Database**

| MOVES CDB Tab | Input datasource | Data Source Details |
|---|---|---|
| Road Type Distribution | RoadTypeDistribution | Analyzed the DMV's Road type VMT data which is collected by road type. This was converted to the appropriate MOVES road type. |
| Source Type Population | SourceTypeYear | The DMV's registration database was used. |
| Vehicle Type VMT | HpmsVtypeYear | Delaware 2017 VMT report together with the MOVES database. This is discussed in detail below. |
| | MonthVmtFraction | Used the data from the CRC-A100 dataset. |
| | DayVMTFraction | |
| | HourVMTFraction | |
| I/M Programs | IMCoverage | This is discussed in more detail below. |
| Generic | EmissionRateByAge | Delaware adopted the LEV-III standards in 2014, the following guidance was used to generate an appropriate "EmissionRateByAge" table: "Instructions for Using LEV and NLEV Inputs for MOVES2014" EPA-420-B-14-060a" |
| Age Distribution | SourceTypeAgeDistribution | The DMV's registration database was used. |
| Average Speed Distribution | AvgSpeedDistribution | Used the data from the CRC-A100 data set. This came from a study of massive amounts of Bluetooth data. This was used nationally for the 2014 NEI. Where the vehicle types were not available, the data from the Delaware Department of Transport's Travel Demand Model was used. |
| Fuel | FuelSupply | Used the MOVES default tables for New Castle County. |
| | FuelFormulation | |
| | FuelUsageFraction | |
| | AVFT | |
| Meteorology Data | ZoneMonthHour | Temperature and humidity data was downloaded from NOAA website for 2017. |

## 5.1 Delaware-Specific Input Data for 2017

As outlined above, the MOVES model allows for a variety of model inputs. DAQ, with assistance from DelDOT, puts considerable effort in creating county-specific input data files. The county-specific input data types created for the 2017 inventory include VMT (by vehicle and roadway type), vehicle registration data (vehicle populations and age distributions), average speeds in the form of speed bin fractions (weekday versus weekend and by roadway type), and inspection and maintenance (I/M) program specifications. Each of these input data sets are discussed separately below. DAQ relies on the MOVES model defaults for fuel parameters (formulations and supply), ramp fractions, and weekly and daily fractions.

### *5.1.1 Vehicle Miles Traveled (VMT) Data*

The activity data used for developing the onroad emission inventory is VMT. DelDOT provided 2017 VMT data by roadway type for all counties in Delaware. DelDOT is required to submit calendar year VMT data annually to the Federal Highway Administration's (FHWA) Highway Performance Monitoring System (HPMS). The VMT is estimated based on data from permanent traffic count stations throughout the county.

DelDOT's traffic count program provides daily and seasonal variation data. Additional temporary stations provide shorter-term counts that are expanded with factors derived from appropriate permanent count stations. Counting and expansion activities are consistent with FHWA guidelines. The traffic data submitted to HPMS are considered the most accurate VMT totals for Delaware.

Since the VMT provided by DelDOT is supplied by HPMS roadway type, the task of creating VMT by MOVES road type fractions requires mapping the twelve HPMS road types to the four MOVES road types. The road type allocations for New Castle County for 2017 are provided in Table 5-2.

**Table 5-2. New Castle County VMT Fractions by Road Type**

| MOVES Road Type Code | Road Type Description | VMT Fraction by Road Type |
|---|---|---|
| 2 | Rural Restricted Access | 0.0000 |
| 3 | Rural Unrestricted Access | 0.1550 |
| 4 | Urban Restricted Access | 0.5457 |
| 5 | Urban Unrestricted Access | 0.2993 |
| **Total** | | **1.0000** |

### *5.1.2 VMT Fractions by Vehicle Type*

MOVES requires VMT by HPMS vehicle types as an input, however, VMT by vehicle type data are not collected in Delaware, so an alternate method was used.

The output from a MOVES statewide run at the national level was analyzed for VMT distribution by vehicle type. These VMT proportions were then used to allocate the VMT as measured by DelDOT to the vehicle types, as can be seen in Table 5-3.

**Table 5-3. New Castle County VMT by Vehicle Type**

| HPMSVtypeID | HPMSVtypeName | yearID | HPMSBaseYearVMT |
|---|---|---|---|
| 10 | Motorcycles | 2017 | 37,567,788 |
| 25 | Light Duty Vehicles | 2017 | 5,525,977,280 |
| 40 | Buses | 2017 | 28,773,188 |
| 50 | Single Unit Trucks | 2017 | 217,394,603 |
| 60 | Combination Trucks | 2017 | 285,900,620 |

### *5.1.3 VMT Temporal Allocations*

The MOVES model input files include allocations of VMT by month. Monthly allocation of VMT is accomplished through the use of permanent count station data provided by DelDOT. For 2017, DelDOT provided monthly VMT data from the permanent count stations throughout New Castle County. Each month's data for all count stations was summed and divided by the sum of the annual VMT recorded by the all count stations in a county. The monthly VMT fractions created in this way are provided in Table 5-4.

**Table 5-4. Monthly VMT Allocation Fractions for New Castle County**

| Month | VMT Fraction |
|---|---|
| January | 0.0700 |
| February | 0.0732 |
| March | 0.0782 |
| April | 0.0834 |
| May | 0.0874 |
| June | 0.0934 |
| July | 0.0907 |
| August | 0.0911 |
| September | 0.0855 |
| October | 0.0847 |
| November | 0.0818 |
| December | 0.0807 |

### *5.1.4 Vehicle Populations and Age Distributions*

Vehicle registration data was obtained from the Delaware Division of Motor Vehicles (DMV) registration database on July 1, 2018. The data shows the number of vehicles registered by model year (MY) for each of the 16 MOBILE6.2 vehicle classes.

The data is first transformed to the 13 MOVES source types using the techniques outlined in the Vehicle Type Mapping sheet in the EPA's conversion tool:

"VMT-Converter-road-veh16-20100209.xls"

Then, the last storage bin (25 years and older) is reallocated across five years according to the proportions listed in the MOVES2014 default database for calendar year 2017.

### *5.1.5 Speed Bin Fractions*

The MOVES model represents average vehicle speeds by roadway type through the use of speed bin fractions. There are 16 speed bins with the first representing speeds less than 2.5 miles per hour (mph), with each subsequent bin having a range of 5 mph (*i.e.*, 42.5 mph – 47.5 mph). The final bin represents speeds equal to or greater than 72.5 mph.

For 2017, DelDOT provided seasonal speed bin fractions for each of the four MOVES roadway types, for each hour of the day, and for weekday and weekend driving patterns. DelDOT estimated speeds using the Peninsula travel demand model. The model accounts for traffic volumes and variations in travel according to purpose, which impact average speeds.

However, the Speed Bin data that was used came from the telematics data that the CRC A-100 study[6] provided. Between September 2015 and August 2016 telematics data from millions of vehicles was taken nationally and compiled into MOVES ready tables. The CRC A-100 dataset covered the vehicle types as outlined in Table 5-5. These cover the vast majority of vehicles. Where CRC A-100 data was not available, the data came from the DelDOT Peninsula travel model. This is the same approach as used for the NEI2014v2 MOVES runs, and is being used again for the NEI 2017 runs.

**Table 5-5. 2017 Vehicle Populations for New Castle County**

| Vehicle Code | Vehicle Type | Number of Vehicles | Include in CRC A-100 Telematics |
|---|---|---|---|
| 11 | Motorcycle | 12,037 | Yes |
| 21 | Passenger Vehicle | 227,297 | Yes |
| 31 | Passenger Truck | 152,764 | Yes |
| 32 | Light Commercial Truck | 81,766 | Yes |
| 41 | Intercity Bus | 145 | No |
| 42 | Transit Bus | 435 | No |
| 43 | School Bus | 721 | No |
| 51 | Refuse Truck | 43 | No |
| 52 | Single Unit Short-Haul Truck | 3,719 | Yes |
| 53 | Single Unit Long-Haul Truck | 271 | Yes |
| 54 | Motor Home | 430 | No |
| 61 | Combination Short-Haul Truck | 696 | Yes |
| 62 | Combination Long-Haul Truck | 482 | Yes |

### *5.1.6 Inspection and Maintenance (I/M)*

Table 5-6 outlines the I/M program as implemented in New Castle County.

The program includes a biennial onboard diagnostic testing program (OBD II) for 1996 and later model year (MY) vehicles. Vehicle emission computer systems are checked for any diagnostic trouble codes present, a symptom of excess emissions which results in the vehicle failing.

Older vehicles, starting with MY 1968, are given a curb idle test (MY 1968-1980) or a two-speed idle test (MY 1981-1995). A tailpipe probe is inserted for 60 seconds to determine exhaust concentrations of hydrocarbons and carbon monoxide. Depending on the MY, vehicles with an excess emission concentration of either pollutant will fail the test.

Older vehicles (MY 1975-1995) are also given a fuel system pressure test (FP) and a gas cap (GC) test. Air pressure is applied to the fuel system from the fuel inlet to the canister. After air pressure has been applied, pressure degradation is monitored. Vehicles fail the FP if it cannot maintain the equivalent pressure of eight inches of water for up to two minutes after being pressurized to 14.0 ± 0.5 inches of water. A similar pressure test is applied to the vehicle's GC.

[6] http://crcsite.wpengine.com/wp-content/uploads/2019/05/ERG_FinalReport_CRCA100_28Feb2017.pdf

### Table 5-6. New Castle County I/M Program Parameters

| Test Type | IDLE | 2500/IDLE | FP & GC | OBD I/M |
|---|---|---|---|---|
| Test Frequency | Biennial | Biennial | Biennial | Biennial |
| Program Type | Test Only | Test Only | Test Only | Test Only |
| Model Years | 1968-1980 | 1981-1995 | 1975-1995 | 1996-2010 |
| **Regulatory Class Coverage** | | | | |
| Passenger Vehicle | 96.02 | 96.02 | 96.02 | 95.62 |
| Passenger Truck | 94.10 | 94.10 | 94.10 | 93.71 |
| Light Comm. Truck | 88.34 | 88.34 | 88.34 | 87.97 |
| **Vehicles Tested (gasoline only)** | | | | |
| Passenger Vehicle | Yes | Yes | Yes | Yes |
| Passenger Truck | Yes | Yes | Yes | Yes |
| Light Comm. Truck (up to 8,500 GVWR) | Yes | Yes | Yes | Yes |
| School Bus | No | No | No | No |
| Single Unit Short-Haul Truck | No | No | No | No |
| Single Unit Long-Haul Truck | No | No | No | No |
| Refuse Truck | No | No | No | No |
| Combination Short-Haul Truck | No | No | No | No |
| Combination Long-Haul Truck | No | No | No | No |
| Motor Home | No | No | No | No |
| Intercity Bus | No | No | No | No |
| Transit Bus | No | No | No | No |
| Motorcycle | No | No | No | No |

#### *5.1.7 Meteorology*

The ZoneMonthHour table is a listing of the average hourly temperature and relative humidity data. This data is averaged for each hour for each month so that there are 288 (12 x 24) readings for both parameters.

Hourly data for every day of every month for 2017 was downloaded using the Local Climatological Data tool[7] provided by NOAA as presented in Table 5-7.

### Table 5-7. New Castle County Local Climatological Data Station Details

| County | Station Location |
|---|---|
| New Castle | NEW CASTLE COUNTY AIRPORT (13781) |

[7] https://www.ncdc.noaa.gov/cdo-web/datatools/lcd?prior=N

This data was processed so as to produce the data in the format as defined in the ZoneMonthHour table.

## 5.2 Controls

All MOVES-recognized onroad control measures known to be in place in Delaware in 2017 were included in the MOVES emission inventory mode modeling. Local control programs include Delaware's I/M program, the Federal reformulated gasoline program, and the Northeast Ozone Transport Region LEV program. The MOVES model internally includes all national control programs, such as the Tier 1, Tier 2 and Tier 3 gasoline fuel and light duty engine emission standards as well as the ultra-low sulfur diesel fuel and heavy duty engine standards.

Two Delaware control programs, the anti-tampering procedures (ATP) performed at the inspections lanes and the anti-idling regulation, were not accounted for in the MOVES runs since the model does not provide for inputting these programs. For the ATP control program, vehicles that are tested are also checked to see if the catalytic converter, GC, and fuel inlet restrictor are present. Vehicles will fail inspection if any of these devices are missing.

7 DE Admin. Code 1145, Excessive Idling of Heavy Duty Vehicles, is designed to eliminate emissions caused by extending idling. While MOVES delineates emissions processes for extended idling, the currently available control programs within MOVES do not account for anti-idling measures. Delaware currently has no off-model method to determine emission benefits from either ATP or 7 DE Admin. Code 1145.

## 5.3 Emission Estimation Methodologies

A single MOVES model run was used to compute both the SSWD emissions and the annual emissions. To achieve this, MOVES was run by selecting all months, both day types, all hours, and the output time aggregation of "24-hour day". An Excel pivot table was created from the MOVES Output Table (provided in Appendix D, Tab 1. Pivot SSWD), to select the summer months of June, July, and August and just the weekdays. The pivot table results were averaged to calculate average SSWD emissions for each pollutant.

The first step in calculating annual emissions was to calculate *Daily Emissions* from the MOVES Output Table. A new column was added to the same MOVES Output Table to calculate *Daily Emissions* using the following equation:

$$emissionQuant \;\; x \;\; DayID / 7 \;\; x \;\; DaysInMonth$$

| | | |
|---|---|---|
| where: | emissionQuant | = MOVES model output, quantity of emissions (tons/day) |
| | DayID | = MOVES model output, representing weekend (2) or weekday (5) |
| | DaysInMonth | = number of days in a particular month |

Then, an Excel pivot table was created from the MOVES Output table (provided in Appendix D, Tab 2. Pivot Annual), selecting all months and both DayID types. Table 5-8 summarizes the fields that were utilized in the pivot tables to calculate SSWD and annual emissions.

**Table 5-8. Calculation of SSWD and Annual Emissions Pivot Table Details**

| Pivot Table Fields | Emission Tally Type | |
|---|---|---|
| | SSWD | Annual |
| Columns | Pollutant | Pollutant |
| Rows | MonthID (Select 6,7,8) | MonthID (Select All) |
| | DayID (Select 5) | DayID (Select Both) |
| ∑ values | Sum of Emission Quant | Sum of Daily Emissions |
| Post Processing | Calculate Average | Use Grand Total Columns |

## 5.4 Calculated 2017 Onroad Emissions

**Table 5-9. 2017 Annual and SSWD Emissions for Onroad Mobile Sources**

| County | Annual (tpy) | | | SSWD (tpd) | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | VOC | $NO_X$ | CO |
| New Castle | 2,213 | 5,184 | 28,807 | 6.23 | 15.70 | 87.23 |

# Appendix B

| Tabs: | Notes: |
| --- | --- |
| Nonpoint Categories | Contains notes on adjustments made to the 2017 BYI inventory; summarizes variations in the 2017 BYI compared to the Adjusted 2017 BYI. |
| SSWD Variations | Lists SSWD factors for categories that were not included in the original BYI or have been adjusted from the BYI. Same SSWD factors were used for 2017 and 2023. |
| 2017_2023 Inventory | The 2017 and 2023 inventory by SCC. Includes growth factors, sswd factors, controls, and uncontrolled inventory. |
| Summary | Pivot table of the 2017 adjusted byi and 2023 projected inventory. |
| DOL GrowthRate NC | DE Department of Labor Industry Growth Rates (2018-2028) for New Castle County used in the inventory where noted. |
| DPC Growth Rate nc | Delaware Population Consortium Data used for Delaware specific populatoin growth factor. |
| Cumulative Controls | Includes calculation of phased-in/cumulative controls. |
| Lighter Fluid | Lighter fluid calculaton from EPA's 2016v3 modeling data. |

***Nonpoint Categories***

**Growth Factors:**

Delaware followed the growth methods from the EPA 2016v3 Technical Support Document. When available Delaware specific growth factors where subsituted for EPAs/MARAMA growth factors. Since EPA grew emissions from 2016, adjustments were made were applicable.

**Corrected Categories:**

| | |
|---|---|
| Ag. Pesticides | BYI added emissions from SCC 2460800000 (FIFRA emissions) that were already accounted for in CCP SCCs;removed FIFRA emissions from ag pesticides to avoid double count. |
| Auto Refinishing | BYI added emissions from Kent and New Castle County; removed Kent County emissions. SSWD did not contain same error. |
| Gasoline Marketing | BYI double counted Aircraft refueling and PFCs; removed double count. |
| AIM | BYI annual emissions did not match internal calculations, but the summer season weekday was correct. Updated annual data to relect DE's inventory. |
| Residential Fuel SSWD | Annual data is correct, but source of BYI SSWD factor is unknown; Adjust SSWD data to match internal DE data. |
| Commercial fuel SSWD | Annual data is correct, but source of BYI SSWD factor is unknown; Adjust SSWD data to match internal DE data. |

**2017 NEI SCC was not included in original BYI:**

| | |
|---|---|
| POTW | Used 2017 NEI data and grew with DE Population. SSWD calculated internally; no seasonal variation. |
| Animal Husbandry | Used 2017 NEI data and grew with national animal projection factors found in EPA's 2016v3 model platform. Used Delaware specific seasonal variation |
| cremation | Used 2017 NEI data and grew with DE Population. SSWD calculated internally; no seasonal variation. |
| animal cremation | Used 2017 NEI data and assumed no growth as done in EPA's 2016v3 modelling platform. SSWD calculated internally; no seasonal variation. |
| res grilling | Used 2017 NEI data and grew with DE Population. SSWD calculated internally; higher emissions in summer. |

**New SCCs:**

| | |
|---|---|
| CCP - Lighter Fluid (24603099 | Calculated EPA 2017 value and grew to 2023 with DE Population. SSWD calculated internally; higher emissions in summer. |

**Other Notes:**

| | |
|---|---|
| Industrial Fuel | BYI data does not match 2017 NEI. Use BYI (DE internal data) and grow that data with MARAMA growth factors used by EPA |
| Gas Marketing 2501060100 | Removed from nonpoint as refueling emissions are already accounted for in onroad inventory |

Table 3-4 Adjusted vs Original 2017 BYI Nonpoint Annual Category Totals

| Adjustment Notes: | Source Categories | Original 2017 Base Year Inventory Annual Emissions (tpy) | | | Adjusted 2017 Base Year Inventory Annual Emissions (tpy) | | |
|---|---|---|---|---|---|---|---|
| | | CO | NOx | VOC | CO | NOx | VOC |
| VOC Double Count | Agricultural Pesticides | - | - | 117 | - | - | 30 |
| VOC Double Count | AIM[4] Coatings | - | - | 403 | - | - | 390 |
| Missing SCC | Animal Cremation[1] | - | - | - | <1 | <1 | <1 |
| Missing SCC | Animal Husbandry[1] | - | - | - | - | - | 35 |
| VOC Double Count | Auto Refinishing | - | - | 29 | - | - | 22 |
| Missing SCC | Human Cremation[1] | - | - | - | <1 | <1 | <1 |
| New SCC | Lighter Fluid (C&CP[2]) [1] | - | - | - | - | - | 12 |
| Missing SCC | POTWs[1,3] | - | - | - | - | - | 12 |
| Missing SCC | Residential Grilling[1] | - | - | - | 150 | 3 | 8 |
| VOC Double Count | Retail Gasoline Stations | - | - | 402 | - | - | 240 |
| | Total | - | - | 951 | 150 | 3 | 749 |

1) New Category

2) C&CP: Consumer and Commercial Products

3) POTWs: Publicly Owned Treatment Works

4) AIM: Architectural and Industrial Maintenance

Table 3-5 Adjusted vs Original 2017 BYI Nonpoint SSWD Category Totals

| Adjustment Notes: | Source Categories | Original 2017 Base Year Inventory SSWD Emissions (tpd) | | | Adjusted 2017 Base Year Inventory SSWD Emissions (tpd) | | |
|---|---|---|---|---|---|---|---|
| | | CO | NOx | VOC | CO | NOx | VOC |
| Use Internal SSWD | Agricultural Pesticides | - | - | 0.32 | - | - | 0.11 |
| Missing SCC | Animal Cremation[1] | - | - | - | <0.01 | <0.01 | <0.01 |
| Missing SCC | Animal Husbandry[1] | - | - | - | - | - | 0.1 |
| Use Internal SSWD | Commercial Fuel | 0.43 | 0.73 | 0.04 | 0.43 | 0.52 | 0.03 |
| Missing SCC | Human Cremation[1] | - | - | - | <0.01 | <0.01 | <0.01 |
| New SCC | Lighter Fluid (C&CP[2]) [1] | - | - | - | - | - | 0.05 |
| Use Internal SSWD | Portable Fuel Containers | - | - | 0.33 | - | - | 0.42 |
| Missing SCC | POTWs[1,3] | - | - | - | - | - | 0.03 |
| Missing SCC | Residential Grilling[1] | - | - | - | 0.66 | 0.01 | 0.04 |
| Use Internal SSWD | Residential Fuel | 0.12 | 0.28 | 0.02 | 0.1 | 0.22 | 0.01 |
| Use Internal SSWD | Retail Gasoline Stations | - | - | 1.91 | - | - | 0.78 |
| | Total | 0.55 | 1.01 | 2.62 | 1.19 | 0.76 | 1.57 |

1) New Category

2) C&CP: Consumer and Commercial Products

3) POTWs: Publicly Owned Treatment Works

This tab clarifies SSWD factors for categories that were not included in the byi or have been adjusted from the byi. Same factors were used for 2017 and 2023.

**These categories were not included in the original BYI:**

| *Categories* | *SCC* | *Pollutant_(* | *2017 SSWD* | *JAN* | *FEB* | *MAR* | *APR* | *MAY* | *JUN* | *JUL* | *AUG* | *SEP* | *OCT* | *NOV* | *DEC* | *TOTAL* | *MON* | *TUE* | *WED* | *THU* | *FRI* | *SAT* | *SUN* | *TOTAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Animal Husbandry | 2805002000 | VOC | 0.003201 | 42 | 42 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 42 | 999 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805018000 | VOC | 0.003201 | 42 | 42 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 42 | 999 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805025000 | VOC | 0.006435 | 15 | 15 | 82 | 82 | 82 | 195 | 195 | 195 | 41 | 41 | 41 | 15 | 999 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805007100 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805009100 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805010200 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805035000 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805040000 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Husbandry | 2805045000 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Ag. Pesticides | 2461850000 | VOC | 0.003667 | 0 | 0 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 0 | 1000 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Human Cremation | 2810060100 | CO | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Human Cremation | 2810060100 | NOX | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Human Cremation | 2810060100 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Cremation | 2810060200 | CO | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Cremation | 2810060200 | NOX | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Animal Cremation | 2810060200 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| POTW | 2630020000 | VOC | 0.002747 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 996 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 142.9 | 1000.3 |
| Res Grilling | 2810025000 | CO | 0.004431 | 2 | 2 | 2 | 10 | 16 | 16 | 16 | 16 | 10 | 5 | 3 | 2 | 100 | 5 | 5 | 5 | 5 | 20 | 30 | 30 | 100 |
| Res Grilling | 2810025000 | NOX | 0.004431 | 2 | 2 | 2 | 10 | 16 | 16 | 16 | 16 | 10 | 5 | 3 | 2 | 100 | 5 | 5 | 5 | 5 | 20 | 30 | 30 | 100 |
| Res Grilling | 2810025000 | VOC | 0.004431 | 2 | 2 | 2 | 10 | 16 | 16 | 16 | 16 | 10 | 5 | 3 | 2 | 100 | 5 | 5 | 5 | 5 | 20 | 30 | 30 | 100 |
| Commercial & Consun | 2460030999 | VOC | 0.004431 | 2 | 2 | 2 | 10 | 16 | 16 | 16 | 16 | 10 | 5 | 3 | 2 | 100 | 5 | 5 | 5 | 5 | 20 | 30 | 30 | 100 |

**These categories sswd factor were adjusted from the original byi typically from annual value being adjusted:**

| *Categories* | *SCC* | *Pollutant_(* | *2017 SSWD* | *JAN* | *FEB* | *MAR* | *APR* | *MAY* | *JUN* | *JUL* | *AUG* | *SEP* | *OCT* | *NOV* | *DEC* | *TOTAL* | *MON* | *TUE* | *WED* | *THU* | *FRI* | *SAT* | *SUN* | *TOTAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commercial Fuel | 2103001000 | VOC | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103004001 | VOC | 0.000177 | 0.197734 | 0.144251 | 0.1655039 | 0.0501303 | 0.0335483 | 0.0045881 | 0.0045881 | 0.0045881 | 0.0076243 | 0.036818 | 0.1325734 | 0.218053 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103004002 | VOC | 0.000177 | 0.197734 | 0.144251 | 0.1655039 | 0.0501303 | 0.0335483 | 0.0045881 | 0.0045881 | 0.0045881 | 0.0076243 | 0.036818 | 0.1325734 | 0.218053 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103005000 | VOC | 0.000958 | 0.177663 | 0.107213 | 0.1218842 | 0.0261987 | 0.0216209 | 0.0524348 | 0.0175376 | 0.0045881 | 0.0139533 | 0.0966224 | 0.1501916 | 0.210093 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103006000 | VOC | 0.00157 | 0.14104 | 0.112533 | 0.1266741 | 0.0561915 | 0.0539469 | 0.0419753 | 0.0373363 | 0.0428732 | 0.0487841 | 0.0625514 | 0.1095398 | 0.166554 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103007000 | VOC | 0.000578 | 0.182615 | 0.1362 | 0.1546442 | 0.0545185 | 0.0401279 | 0.0149951 | 0.0149951 | 0.0149951 | 0.01763 | 0.0429655 | 0.1260658 | 0.200248 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103001000 | NOX | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103004001 | NOX | 0.000177 | 0.197734 | 0.144251 | 0.1655039 | 0.0501303 | 0.0335483 | 0.0045881 | 0.0045881 | 0.0045881 | 0.0076243 | 0.036818 | 0.1325734 | 0.218053 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103004002 | NOX | 0.000177 | 0.197734 | 0.144251 | 0.1655039 | 0.0501303 | 0.0335483 | 0.0045881 | 0.0045881 | 0.0045881 | 0.0076243 | 0.036818 | 0.1325734 | 0.218053 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103005000 | NOX | 0.000958 | 0.177663 | 0.107213 | 0.1218842 | 0.0261987 | 0.0216209 | 0.0524348 | 0.0175376 | 0.0045881 | 0.0139533 | 0.0966224 | 0.1501916 | 0.210093 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103006000 | NOX | 0.00157 | 0.14104 | 0.112533 | 0.1266741 | 0.0561915 | 0.0539469 | 0.0419753 | 0.0373363 | 0.0428732 | 0.0487841 | 0.0625514 | 0.1095398 | 0.166554 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103007000 | NOX | 0.000578 | 0.182615 | 0.1362 | 0.1546442 | 0.0545185 | 0.0401279 | 0.0149951 | 0.0149951 | 0.0149951 | 0.01763 | 0.0429655 | 0.1260658 | 0.200248 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103001000 | CO | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103004001 | CO | 0.000177 | 0.197734 | 0.144251 | 0.1655039 | 0.0501303 | 0.0335483 | 0.0045881 | 0.0045881 | 0.0045881 | 0.0076243 | 0.036818 | 0.1325734 | 0.218053 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103004002 | CO | 0.000177 | 0.197734 | 0.144251 | 0.1655039 | 0.0501303 | 0.0335483 | 0.0045881 | 0.0045881 | 0.0045881 | 0.0076243 | 0.036818 | 0.1325734 | 0.218053 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103005000 | CO | 0.000958 | 0.177663 | 0.107213 | 0.1218842 | 0.0261987 | 0.0216209 | 0.0524348 | 0.0175376 | 0.0045881 | 0.0139533 | 0.0966224 | 0.1501916 | 0.210093 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103006000 | CO | 0.00157 | 0.14104 | 0.112533 | 0.1266741 | 0.0561915 | 0.0539469 | 0.0419753 | 0.0373363 | 0.0428732 | 0.0487841 | 0.0625514 | 0.1095398 | 0.166554 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Commercial Fuel | 2103007000 | CO | 0.000578 | 0.182615 | 0.1362 | 0.1546442 | 0.0545185 | 0.0401279 | 0.0149951 | 0.0149951 | 0.0149951 | 0.01763 | 0.0429655 | 0.1260658 | 0.200248 | 1 | 167 | 167 | 167 | 167 | 167 | 167 | 0 | 1000 |
| Gasoline Marketing | 2501060051 | VOC | 0.003432 | 0.081145 | 0.071113 | 0.0671631 | 0.0826335 | 0.0984194 | 0.0864317 | 0.0801063 | 0.1011787 | 0.0709678 | 0.0980548 | 0.079922 | 0.082865 | 1 | 166.7 | 166.7 | 166.7 | 166.7 | 166.7 | 166.7 | 0 | |
| Gasoline Marketing | 2501060053 | VOC | 0.003432 | 0.081145 | 0.071113 | 0.0671631 | 0.0826335 | 0.0984194 | 0.0864317 | 0.0801063 | 0.1011787 | 0.0709678 | 0.0980548 | 0.079922 | 0.082865 | 1 | 166.7 | 166.7 | 166.7 | 166.7 | 166.7 | 166.7 | 0 | |
| Gasoline Marketing | 2501060201 | VOC | 0.002942 | 0.081145 | 0.071113 | 0.0671631 | 0.0826335 | 0.0984194 | 0.0864317 | 0.0801063 | 0.1011787 | 0.0709678 | 0.0980548 | 0.079922 | 0.082865 | | 142.86 | 142.86 | 142.86 | 142.86 | 142.86 | 142.86 | 142.86 | |
| Gasoline Marketing | 2505030120 | VOC | 0.003432 | 0.081145 | 0.071113 | 0.0671631 | 0.0826335 | 0.0984194 | 0.0864317 | 0.0801063 | 0.1011787 | 0.0709678 | 0.0980548 | 0.079922 | 0.082865 | 1 | 166.7 | 166.7 | 166.7 | 166.7 | 166.7 | 166.7 | 0 | |
| Gasoline Marketing - F | 2501011011 | VOC | 0.003414 | 0.02 | 0.02 | 0.09 | 0.09 | 0.09 | 0.133 | 0.133 | 0.133 | 0.09 | 0.09 | 0.09 | 0.02 | 0.999 | 111.1 | 111.1 | 111.1 | 111.1 | 111.1 | 222.2 | 222.2 | 999.9 |
| Gasoline Marketing - F | 2501011012 | VOC | 0.003414 | 0.02 | 0.02 | 0.09 | 0.09 | 0.09 | 0.133 | 0.133 | 0.133 | 0.09 | 0.09 | 0.09 | 0.02 | 0.999 | 111.1 | 111.1 | 111.1 | 111.1 | 111.1 | 222.2 | 222.2 | 999.9 |
| Gasoline Marketing - F | 2501011013 | VOC | 0.003414 | 0.02 | 0.02 | 0.09 | 0.09 | 0.09 | 0.133 | 0.133 | 0.133 | 0.09 | 0.09 | 0.09 | 0.02 | 0.999 | 111.1 | 111.1 | 111.1 | 111.1 | 111.1 | 222.2 | 222.2 | 999.9 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline Marketing - F | 2501011014 | VOC | 0.003414 | 0.02 | 0.02 | 0.09 | 0.09 | 0.09 | 0.133 | 0.133 | 0.133 | 0.09 | 0.09 | 0.09 | 0.02 | 0.999 | 111.1 | 111.1 | 111.1 | 111.1 | 111.1 | 222.2 | 222.2 | 999.9 |
| Gasoline Marketing - F | 2501011015 | VOC | 0.003414 | 0.02 | 0.02 | 0.09 | 0.09 | 0.09 | 0.133 | 0.133 | 0.133 | 0.09 | 0.09 | 0.09 | 0.02 | 0.999 | 111.1 | 111.1 | 111.1 | 111.1 | 111.1 | 222.2 | 222.2 | 999.9 |
| Gasoline Marketing - F | 2501012011 | VOC | 0.003786 | 0.0622 | 0.0622 | 0.0856 | 0.0856 | 0.0856 | 0.0997 | 0.0997 | 0.0997 | 0.0856 | 0.0856 | 0.0856 | 0.0622 | 0.9993 | 164.5 | 164.5 | 164.5 | 164.5 | 164.5 | 88.9 | 88.9 | 1000.3 |
| Gasoline Marketing - F | 2501012012 | VOC | 0.003786 | 0.0622 | 0.0622 | 0.0856 | 0.0856 | 0.0856 | 0.0997 | 0.0997 | 0.0997 | 0.0856 | 0.0856 | 0.0856 | 0.0622 | 0.9993 | 164.5 | 164.5 | 164.5 | 164.5 | 164.5 | 88.9 | 88.9 | 1000.3 |
| Gasoline Marketing - F | 2501012013 | VOC | 0.003786 | 0.0622 | 0.0622 | 0.0856 | 0.0856 | 0.0856 | 0.0997 | 0.0997 | 0.0997 | 0.0856 | 0.0856 | 0.0856 | 0.0622 | 0.9993 | 164.5 | 164.5 | 164.5 | 164.5 | 164.5 | 88.9 | 88.9 | 1000.3 |
| Gasoline Marketing - F | 2501012014 | VOC | 0.003786 | 0.0622 | 0.0622 | 0.0856 | 0.0856 | 0.0856 | 0.0997 | 0.0997 | 0.0997 | 0.0856 | 0.0856 | 0.0856 | 0.0622 | 0.9993 | 164.5 | 164.5 | 164.5 | 164.5 | 164.5 | 88.9 | 88.9 | 1000.3 |
| Gasoline Marketing - F | 2501012015 | VOC | 0.003786 | 0.0622 | 0.0622 | 0.0856 | 0.0856 | 0.0856 | 0.0997 | 0.0997 | 0.0997 | 0.0856 | 0.0856 | 0.0856 | 0.0622 | 0.9993 | 164.5 | 164.5 | 164.5 | 164.5 | 164.5 | 88.9 | 88.9 | 1000.3 |
| Residential Fuel | 2104002000 | VOC | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104004000 | VOC | 0.000197 | 0.195722 | 0.14318 | 0.1640589 | 0.0507143 | 0.0344238 | 0.005973 | 0.005973 | 0.005973 | 0.0089557 | 0.037636 | 0.1317075 | 0.215683 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104006000 | VOC | 0.000574 | 0.19715 | 0.141168 | 0.170675 | 0.0618432 | 0.0353678 | 0.0209175 | 0.0152587 | 0.015966 | 0.0173808 | 0.0251617 | 0.0963015 | 0.202809 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104007000 | VOC | 0.00075 | 0.171373 | 0.130214 | 0.1465697 | 0.0577812 | 0.0450201 | 0.0227331 | 0.0227331 | 0.0227331 | 0.0250696 | 0.0475363 | 0.1212272 | 0.18701 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104011000 | VOC | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104002000 | NOX | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104004000 | NOX | 0.000197 | 0.195722 | 0.14318 | 0.1640589 | 0.0507143 | 0.0344238 | 0.005973 | 0.005973 | 0.005973 | 0.0089557 | 0.037636 | 0.1317075 | 0.215683 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104006000 | NOX | 0.000574 | 0.19715 | 0.141168 | 0.170675 | 0.0618432 | 0.0353678 | 0.0209175 | 0.0152587 | 0.015966 | 0.0173808 | 0.0251617 | 0.0963015 | 0.202809 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104007000 | NOX | 0.00075 | 0.171373 | 0.130214 | 0.1465697 | 0.0577812 | 0.0450201 | 0.0227331 | 0.0227331 | 0.0227331 | 0.0250696 | 0.0475363 | 0.1212272 | 0.18701 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104011000 | NOX | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104002000 | CO | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104004000 | CO | 0.000197 | 0.195722 | 0.14318 | 0.1640589 | 0.0507143 | 0.0344238 | 0.005973 | 0.005973 | 0.005973 | 0.0089557 | 0.037636 | 0.1317075 | 0.215683 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104006000 | CO | 0.000574 | 0.19715 | 0.141168 | 0.170675 | 0.0618432 | 0.0353678 | 0.0209175 | 0.0152587 | 0.015966 | 0.0173808 | 0.0251617 | 0.0963015 | 0.202809 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104007000 | CO | 0.00075 | 0.171373 | 0.130214 | 0.1465697 | 0.0577812 | 0.0450201 | 0.0227331 | 0.0227331 | 0.0227331 | 0.0250696 | 0.0475363 | 0.1212272 | 0.18701 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |
| Residential Fuel | 2104011000 | CO | 0 | 0.204399 | 0.1478 | 0.1702916 | 0.0481957 | 0.0306476 | 0 | 0 | 0 | 0.003213 | 0.0341078 | 0.1354424 | 0.225902 | 1 | 143 | 143 | 143 | 143 | 143 | 143 | 143 | 1000 |

| Category | State FIPS | County FIPS | SCC | Pollutant Code | 2017 Emission TON Value Annual | 2017 SSWD (tpd) | 2017 Data Source | 2023 Emission TON Value Annual | 2023 SSWD (tpd) | Growth Factor | Growth Factor Source | Post 2017 Control | Effective Date | Uncontrolled 2023_TON_Annual | Uncontrolled 2023_TPD_SSWD | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ag Burning** | 10 | 003 | 2801500600 | CO | 8.4 | 0.00 | BYI | 8.4 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth: No SSWD Emissions | 0 | NA | 8.36 | 0.00 | |
| **Ag Burning** | 10 | 003 | 2801500600 | NOX | 0.2 | 0.00 | BYI | 0.2 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth: No SSWD Emissions | 0 | NA | 0.25 | 0.00 | |
| **Ag Burning** | 10 | 003 | 2801500600 | VOC | 0.6 | 0.00 | BYI | 0.6 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth: No SSWD Emissions | 0 | NA | 0.57 | 0.00 | |
| **AIM Coatings** | 10 | 003 | 2401002000 | VOC | 271.1 | 1.00 | ADJUSTED ANNUEL, SSWD BYI | 278.7 | 1.03 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 3/1/2017 - 32.4% control included in 2017 data | 278.67 | 1.03 | SSWD from byi, annual value corrected |
| **AIM Coatings** | 10 | 003 | 2401003000 | VOC | 106.2 | 0.39 | ADJUSTED ANNUEL, SSWD BYI | 109.1 | 0.40 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 3/1/2017 - 32.4% control included in 2017 data | 109.11 | 0.40 | SSWD from byi, annual value corrected |
| **AIM Coatings** | 10 | 003 | 2401100000 | VOC | 13.2 | 0.06 | ADJUSTED ANNUEL, SSWD BYI | 13.5 | 0.06 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 3/1/2017 - 38% control included in 2017 data | 13.54 | 0.06 | SSWD from byi, annual value corrected |
| **Animal Husbandry** | 10 | 003 | 2805002000 | VOC | 2.8 | 0.01 | ADJUSTED BYI | 2.7 | 0.01 | 0.98 | EPA 2016v3: National Projection Factors for Livestock (2017:2023) No adjustment needed. | 0 | NA | 2.73 | 0.01 | This data was not included in BYI. We are adding to be consistent with EPA method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805018000 | VOC | 2.3 | 0.01 | ADJUSTED BYI | 2.3 | 0.01 | 0.99 | EPA 2016v3: National Projection Factors for Livestock (2017:2023) No adjustment needed. | 0 | NA | 2.32 | 0.01 | This data was not included in BYI. We are adding to be consistent with EPA method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805025000 | VOC | 0.1 | 0.00 | ADJUSTED BYI | 0.1 | 0.00 | 1.06 | EPA 2016v3: National Projection Factors for Livestock (2017:2023) No adjustment needed. | 0 | NA | 0.09 | 0.00 | This data was not included in BYI. We are adding to be consistent with EPA method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805007100 | VOC | 26.8 | 0.07 | ADJUSTED BYI | 28.0 | 0.08 | 1.04 | EPA 2016v3: National Projection Factors for Livestock (2017:2023) No adjustment needed. | 0 | NA | 27.96 | 0.08 | This data was not included in BYI. We are adding to be consistent with EPA method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805009100 | VOC | 1.6 | 0.00 | ADJUSTED BYI | 1.7 | 0.00 | 1.09 | EPA 2016v3: National Projection Factors for Livestock (2017:2023) No adjustment needed. | 0 | NA | 1.73 | 0.00 | This data was not included in BYI. We are adding to be consistent with EPA method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805010200 | VOC | 0.2 | 0.00 | ADJUSTED BYI | 0.2 | 0.00 | 0.99 | EPA 2016v3: National Projection Factors for Livestock (2017:2023) No adjustment needed. | 0 | NA | 0.17 | 0.00 | This data was not included in BYI. We are adding to be consistent with EPA method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805035000 | VOC | 1.0 | 0.00 | ADJUSTED BYI | 1.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.99 | 0.00 | method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805040000 | VOC | 0.1 | 0.00 | ADJUSTED BYI | 0.1 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.11 | 0.00 | method and show complete emissions. |
| **Animal Husbandry** | 10 | 003 | 2805045000 | VOC | 0.2 | 0.00 | ADJUSTED BYI | 0.2 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.19 | 0.00 | method and show complete emissions. |
| **Asphalt Paving** | 10 | 003 | 2461021000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.02 | 0.00 | |
| **Asphalt Paving** | 10 | 003 | 2461022000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.00 | 0.00 | |
| **Auto Refinishing** | 10 | 003 | 2401005000 | VOC | 21.8 | 0.08 | ADJUSTED ANNUEL, SSWD BYI | 21.5 | 0.08 | 0.99 | NAICS 811 - DE DOL Industry Growth for NCC | 0 | NA | 21.54 | 0.08 | |
| **Commercial & Consumer** | 10 | 003 | 2460100000 | VOC | 331.3 | 0.91 | BYI | 340.5 | 0.94 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 340.47 | 0.94 | |
| **Commercial & Consumer** | 10 | 003 | 2460200000 | VOC | 361.7 | 0.99 | BYI | 371.8 | 1.02 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 371.78 | 1.02 | |
| **Commercial & Consumer** | 10 | 003 | 2460400000 | VOC | 97.0 | 0.27 | BYI | 99.7 | 0.27 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 99.73 | 0.27 | |
| **Commercial & Consumer** | 10 | 003 | 2460500000 | VOC | 85.2 | 0.23 | BYI | 87.6 | 0.24 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 87.55 | 0.24 | |
| **Commercial & Consumer** | 10 | 003 | 2460600000 | VOC | 32.9 | 0.09 | BYI | 33.8 | 0.09 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 33.80 | 0.09 | |
| **Commercial & Consumer** | 10 | 003 | 2460800000 | VOC | 87.0 | 0.33 | BYI | 89.4 | 0.34 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 89.42 | 0.34 | |
| **Commercial & Consumer** | 10 | 003 | 2460900000 | VOC | 122.6 | 0.34 | BYI | 126.0 | 0.35 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 125.96 | 0.35 | |
| **Commercial Fuel** | 10 | 003 | 2103001000 | VOC | 0.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.00 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103004001 | VOC | 0.3 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.4 | 0.00 | 1.23 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.43 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103004002 | VOC | 2.3 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 2.8 | 0.00 | 1.23 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 2.77 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103005000 | VOC | 0.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.75 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.01 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103006000 | VOC | 17.9 | 0.03 | ANNUAL BYI, SSWD ADJUSTED | 20.4 | 0.03 | 1.14 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 20.45 | 0.03 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103007000 | VOC | 0.2 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.2 | 0.00 | 1.20 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.22 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103001000 | NOX | 0.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.00 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103004001 | NOX | 20.4 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 25.0 | 0.00 | 1.23 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 25.02 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103004002 | NOX | 32.4 | 0.01 | ANNUAL BYI, SSWD ADJUSTED | 39.8 | 0.01 | 1.23 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 39.77 | 0.01 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103005000 | NOX | 0.6 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.5 | 0.00 | 0.75 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.48 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103006000 | NOX | 326.0 | 0.51 | ANNUAL BYI, SSWD ADJUSTED | 371.8 | 0.58 | 1.14 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 371.79 | 0.58 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103007000 | NOX | 4.8 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 5.8 | 0.00 | 1.20 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 5.77 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Commercial Fuel** | 10 | 003 | 2103001000 | CO | 0.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.00 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commercial Fuel | 10 | 003 | 2103004001 | CO | 5.1 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 6.3 | 0.00 | 1.23 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 6.26 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| Commercial Fuel | 10 | 003 | 2103004002 | CO | 7.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 8.6 | 0.00 | 1.23 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 8.56 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| Commercial Fuel | 10 | 003 | 2103005000 | CO | 0.1 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.75 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.04 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| Commercial Fuel | 10 | 003 | 2103006000 | CO | 273.9 | 0.43 | ANNUAL BYI, SSWD ADJUSTED | 312.3 | 0.49 | 1.14 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 312.30 | 0.49 | Adjust SSWD fraction to match internal data SSWD calculation. |
| Commercial Fuel | 10 | 003 | 2103007000 | CO | 2.8 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 3.3 | 0.00 | 1.20 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 3.33 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| Dry Cleaners | 10 | 003 | 2420010370 | VOC | 1.4 | 0.01 | BYI | 1.5 | 0.01 | 1.08 | NAICS 812 (Use DE DOL Industry Growth for NCC) | 0 | NA | 1.54 | 0.01 | |
| Gasoline Marketing | 10 | 003 | 2501060051 | VOC | 0.7 | 0.00 | ADJUSTED BYI | 0.7 | 0.00 | 1.07 | EPA 2016v3: Use EPA 2023 value (MARAMA growth 2016_202x_2019_05_26_withAEO2019 gasoline) | 0 | NA | 0.71 | 0.00 | SSWD/annual different than byi; EPA projected value |
| Gasoline Marketing | 10 | 003 | 2501060053 | VOC | 136.7 | 0.47 | ADJUSTED BYI | 139.4 | 0.48 | 1.07 | EPA 2016v3: Use EPA 2023 value (MARAMA growth 2016_202x_2019_05_26_withAEO2019 gasoline) with DE 2020 controls | 4.86 | 2020 enhanced vapor pressure controls | 146.54 | 0.50 | SSWD/annual different than byi; EPA projected value with DE controls |
| Gasoline Marketing | 10 | 003 | 2501060201 | VOC | 94.3 | 0.28 | ADJUSTED BYI | 14.7 | 0.04 | 1.07 | EPA 2016v3: Use EPA 2023 value (MARAMA growth 2016_202x_2019_05_26_withAEO2019 gasoline) with DE 2020 controls | 85.5 | All stage II removed in 2021. 100% removal accounted for with 99% rate penetration | 101.08 | 0.30 | SSWD/annual different than byi; EPA projected value with DE controls |
| Gasoline Marketing | 10 | 003 | 2505030120 | VOC | 8.8 | 0.03 | ADJUSTED BYI | 9.361 | 0.03 | 1.06 | EPA 2016v3: Use EPA 2016v3 GF | 0 | NA | 9.36 | 0.03 | SSWD/annual different than byi; Use EPA GF for this scc |
| Gasoline Marketing - aircraft refueling | 10 | 003 | 2501080050 | VOC | 1.6 | 0.01 | BYI | 1.6 | 0.01 | 1.05 | EPA 2016v3: Use EPA 2023 value (MARAMA 2016 to 2023 Growth Code = AEO2019_SA_TRANS_AVGAS) | 0 | NA | 1.64 | 0.01 | EPA projected value |
| Gasoline Marketing - aircraft refueling | 10 | 003 | 2501080100 | VOC | 1.1 | 0.00 | BYI | 1.2 | 0.00 | 1.05 | EPA 2016v3: Use EPA 2023 value (MARAMA 2016 to 2023 Growth Code = AEO2019_SA_TRANS_AVGAS) | 0 | NA | 1.15 | 0.00 | EPA projected value |
| Gasoline Marketing - aircraft refueling | 10 | 003 | 2501080201 | VOC | 0.4 | 0.00 | BYI | 0.4 | 0.00 | 1.05 | EPA 2016v3: Use EPA 2023 value (MARAMA 2016 to 2023 Growth Code = AEO2019_SA_TRANS_AVGAS) | 0 | NA | 0.45 | 0.00 | EPA projected value |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011011 | VOC | 7.4 | 0.03 | ANNUAL BYI, SSWD ADJUSTED | 6.7 | 0.02 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 7.58 | 0.03 | SSWD different than byi; controls calculated from DE internal documents; EPA growth method is population. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011012 | VOC | 63.7 | 0.22 | ANNUAL BYI, SSWD ADJUSTED | 57.6 | 0.20 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 65.50 | 0.22 | SSWD different than byi; controls calculated from DE internal documents; EPA growth method is population. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011013 | VOC | 3.5 | 0.01 | ANNUAL BYI, SSWD ADJUSTED | 3.2 | 0.01 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 3.59 | 0.01 | SSWD different than byi; controls calculated from DE internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011014 | VOC | 12.4 | 0.04 | ANNUAL BYI, SSWD ADJUSTED | 11.2 | 0.04 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 12.77 | 0.04 | SSWD different than byi; controls calculated from DE internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011015 | VOC | 2.2 | 0.01 | ANNUAL BYI, SSWD ADJUSTED | 2.0 | 0.01 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 2.24 | 0.01 | SSWD different than byi; controls calculated from DE internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012011 | VOC | 0.6 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.6 | 0.00 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 0.64 | 0.00 | SSWD different than byi; controls calculated from DE internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012012 | VOC | 7.7 | 0.03 | ANNUAL BYI, SSWD ADJUSTED | 6.9 | 0.03 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 7.88 | 0.03 | SSWD different than byi; controls calculated from DE internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012013 | VOC | 5.5 | 0.02 | ANNUAL BYI, SSWD ADJUSTED | 5.0 | 0.02 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 5.69 | 0.02 | SSWD different than byi; controls calculated from DE internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012014 | VOC | 14.2 | 0.05 | ANNUAL BYI, SSWD ADJUSTED | 12.9 | 0.05 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 14.61 | 0.06 | SSWD different than byi; controls calculated from DE internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012015 | VOC | 2.5 | 0.01 | ANNUAL BYI, SSWD ADJUSTED | 2.3 | 0.01 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 12 | 1/1/2018 | 2.56 | 0.01 | SSWD different than byi; controls calculated from DE internal documents. |
| Graphic Arts | 10 | 003 | 2425000000 | VOC | 256.8 | 0.99 | BYI | 263.9 | 1.02 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 263.93 | 1.02 | |
| Industrial Adhesives | 10 | 003 | 2440020000 | VOC | 106.9 | 0.41 | BYI | 109.8 | 0.42 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 109.82 | 0.42 | |
| Industrial Fuel | 10 | 003 | 2102002000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102004001 | VOC | 0.2 | 0.00 | BYI | 0.2 | 0.00 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.21 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102004002 | VOC | 23.7 | 0.06 | BYI | 29.0 | 0.078 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 28.96 | 0.08 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102005000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102006000 | VOC | 12.5 | 0.04 | BYI | 15.3 | 0.05 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 15.30 | 0.05 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102007000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102002000 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102004001 | NOX | 16.9 | 0.05 | BYI | 20.7 | 0.06 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 20.69 | 0.06 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102004002 | NOX | 340.4 | 0.91 | BYI | 416.5 | 1.12 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 416.53 | 1.12 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| Industrial Fuel | 10 | 003 | 2102005000 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |

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| **Industrial Fuel** | 10 | 003 | 2102006000 | NOX | 227.2 | 0.70 | BYI | 278.2 | 0.86 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 278.19 | 0.86 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Fuel** | 10 | 003 | 2102007000 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Fuel** | 10 | 003 | 2102002000 | CO | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Fuel** | 10 | 003 | 2102004001 | CO | 4.2 | 0.01 | BYI | 5.2 | 0.01 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 5.17 | 0.01 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Fuel** | 10 | 003 | 2102004002 | CO | 73.3 | 0.20 | BYI | 89.6 | 0.24 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 89.65 | 0.24 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Fuel** | 10 | 003 | 2102005000 | CO | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Fuel** | 10 | 003 | 2102006000 | CO | 190.8 | 0.59 | BYI | 233.7 | 0.72 | 1.22 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 233.68 | 0.72 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Fuel** | 10 | 003 | 2102007000 | CO | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.00 | EPA 2016v3 Method: EPA uses MARAMA Growth Factors based on DE 2017 data: | 0 | NA | 0.00 | 0.00 | BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values. |
| **Industrial Surface** | 10 | 003 | 2401015000 | VOC | 3.3 | 0.01 | BYI | 2.9 | 0.01 | 0.90 | NAICS 321 (Use DE DOL Industry Growth for NCC) | 0 | NA | 2.92 | 0.01 | |
| **Industrial Surface** | 10 | 003 | 2401020000 | VOC | 2.0 | 0.01 | BYI | 1.9 | 0.01 | 0.95 | NAICS 337 (Use DE DOL Industry Growth for NCC) | 0 | NA | 1.93 | 0.01 | |
| **Industrial Surface** | 10 | 003 | 2401025000 | VOC | 0.6 | 0.00 | BYI | 0.6 | 0.00 | 0.95 | NAICS 337 (Use DE DOL Industry Growth for NCC) | 0 | NA | 0.55 | 0.00 | |
| **Industrial Surface** | 10 | 003 | 2401030000 | VOC | 12.9 | 0.05 | BYI | 13.3 | 0.05 | 1.03 | NAICS 332 (Use DE DOL Industry Growth for NCC) | 0 | NA | 13.27 | 0.05 | |
| **Industrial Surface** | 10 | 003 | 2401040000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.03 | NAICS 332 (Use DE DOL Industry Growth for NCC) | 0 | NA | 0.00 | 0.00 | |
| **Industrial Surface** | 10 | 003 | 2401045000 | VOC | 1.2 | 0.00 | BYI | 1.3 | 0.00 | 1.03 | NAICS 332 (Use DE DOL Industry Growth for NCC) | 0 | NA | 1.27 | 0.00 | |
| **Industrial Surface** | 10 | 003 | 2401055000 | VOC | 12.9 | 0.05 | BYI | 13.7 | 0.05 | 1.07 | NAICS 333 (Use DE DOL Industry Growth for NCC) | 0 | NA | 13.71 | 0.05 | |
| **Industrial Surface** | 10 | 003 | 2401060000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.05 | NAICS 335 (Use DE DOL Industry Growth for NCC) | 0 | NA | 0.00 | 0.00 | |
| **Industrial Surface** | 10 | 003 | 2401065000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.03 | NAICS 334 (Use DE DOL Industry Growth for NCC) | 0 | NA | 0.00 | 0.00 | |
| **Industrial Surface** | 10 | 003 | 2401070000 | VOC | 4.8 | 0.02 | BYI | 4.6 | 0.02 | 0.96 | NAICS 336 (Use DE DOL Industry Growth for NCC) | 0 | NA | 4.58 | 0.02 | |
| **Industrial Surface** | 10 | 003 | 2401075000 | VOC | 2.5 | 0.01 | BYI | 2.4 | 0.01 | 0.96 | NAICS 336 (Use DE DOL Industry Growth for NCC) | 0 | NA | 2.37 | 0.01 | |
| **Industrial Surface** | 10 | 003 | 2401080000 | VOC | 3.9 | 0.02 | BYI | 3.7 | 0.01 | 0.96 | NAICS 336 (Use DE DOL Industry Growth for NCC) | 0 | NA | 3.74 | 0.01 | |
| **Industrial Surface** | 10 | 003 | 2401085000 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.96 | NAICS 336 (Use DE DOL Industry Growth for NCC) | 0 | NA | 0.00 | 0.00 | |
| **Industrial Surface** | 10 | 003 | 2401090000 | VOC | 35.0 | 0.13 | BYI | 33.9 | 0.13 | 0.97 | NAICS 339 (Use DE DOL Industry Growth for NCC) | 0 | NA | 33.90 | 0.13 | |
| **Land Clearing** | 10 | 003 | 2610000500 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.00 | 0.00 | |
| **Land Clearing** | 10 | 003 | 2610000500 | NOx | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.00 | 0.00 | |
| **Land Clearing** | 10 | 003 | 2610000500 | CO | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.00 | 0.00 | |
| **Prescribed Burning** | 10 | 003 | 2811015001 | NOX | 0.3 | 0.00 | BYI | 0.3 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth | 0 | NA | 0.32 | 0.00 | |
| **Prescribed Burning** | 10 | 003 | 2811015002 | NOX | 4.2 | 0.00 | BYI | 4.2 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth | 0 | NA | 4.17 | 0.00 | |
| **Prescribed Burning** | 10 | 003 | 2811015002 | VOC | 47.2 | 0.00 | BYI | 47.2 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth | 0 | NA | 47.19 | 0.00 | |
| **Residential Fuel** | 10 | 003 | 2104002000 | VOC | 0.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.00 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104004000 | VOC | 2.5 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 3.1 | 0.00 | 1.25 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 3.13 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104006000 | VOC | 19.7 | 0.01 | ANNUAL BYI, SSWD ADJUSTED | 22.3 | 0.01 | 1.13 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 22.33 | 0.01 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104007000 | VOC | 0.9 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 1.0 | 0.00 | 1.07 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.98 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104011000 | VOC | 0.1 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.1 | 0.00 | 1.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.06 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104002000 | NOX | 0.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.00 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104004000 | NOX | 64.5 | 0.01 | ANNUAL BYI, SSWD ADJUSTED | 80.6 | 0.02 | 1.25 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 80.60 | 0.02 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104006000 | NOX | 336.6 | 0.19 | ANNUAL BYI, SSWD ADJUSTED | 381.6 | 0.22 | 1.13 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 381.62 | 0.22 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104007000 | NOX | 23.9 | 0.02 | ANNUAL BYI, SSWD ADJUSTED | 25.5 | 0.02 | 1.07 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 25.47 | 0.02 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104011000 | NOX | 1.4 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 1.4 | 0.00 | 1.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 1.43 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104002000 | CO | 0.0 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.0 | 0.00 | 0.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.00 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104004000 | CO | 17.9 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 22.4 | 0.00 | 1.25 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 22.39 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104006000 | CO | 143.2 | 0.08 | ANNUAL BYI, SSWD ADJUSTED | 162.4 | 0.09 | 1.13 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 162.39 | 0.09 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104007000 | CO | 13.8 | 0.01 | ANNUAL BYI, SSWD ADJUSTED | 14.7 | 0.01 | 1.07 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 14.69 | 0.01 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Fuel** | 10 | 003 | 2104011000 | CO | 0.4 | 0.00 | ANNUAL BYI, SSWD ADJUSTED | 0.4 | 0.00 | 1.00 | EPA2016v3: EPA uses MARAMA Projections based on DE 2017 data: AEO 2019 | 0 | NA | 0.39 | 0.00 | Adjust SSWD fraction to match internal data SSWD calculation. |
| **Residential Open Burning** | 10 | 003 | 2610000100 | CO | 0.3 | 0.00 | BYI | 0.3 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.34 | 0.00 | |
| **Residential Open Burning** | 10 | 003 | 2610000400 | CO | 12.9 | 0.00 | BYI | 12.9 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 12.93 | 0.00 | |
| **Residential Open Burning** | 10 | 003 | 2610030000 | CO | 2.2 | 0.00 | BYI | 2.2 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 2.21 | 0.00 | |
| **Residential Open Burning** | 10 | 003 | 2610000100 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.02 | 0.00 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential Open Burning** | 10 | 003 | 2610000400 | NOX | 0.5 | 0.00 | BYI | 0.5 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.46 | 0.00 | |
| **Residential Open Burning** | 10 | 003 | 2610030000 | NOX | 0.2 | 0.00 | BYI | 0.2 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.16 | 0.00 | |
| **Residential Open Burning** | 10 | 003 | 2610000100 | VOC | 0.1 | 0.00 | BYI | 0.1 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.09 | 0.00 | |
| **Residential Open Burning** | 10 | 003 | 2610000400 | VOC | 1.8 | 0.00 | BYI | 1.8 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 1.75 | 0.00 | |
| **Residential Open Burning** | 10 | 003 | 2610030000 | VOC | 0.2 | 0.00 | BYI | 0.2 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.16 | 0.00 | |
| **Solvent Cleaning** | 10 | 003 | 2415000000 | VOC | 91.0 | 0.29 | BYI | 66.0 | 0.21 | 1.00 | EPA 2016v3: NAICS 31-22_441_811 (Use DE DOL Industry Growth for NCC) | 27 | 8/11/2022 | 90.99 | 0.29 | DE Control |
| **Structure Fires** | 10 | 003 | 2810030000 | VOC | 2.5 | 0.01 | BYI | 2.5 | 0.01 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 2.47 | 0.01 | |
| **Structure Fires** | 10 | 003 | 2810035000 | VOC | 0.2 | 0.00 | BYI | 0.2 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.23 | 0.00 | |
| **Structure Fires** | 10 | 003 | 2810030000 | NOX | 0.3 | 0.00 | BYI | 0.3 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.31 | 0.00 | |
| **Structure Fires** | 10 | 003 | 2810035000 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.03 | 0.00 | |
| **Structure Fires** | 10 | 003 | 2810030000 | CO | 13.5 | 0.03 | BYI | 13.5 | 0.03 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 13.48 | 0.03 | |
| **Structure Fires** | 10 | 003 | 2810035000 | CO | 1.2 | 0.00 | BYI | 1.2 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 1.24 | 0.00 | |
| **Traffic Markings** | 10 | 003 | 2401008000 | VOC | 2.3 | 0.01 | BYI | 2.3 | 0.01 | 1.00 | EPA 2016v3: Assume No Growth | 0 | 3-1-2017 - 9.7% | 2.28 | 0.01 | |
| **Vehicle Fires** | 10 | 003 | 2810050000 | NOX | 0.1 | 0.00 | BYI | 0.1 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.10 | 0.00 | |
| **Vehicle Fires** | 10 | 003 | 2810050000 | CO | 3.1 | 0.01 | BYI | 3.1 | 0.01 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 3.08 | 0.01 | |
| **Vehicle Fires** | 10 | 003 | 2810050000 | VOC | 0.8 | 0.00 | BYI | 0.8 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.79 | 0.00 | |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008100 | CO | 409.8 | 0.88 | BYI | 453.5 | 0.98 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 453.55 | 0.98 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008210 | CO | 144.1 | 0.31 | BYI | 128.1 | 0.28 | 0.89 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 128.08 | 0.28 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008220 | CO | 101.2 | 0.22 | BYI | 113.2 | 0.24 | 1.12 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 113.24 | 0.24 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008230 | CO | 52.0 | 0.11 | BYI | 60.2 | 0.13 | 1.16 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 60.24 | 0.13 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008310 | CO | 386.0 | 0.83 | BYI | 350.3 | 0.76 | 0.91 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 350.33 | 0.76 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008320 | CO | 271.2 | 0.59 | BYI | 303.3 | 0.65 | 1.12 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 303.33 | 0.65 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008330 | CO | 139.4 | 0.30 | BYI | 161.3 | 0.35 | 1.16 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 161.34 | 0.35 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008400 | CO | 14.4 | 0.03 | BYI | 18.9 | 0.04 | 1.31 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 18.87 | 0.04 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008510 | CO | 74.7 | 0.16 | BYI | 27.1 | 0.06 | 0.36 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 27.06 | 0.06 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008530 | CO | 6.5 | 0.01 | BYI | 8.5 | 0.02 | 1.31 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 8.47 | 0.02 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008610 | CO | 142.3 | 0.31 | BYI | 145.8 | 0.31 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 145.82 | 0.31 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008620 | CO | 90.9 | 0.20 | BYI | 93.2 | 0.20 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 93.16 | 0.20 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008630 | CO | 0.2 | 0.00 | BYI | 0.2 | 0.00 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 0.18 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008700 | CO | 510.0 | 1.10 | BYI | 564.4 | 1.22 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 564.41 | 1.22 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104009000 | CO | 42.3 | 0.09 | BYI | 46.8 | 0.10 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 46.78 | 0.10 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008100 | NOX | 7.2 | 0.02 | BYI | 7.9 | 0.02 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 7.91 | 0.02 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008210 | NOX | 1.7 | 0.00 | BYI | 1.6 | 0.00 | 0.89 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 1.55 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008220 | NOX | 1.4 | 0.00 | BYI | 1.6 | 0.00 | 1.12 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 1.56 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008230 | NOX | 0.8 | 0.00 | BYI | 1.0 | 0.00 | 1.16 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 0.97 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008310 | NOX | 4.7 | 0.01 | BYI | 4.3 | 0.01 | 0.91 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 4.25 | 0.01 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008320 | NOX | 3.7 | 0.01 | BYI | 4.2 | 0.01 | 1.12 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 4.17 | 0.01 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008330 | NOX | 2.3 | 0.00 | BYI | 2.6 | 0.01 | 1.16 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 2.60 | 0.01 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008400 | NOX | 3.4 | 0.01 | BYI | 4.5 | 0.01 | 1.31 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 4.51 | 0.01 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008510 | NOX | 0.7 | 0.00 | BYI | 0.3 | 0.00 | 0.36 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 0.26 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008530 | NOX | 1.5 | 0.00 | BYI | 2.0 | 0.00 | 1.31 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 2.02 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008610 | NOX | 0.8 | 0.00 | BYI | 0.8 | 0.00 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 0.81 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008620 | NOX | 0.5 | 0.00 | BYI | 0.5 | 0.00 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 0.52 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008630 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 0.04 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008700 | NOX | 8.9 | 0.02 | BYI | 9.8 | 0.02 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 9.85 | 0.02 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104009000 | NOX | 2.6 | 0.01 | BYI | 2.9 | 0.01 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 2.87 | 0.01 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008100 | VOC | 52.0 | 0.11 | BYI | 57.5 | 0.12 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 57.53 | 0.12 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008210 | VOC | 33.1 | 0.07 | BYI | 29.4 | 0.06 | 0.89 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 29.41 | 0.06 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008220 | VOC | 7.3 | 0.02 | BYI | 8.2 | 0.02 | 1.12 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 8.20 | 0.02 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008230 | VOC | 6.3 | 0.01 | BYI | 7.3 | 0.02 | 1.16 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 7.29 | 0.02 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008310 | VOC | 88.6 | 0.19 | BYI | 81.1 | 0.18 | 0.91 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 81.09 | 0.18 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008320 | VOC | 19.6 | 0.04 | BYI | 22.0 | 0.05 | 1.12 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 21.96 | 0.05 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008330 | VOC | 16.9 | 0.04 | BYI | 19.5 | 0.04 | 1.16 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 19.54 | 0.04 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008400 | VOC | 2.0 | 0.00 | BYI | 2.6 | 0.01 | 1.31 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 2.61 | 0.01 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008510 | VOC | 4.8 | 0.01 | BYI | 1.7 | 0.00 | 0.36 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 1.72 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008530 | VOC | 0.9 | 0.00 | BYI | 1.2 | 0.00 | 1.31 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 1.17 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008610 | VOC | 26.6 | 0.06 | BYI | 27.3 | 0.06 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 27.30 | 0.06 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008620 | VOC | 17.0 | 0.04 | BYI | 17.4 | 0.04 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 17.44 | 0.04 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008630 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.03 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 0.02 | 0.00 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104008700 | VOC | 64.7 | 0.14 | BYI | 71.6 | 0.15 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 71.59 | 0.15 | Use EPA values. |
| **Fuel Comb - Residential - Wood** | 10 | 003 | 2104009000 | VOC | 13.4 | 0.03 | BYI | 14.8 | 0.03 | 1.11 | EPA 2016v3: EPA accepted value 2017/2023 | 0 | NA | 14.80 | 0.03 | Use EPA values. |
| **Ag. Pesticides** | 10 | 003 | 2461850000 | VOC | 30.4 | 0.11 | ADJUSTED BYI | 30.4 | 0.11 | 1.00 | EPA 2016v3 Method: Assume No Growth | 0 | NA | 30.40 | 0.11 | BYI incorrect values. Use EPA Method rather than EPA values bc they grow from 2016. |
| **Commercial Cooking** | 10 | 003 | 2302003100 | VOC | 2.8 | 0.01 | BYI | 2.9 | 0.01 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 2.88 | 0.01 | |
| **Commercial Cooking** | 10 | 003 | 2302003000 | VOC | 4.3 | 0.01 | BYI | 4.5 | 0.01 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 4.45 | 0.01 | |
| **Commercial Cooking** | 10 | 003 | 2302003200 | VOC | 0.1 | 0.00 | BYI | 0.1 | 0.00 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 0.13 | 0.00 | |
| **Commercial Cooking** | 10 | 003 | 2302002200 | VOC | 21.0 | 0.06 | BYI | 21.6 | 0.06 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 21.62 | 0.06 | |
| **Commercial Cooking** | 10 | 003 | 2302002100 | VOC | 6.3 | 0.02 | BYI | 6.5 | 0.02 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 6.45 | 0.02 | |
| **Commercial Cooking** | 10 | 003 | 2302002100 | CO | 20.9 | 0.06 | BYI | 21.5 | 0.06 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 21.51 | 0.06 | |
| **Commercial Cooking** | 10 | 003 | 2302002200 | CO | 68.8 | 0.19 | BYI | 70.7 | 0.19 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 70.72 | 0.19 | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Commercial Cooking** | 10 | 003 | 2302003100 | CO | 5.8 | 0.02 | BYI | 6.0 | 0.02 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 5.98 | 0.02 | |
| **Prescribed Burning** | 10 | 003 | 2811015001 | VOC | 17.5 | 0.00 | BYI | 17.5 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth | 0 | NA | 17.48 | 0.00 | |
| **Prescribed Burning** | 10 | 003 | 2811015002 | CO | 198.3 | 0.00 | BYI | 198.3 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth | 0 | NA | 198.27 | 0.00 | |
| **Prescribed Burning** | 10 | 003 | 2811015001 | CO | 74.9 | 0.00 | BYI | 74.9 | 0.00 | 1.00 | EPA 2016v3 Method: Assume No Growth | 0 | NA | 74.90 | 0.00 | |
| **CMV Evap** | 10 | 003 | 2505020030 | VOC | 84.8 | 0.23 | BYI | 63.0 | 0.17 | 0.74 | EPA 2016v3: MARAMA AEO2019 Growth Factor | 0 | NA | 63.05 | 0.17 | |
| **CMV Evap** | 10 | 003 | 2505020060 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 0.75 | EPA 2016v3: MARAMA AEO2019 Growth Factor | 0 | NA | 0.00 | 0.00 | |
| **CMV Evap** | 10 | 003 | 2505020090 | VOC | 0.3 | 0.00 | BYI | 0.4 | 0.00 | 1.09 | EPA 2016v3: MARAMA AEO2019 Growth Factor | 0 | NA | 0.38 | 0.00 | |
| **CMV Evap** | 10 | 003 | 2505020120 | VOC | 29.2 | 0.08 | BYI | 31.0 | 0.09 | 1.06 | EPA 2016v3: MARAMA AEO2019 Growth Factor | 0 | NA | 31.03 | 0.09 | |
| **CMV Evap** | 10 | 003 | 2505020150 | VOC | 3.1 | 0.01 | BYI | 3.8 | 0.01 | 1.25 | EPA 2016v3: MARAMA AEO2019 Growth Factor | 0 | NA | 3.82 | 0.01 | |
| **Wildfires** | 10 | 003 | 2810001001 | CO | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | No wildfire in internal model or EPA 2020 NEI model for eastcoast | 0 | NA | 0.00 | 0.00 | |
| **Wildfires** | 10 | 003 | 2810001002 | CO | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | No wildfire in internal model or EPA 2020 NEI model for eastcoast | 0 | NA | 0.00 | 0.00 | |
| **Wildfires** | 10 | 003 | 2810001001 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | No wildfire in internal model or EPA 2020 NEI model for eastcoast | 0 | NA | 0.00 | 0.00 | |
| **Wildfires** | 10 | 003 | 2810001002 | NOX | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | No wildfire in internal model or EPA 2020 NEI model for eastcoast | 0 | NA | 0.00 | 0.00 | |
| **Wildfires** | 10 | 003 | 2810001001 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | No wildfire in internal model or EPA 2020 NEI model for eastcoast | 0 | NA | 0.00 | 0.00 | |
| **Wildfires** | 10 | 003 | 2810001002 | VOC | 0.0 | 0.00 | BYI | 0.0 | 0.00 | 1.00 | No wildfire in internal model or EPA 2020 NEI model for eastcoast | 0 | NA | 0.00 | 0.00 | |
| **Human Cremation** | 10 | 003 | 2810060100 | CO | 0.3 | 0.00 | ADJUSTED BYI | 0.3 | 0.00 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 0.32 | 0.00 | 2017 NEI SCC Not included in BYI: Use 2017 NEI value and grow by DE population |
| **Human Cremation** | 10 | 003 | 2810060100 | NOX | 0.4 | 0.00 | ADJUSTED BYI | 0.4 | 0.00 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 0.39 | 0.00 | 2017 NEI SCC Not included in BYI: Use 2017 NEI value and grow by DE population |
| **Human Cremation** | 10 | 003 | 2810060100 | VOC | 0.0 | 0.00 | ADJUSTED BYI | 0.0 | 0.00 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 0.03 | 0.00 | 2017 NEI SCC Not included in BYI: Use 2017 NEI value and grow by DE population |
| **Animal Cremation** | 10 | 003 | 2810060200 | CO | 0.000083 | 0.00000023 | ADJUSTED BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.00 | 0.00 | 2017 NEI SCC Not included in BYI: |
| **Animal Cremation** | 10 | 003 | 2810060200 | NOX | 0.000100 | 0.00000027 | ADJUSTED BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.00 | 0.00 | 2017 NEI SCC Not included in BYI: |
| **Animal Cremation** | 10 | 003 | 2810060200 | VOC | 0.000008 | 0.00000002 | ADJUSTED BYI | 0.0 | 0.00 | 1.00 | EPA 2016v3: Assume No Growth | 0 | NA | 0.00 | 0.00 | 2017 NEI SCC Not included in BYI: |
| **POTW** | 10 | 003 | 2630020000 | VOC | 11.6 | 0.03 | ADJUSTED BYI | 11.9 | 0.03 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 11.91 | 0.03 | 2017 NEI SCC Not included in BYI: |
| **Res Grilling** | 10 | 003 | 2810025000 | CO | 150.0 | 0.66 | ADJUSTED BYI | 154.2 | 0.68 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 154.20 | 0.68 | 2017 NEI SCC Not included in BYI: Use 2017 NEI value and grow by DE population |
| **Res Grilling** | 10 | 003 | 2810025000 | NOX | 3.1 | 0.01 | ADJUSTED BYI | 3.2 | 0.01 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 3.19 | 0.01 | 2017 NEI SCC Not included in BYI: |
| **Res Grilling** | 10 | 003 | 2810025000 | VOC | 8.2 | 0.04 | ADJUSTED BYI | 8.5 | 0.04 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | NA | 8.45 | 0.04 | 2017 NEI SCC Not included in BYI: |
| **Commercial & Consumer** | 10 | 003 | 2460030999 | VOC | 12.3 | 0.05 | ADJUSTED BYI | 12.6 | 0.06 | 1.03 | Delaware Population Consortium: See Tab "DPC" | 0 | 1/1/2017 - 13.4% | 12.61 | 0.06 | New SCCs: Backcalculated from EPA 2016v3 data |

DE Department of Labor Industry Growth Rates (2018-2028) for New Castle County

| Base Year | End Year | Total Years |
|---|---|---|
| 2017 | 2023 | 6 |

| NAICS | Industry | 2018 Empl. | 2028 Empl. | 10-Year Job Change | Annual Growth Rate | Calculated: Growth Factor for 6 years at | Calculated: Min | Calculated: Max |
|---|---|---|---|---|---|---|---|---|
| | **Total Employment, All Jobs** | **315,660** | **330,470** | **14,810** | **0.46%** | 1.028 | 0.75 | 1.25 |
| | **Total Self-Employed and Unpaid Family Workers, Primary Job** | **13,120** | **13,880** | **760** | **0.6%** | 1.034 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **11** | **Ag, For. Fishing** | **770** | **750** | **-20** | **-0.3%** | 0.984 | 0.75 | 1.25 |
| 111 | Crop production | 420 | 410 | -10 | -0.2% | 0.986 | 0.75 | 1.25 |
| 112 | Animal Production | 340 | 330 | -10 | -0.3% | 0.982 | 0.75 | 1.25 |
| 115 | Support Activities for Agriculture and Forestry | 10 | 10 | 0 | 0.0% | 1.000 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **21** | **Mining** | * | * | * | * | | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **22** | **Utilities** | * | * | * | * | | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **23** | **Construction** | **14,010** | **14,360** | **350** | **0.2%** | 1.015 | 0.75 | 1.25 |
| 236 | Construction of buildings | 3,070 | 3,340 | 270 | 0.8% | 1.052 | 0.75 | 1.25 |
| 237 | Heavy and civil engineering construction | 1,760 | 1,390 | -370 | -2.3% | 0.868 | 0.75 | 1.25 |
| 238 | Specialty trade contractors | 9,180 | 9,630 | 450 | 0.5% | 1.029 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **31** | **Manufacturing** | **11,530** | **11,650** | **120** | **0.1%** | 1.006 | 0.75 | 1.25 |
| 311 | Food manufacturing | 250 | 300 | 50 | 1.8% | 1.116 | 0.75 | 1.25 |
| 312 | Beverage and tobacco product manufacturing | * | * | * | * | | 0.75 | 1.25 |
| 314 | Textile product mills | 80 | 60 | -20 | -2.8% | 0.841 | 0.75 | 1.25 |
| 315 | Apparel manufacturing | * | * | * | * | | 0.75 | 1.25 |
| 321 | Wood product manufacturing | 120 | 100 | -20 | -1.8% | 0.896 | 0.75 | 1.25 |
| 322 | Paper manufacturing | 40 | 40 | 0 | 0.0% | 1.000 | 0.75 | 1.25 |
| 323 | Printing and related support activities | 310 | 210 | -100 | -3.8% | 0.792 | 0.75 | 1.25 |
| 324 | Petroleum and coal products manufacturing | * | * | * | * | | 0.75 | 1.25 |
| 325 | Chemical manufacturing | 2,010 | 2,030 | 20 | 0.1% | 1.006 | 0.75 | 1.25 |
| 326 | Plastics and rubber products manufacturing | 1,180 | 1,060 | -120 | -1.1% | 0.938 | 0.75 | 1.25 |
| 327 | Nonmetallic mineral product manufacturing | 400 | 430 | 30 | 0.7% | 1.044 | 0.75 | 1.25 |
| 331 | Primary metal manufacturing | 50 | 50 | 0 | 0.0% | 1.000 | 0.75 | 1.25 |
| 332 | Fabricated metal product manufacturing | 860 | 900 | 40 | 0.5% | 1.028 | 0.75 | 1.25 |
| 333 | Machinery manufacturing | 270 | 300 | 30 | 1.1% | 1.065 | 0.75 | 1.25 |
| 334 | Computer and electronic product manufacturing | 2,790 | 2,910 | 120 | 0.4% | 1.026 | 0.75 | 1.25 |
| 335 | Electrical equipment and appliance manufacturing | 720 | 780 | 60 | 0.8% | 1.049 | 0.75 | 1.25 |
| 336 | Transportation equipment manufacturing | 410 | 380 | -30 | -0.8% | 0.955 | 0.75 | 1.25 |
| 337 | Furniture and related product manufacturing | 390 | 360 | -30 | -0.8% | 0.953 | 0.75 | 1.25 |
| 339 | Miscellaneous manufacturing | 190 | 180 | -10 | -0.5% | 0.968 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **42** | **Wholesale Trade** | **6,940** | **6,910** | **-30** | **0.0%** | 0.997 | 0.75 | 1.25 |
| 423 | Merchant wholesalers, durable goods | 3,770 | 4,220 | 450 | 1.1% | 1.070 | 0.75 | 1.25 |
| 424 | Merchant wholesalers, nondurable goods | 2,380 | 2,030 | -350 | -1.6% | 0.909 | 0.75 | 1.25 |
| 425 | Electronic markets and agents and brokers | 790 | 660 | -130 | -1.8% | 0.898 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **44** | **Retail Trade** | **30,170** | **30,090** | **-80** | **0.0%** | 0.998 | 0.75 | 1.25 |
| 441 | Motor vehicle and parts dealers | 4,020 | 4,070 | 50 | 0.1% | 1.007 | 0.75 | 1.25 |
| 442 | Furniture and home furnishings stores | 1,190 | 1,210 | 20 | 0.2% | 1.010 | 0.75 | 1.25 |
| 443 | Electronics and appliance stores | 1,190 | 1,430 | 240 | 1.9% | 1.117 | 0.75 | 1.25 |
| 444 | Building material and garden supply stores | 2,750 | 2,580 | -170 | -0.6% | 0.962 | 0.75 | 1.25 |
| 445 | Food and beverage stores | 5,440 | 5,770 | 330 | 0.6% | 1.036 | 0.75 | 1.25 |
| 446 | Health and personal care stores | 2,440 | 2,550 | 110 | 0.4% | 1.027 | 0.75 | 1.25 |
| 447 | Gasoline stations | 1,630 | 1,730 | 100 | 0.6% | 1.036 | 0.75 | 1.25 |
| 448 | Clothing and clothing accessories stores | 2,930 | 2,810 | -120 | -0.4% | 0.975 | 0.75 | 1.25 |
| 451 | Sporting goods, hobby, book, and music stores | 1,330 | 1,170 | -160 | -1.3% | 0.926 | 0.75 | 1.25 |
| 452 | General merchandise stores | 4,880 | 4,570 | -310 | -0.7% | 0.961 | 0.75 | 1.25 |
| 453 | Miscellaneous store retailers | 1,670 | 1,550 | -120 | -0.7% | 0.956 | 0.75 | 1.25 |
| 454 | Nonstore retailers | 700 | 650 | -50 | -0.7% | 0.957 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **48** | **Transportation and Warehousing** | **11,420** | **11,940** | **520** | **0.4%** | 1.027 | 0.75 | 1.25 |
| 481 | Air transportation | 170 | 190 | 20 | 1.1% | 1.069 | 0.75 | 1.25 |
| 482 | Rail transportation | 1,110 | 970 | -140 | -1.3% | 0.922 | 0.75 | 1.25 |
| 484 | Truck transportation | 1,540 | 1,740 | 200 | 1.2% | 1.076 | 0.75 | 1.25 |
| 485 | Transit and ground passenger transport | 910 | 650 | -260 | -3.3% | 0.817 | 0.75 | 1.25 |
| 488 | Support activities for transportation | 1,700 | 2,010 | 310 | 1.7% | 1.106 | 0.75 | 1.25 |
| 491 | Postal service | 1,370 | 1,340 | -30 | -0.2% | 0.987 | 0.75 | 1.25 |
| 492 | Couriers and messengers | 1,060 | 1,140 | 80 | 0.7% | 1.045 | 0.75 | 1.25 |
| 493 | Warehousing and storage | * | * | * | * | | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **51** | **Information** | **3,190** | **2,890** | **-300** | **-1.0%** | 0.942 | 0.75 | 1.25 |
| 511 | Publishing industries | 550 | 520 | -30 | -0.6% | 0.967 | 0.75 | 1.25 |
| 512 | Motion picture and sound recording industries | 340 | 310 | -30 | -0.9% | 0.946 | 0.75 | 1.25 |
| 515 | Broadcasting (except Internet) | 140 | 120 | -20 | -1.5% | 0.912 | 0.75 | 1.25 |
| 517 | Telecommunications | 1,610 | 1,790 | 180 | 1.1% | 1.066 | 0.75 | 1.25 |
| 518 | Data processing, hosting and related services | 420 | 50 | -370 | -19.2% | 0.750 | 0.75 | 1.25 |
| 519 | Other information services | 130 | 100 | -30 | -2.6% | 0.854 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **52** | **Finance and Insurance** | **38,340** | **39,760** | **1,420** | **0.4%** | 1.022 | 0.75 | 1.25 |
| 522 | Credit intermediation and related activities | 25,210 | 26,470 | 1,260 | 0.5% | 1.030 | 0.75 | 1.25 |
| 523 | Securities, commodity contracts, investments | 8,410 | 8,790 | 380 | 0.4% | 1.027 | 0.75 | 1.25 |
| 524 | Insurance carriers and related activities | 4,710 | 4,480 | -230 | -0.5% | 0.970 | 0.75 | 1.25 |
| 525 | Funds, trusts, and other financial vehicles | 10 | 20 | 10 | 7.2% | 1.250 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **53** | **Real Estate and Rental and Leasing** | **3,530** | **3,730** | **200** | **0.6%** | 1.034 | 0.75 | 1.25 |
| 531 | Real estate | 2,720 | 2,850 | 130 | 0.5% | 1.028 | 0.75 | 1.25 |
| 532 | Rental and leasing services | 810 | 880 | 70 | 0.8% | 1.051 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **54** | **Professional and Technical Services** | **21,280** | **21,660** | **380** | **0.2%** | 1.011 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **55** | **Management of Companies and Enterprises** | **6,970** | **7,230** | **260** | **0.4%** | 1.022 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **56** | **Administrative and Waste Services** | **19,380** | **19,270** | **-110** | **-0.1%** | 0.997 | 0.75 | 1.25 |
| 561 | Administrative and support services | 18,190 | 18,120 | -70 | 0.0% | 0.998 | 0.75 | 1.25 |
| 562 | Waste management and remediation service | 1,190 | 1,150 | -40 | -0.3% | 0.980 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **61** | **Educational Services** | **28,000** | **28,270** | **270** | **0.1%** | 1.006 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **62** | **Health Care and Social Assistance** | **48,930** | **56,590** | **7,660** | **1.5%** | 1.091 | 0.75 | 1.25 |
| 621 | Ambulatory health care services | 13,770 | 15,550 | 1,780 | 1.2% | 1.076 | 0.75 | 1.25 |
| 622 | Hospitals | 17,960 | 21,650 | 3,690 | 1.9% | 1.119 | 0.75 | 1.25 |
| 623 | Nursing and residential care facilities | 8,760 | 9,960 | 1,200 | 1.3% | 1.080 | 0.75 | 1.25 |
| 624 | Social assistance | 8,440 | 9,430 | 990 | 1.1% | 1.069 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **71** | **Arts, Entertainment, and Recreation** | **6,140** | **7,050** | **910** | **1.4%** | 1.086 | 0.75 | 1.25 |
| 711 | Performing arts and spectator sports | 510 | 520 | 10 | 0.2% | 1.012 | 0.75 | 1.25 |
| 712 | Museums, historical sites, zoos, and parks | 850 | 840 | -10 | -0.1% | 0.993 | 0.75 | 1.25 |
| 713 | Amusement, gambling, and recreation industries | 4,780 | 5,690 | 910 | 1.8% | 1.110 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **72** | **Accommodation and Food Services** | **23,370** | **24,990** | **1,620** | **0.7%** | 1.041 | 0.75 | 1.25 |
| 721 | Accommodation | 1,820 | 1,960 | 140 | 0.7% | 1.045 | 0.75 | 1.25 |
| 722 | Food services and drinking places | 21,550 | 23,030 | 1,480 | 0.7% | 1.041 | 0.75 | 1.25 |
| | | | | | | 1.000 | 0.75 | 1.25 |
| **81** | **Other Services, Except Public Administration** | **12,870** | **13,400** | **530** | **0.4%** | 1.025 | 0.75 | 1.25 |
| 811 | Repair and maintenance | 1,930 | 1,890 | -40 | -0.2% | 0.988 | 0.75 | 1.25 |
| 812 | Personal and laundry services | 3,400 | 3,860 | 460 | 1.3% | 1.079 | 0.75 | 1.25 |
| 813 | Religious, grantmaking, civic, professional, and similar ( | 7,250 | 7,320 | 70 | 0.1% | 1.006 | 0.75 | 1.25 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 814 | Private households | 290 | 330 | 40 | 1.3% | **1.081** | **0.75** | **1.25** |
| | | | | | | **1.000** | **0.75** | **1.25** |
| | **Government** | **14,210** | **14,600** | **390** | **0.3%** | **1.016** | **0.75** | **1.25** |
| | Federal Government, Excluding Postal Service | 7,500 | 7,670 | 170 | 0.2% | **1.014** | **0.75** | **1.25** |
| | State Government, Excluding Education and Hospita | 4,780 | 5,110 | 330 | 0.7% | **1.041** | **0.75** | **1.25** |
| | Local government, Excluding Education and Hospital | 1,930 | 1,820 | -110 | -0.6% | **0.965** | **0.75** | **1.25** |
| | 31-33, 441, 811 Average Growth | | | | | **1.000** | **0.75** | **1.25** |

An asterisk (*) represents data that cannot be released due to employer confidentiality restrictions.
Retrieved 4-20-23
https://labor.delaware.gov/divisions/oolmi/projections/Projections-QCEW-LT/

**Delaware Population Consortium**

DPC-2022vo-single-year-5year-age-cohorts retrieved 5-12-2023

https://stateplanning.delaware.gov/demography/dpc.shtml

New Castle:

| 2017 | 2023 | Growth Rate |
|---|---|---|
| 562,453.00 | 578,060.00 | **1.028** |

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | 1.028 | | | |
| Population | 538753 | 544177 | 546727 | 549557 | 552518 | 555811 | 559282 | 562453 | 565467 | 568198 | 570888 | 572867 | 575897 | 578060 | 580140 | 582088 | 584076 |
| Households | 198207 | 200910 | 202649 | 204592 | 206615 | 208888 | 211227 | 213506 | 215731 | 217899 | 222314 | 223058 | 224073 | 224558 | 224996 | 225307 | 225676 |
| Population Ch | 5424 | 2550 | 2830 | 2961 | 3293 | 3471 | 3171 | 3014 | 2731 | 2690 | 1979 | 3030 | 2163 | 2080 | 1948 | 1988 | 1886 |
| Births | 6780 | 6880 | 6482 | 6451 | 6461 | 6599 | 6448 | 6413 | 6228 | 6254 | 6262 | 6249 | 6217 | 6164 | 6105 | 6042 | 5984 |
| Deaths | 4221 | 4394 | 4260 | 4341 | 4339 | 4555 | 4676 | 4894 | 4987 | 5061 | 5139 | 5220 | 5306 | 5394 | 5488 | 5587 | 5688 |
| Net Migrati | 2865 | 64 | 608 | 851 | 1171 | 1427 | 1399 | 1495 | 1490 | 1497 | 856 | 2001 | 1252 | 1310 | 1331 | 1533 | 1590 |
| Household Ch | 2703 | 1739 | 1943 | 2023 | 2273 | 2339 | 2279 | 2225 | 2168 | 4415 | 744 | 1015 | 485 | 438 | 311 | 369 | 225 |
| Total Labor Fc | 272217 | 277662 | 277961 | 275762 | 284612 | 293437 | 299262 | 296709 | 300921 | 305794 | 300358 | 300511 | 300727 | 300488 | 300135 | 299774 | 299435 |
| Civilian | 271852 | 277392 | 277606 | 275411 | 284173 | 293008 | 298832 | 296352 | 300468 | 305257 | 299826 | 299984 | 300205 | 299970 | 299622 | 299266 | 298932 |
| Employec | 247824 | 255154 | 256649 | 255423 | 264797 | 275293 | 278904 | 279236 | 285161 | 290850 | 287833 | 287985 | 288197 | 287971 | 287637 | 287295 | 286975 |
| Private | 208875 | 215053 | 216313 | 215280 | 223180 | 232027 | 235071 | 235350 | 240344 | 245139 | 242596 | 242724 | 242903 | 242712 | 242431 | 242143 | 241873 |
| Goverr | 28867 | 29720 | 29895 | 29752 | 30844 | 32066 | 32487 | 32526 | 33216 | 33878 | 33527 | 33545 | 33569 | 33543 | 33504 | 33464 | 33427 |
| Self-En | 9718 | 10006 | 10064 | 10016 | 10384 | 10796 | 10937 | 10950 | 11182 | 11406 | 11287 | 11293 | 11302 | 11293 | 11280 | 11266 | 11254 |
| Unpaic | 364 | 375 | 377 | 375 | 389 | 404 | 409 | 410 | 419 | 427 | 423 | 423 | 423 | 423 | 422 | 422 | 421 |
| Unemplo | 24028 | 22238 | 20957 | 19988 | 19376 | 17715 | 19928 | 17116 | 15307 | 14407 | 11993 | 11999 | 12008 | 11999 | 11985 | 11971 | 11957 |
| Military | 365 | 270 | 355 | 351 | 439 | 429 | 430 | 357 | 453 | 537 | 532 | 527 | 522 | 518 | 513 | 508 | 503 |
| Jobs by Place ( | 263947 | 266255 | 266860 | 270496 | 278328 | 285877 | 287479 | 288069 | 291306 | 300050 | 296939 | 297095 | 297314 | 297081 | 296736 | 296383 | 296054 |
| Jobs by Resi | 247823 | 255153 | 256649 | 255423 | 264796 | 275293 | 278904 | 279235 | 285160 | 290849 | 287833 | 287984 | 288197 | 287970 | 287636 | 287295 | 286975 |
| Net Commu | 16124 | 11102 | 10211 | 15073 | 13532 | 10584 | 8575 | 8834 | 6146 | 9201 | 9106 | 9111 | 9117 | 9111 | 9100 | 9088 | 9079 |

| 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 585962 | 587675 | 589254 | 590820 | 591649 | 592325 | 593012 | 593583 | 593973 | 594251 | 594450 | 594505 | 594440 | 594231 | 593669 | 593425 | 592853 | 592044 |
| 225901 | 226166 | 226293 | 226330 | 226047 | 225695 | 225582 | 225447 | 225190 | 224541 | 224042 | 223420 | 222988 | 222503 | 221668 | 221314 | 220620 | 219781 |
| 1713 | 1579 | 1566 | 829 | 676 | 687 | 571 | 390 | 278 | 199 | 55 | -65 | -209 | -562 | -244 | -572 | -809 | -871 |
| 5936 | 5898 | 5869 | 5851 | 5839 | 5834 | 5835 | 5842 | 5846 | 5847 | 5847 | 5846 | 5835 | 5821 | 5800 | 5775 | 5747 | 5713 |
| 5796 | 5909 | 6024 | 6142 | 6259 | 6378 | 6494 | 6613 | 6726 | 6838 | 6940 | 7032 | 7116 | 7194 | 7267 | 7332 | 7381 | 7425 |
| 1573 | 1590 | 1721 | 1120 | 1096 | 1231 | 1230 | 1161 | 1158 | 1190 | 1148 | 1121 | 1072 | 811 | 1223 | 985 | 825 | 841 |
| 265 | 127 | 37 | -283 | -352 | -113 | -135 | -257 | -649 | -499 | -622 | -432 | -485 | -835 | -354 | -694 | -839 | -772 |
| 299271 | 298890 | 298630 | 298287 | 297629 | 297125 | 296508 | 296006 | 295372 | 294756 | 294090 | 293484 | 292953 | 292386 | 291891 | 291414 | 290822 | 290156 |
| 298772 | 298396 | 298140 | 297802 | 297148 | 296649 | 296036 | 295539 | 294909 | 294297 | 293635 | 293033 | 292507 | 291944 | 291453 | 290980 | 290392 | 289730 |
| 286821 | 286460 | 286214 | 285890 | 285262 | 284783 | 284195 | 283717 | 283113 | 282525 | 281890 | 281312 | 280807 | 280266 | 279795 | 279341 | 278776 | 278141 |
| 241743 | 241439 | 241232 | 240958 | 240429 | 240025 | 239530 | 239127 | 238618 | 238122 | 237587 | 237100 | 236674 | 236218 | 235821 | 235439 | 234963 | 234428 |
| 33409 | 33367 | 33338 | 33301 | 33228 | 33172 | 33103 | 33048 | 32977 | 32909 | 32835 | 32767 | 32709 | 32646 | 32591 | 32538 | 32472 | 32398 |
| 11248 | 11233 | 11224 | 11211 | 11186 | 11168 | 11145 | 11126 | 11102 | 11079 | 11054 | 11032 | 11012 | 10991 | 10972 | 10954 | 10932 | 10907 |
| 421 | 421 | 420 | 420 | 419 | 418 | 417 | 416 | 416 | 415 | 414 | 413 | 412 | 411 | 411 | 410 | 409 | 408 |
| 11951 | 11936 | 11926 | 11912 | 11886 | 11866 | 11841 | 11822 | 11796 | 11772 | 11745 | 11721 | 11700 | 11678 | 11658 | 11639 | 11616 | 11589 |
| 499 | 494 | 490 | 485 | 481 | 476 | 472 | 467 | 463 | 459 | 455 | 451 | 446 | 442 | 438 | 434 | 430 | 426 |
| 295894 | 295522 | 295269 | 294933 | 294286 | 293791 | 293185 | 292692 | 292069 | 291462 | 290807 | 290211 | 289689 | 289131 | 288646 | 288178 | 287595 | 286941 |
| 286820 | 286459 | 286214 | 285888 | 285261 | 284782 | 284194 | 283716 | 283113 | 282524 | 281889 | 281312 | 280806 | 280265 | 279795 | 279341 | 278776 | 278141 |
| 9074 | 9063 | 9055 | 9045 | 9025 | 9009 | 8991 | 8976 | 8956 | 8938 | 8918 | 8899 | 8883 | 8866 | 8851 | 8837 | 8819 | 8800 |

| 2045 | 2046 | 2047 | 2048 | 2049 | 2050 |
|---|---|---|---|---|---|
| 591173 | 590283 | 589311 | 588287 | 587225 | 586107 |
| 219009 | 218062 | 217277 | 216341 | 215366 | 214331 |
| -890 | -972 | -1024 | -1062 | -1118 | |
| 5675 | 5642 | 5610 | 5579 | 5547 | |
| 7464 | 7499 | 7525 | 7543 | 7547 | |
| 899 | 885 | 891 | 902 | 882 | |
| -947 | -785 | -936 | -975 | -1035 | |
| 289513 | 288855 | 288104 | 287239 | 286307 | 285331 |
| 289091 | 288437 | 287689 | 286828 | 285900 | 284928 |
| 277527 | 276900 | 276181 | 275355 | 274464 | 273531 |
| 233910 | 233381 | 232776 | 232079 | 231328 | 230542 |
| 32327 | 32254 | 32170 | 32074 | 31970 | 31861 |
| 10883 | 10859 | 10830 | 10798 | 10763 | 10726 |
| 407 | 406 | 405 | 404 | 403 | 402 |
| 11564 | 11537 | 11508 | 11473 | 11436 | 11397 |
| 422 | 418 | 415 | 411 | 407 | 403 |
| 286306 | 285659 | 284918 | 284066 | 283147 | 282184 |
| 277526 | 276899 | 276181 | 275355 | 274464 | 273530 |
| 8780 | 8760 | 8737 | 8711 | 8683 | 8654 |

**Cumulative/Phased-in Controls:**

| Category | Region | County | SCC | | Control Efficiency | Calc Pre-control E | Calc - Emissions w | Calculation - Cum | Cumulative/Pha | Effective Date | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline Marketing - PFCs | 10 | 003 | 2501011011 | VOC | 57 | 7.4 | 6.5 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011012 | VOC | 57 | 64.2 | 56.3 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011013 | VOC | 57 | 3.5 | 3.1 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011014 | VOC | 57 | 12.9 | 11.3 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501011015 | VOC | 57 | 2.3 | 2.0 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012011 | VOC | 57 | 0.6 | 0.6 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012012 | VOC | 57 | 8.0 | 7.0 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012013 | VOC | 57 | 5.8 | 5.0 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012014 | VOC | 57 | 14.7 | 12.9 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing - PFCs | 10 | 003 | 2501012015 | VOC | 57 | 2.6 | 2.3 | 12% | 12 | 1/1/2018 | Controls calculated from DE 2020 internal documents. |
| Gasoline Marketing | 10 | 003 | 2501060053 | VOC | 97 | 125.6 | 119.5 | 4.9% | 4.9 | 2020 enhanced | Controls calculated from DE 2020 internal documents. Conservatively use 2020 controls. Rate Penetration is 90%. |
| Gasoline Marketing | 10 | 003 | 2501060201 | VOC | 90 | 86.80 | 12.6 | 85.5% | 85.5 | All stage II rem | Controls calculated from DE 2020 internal documents. Assume all stage II removed in 2023. Rate Penetartion is 99%. |
| Solvent Cleaning | 10 | 003 | 2415000000 | VOC | 80 | 149.1 | 108.2 | 27.4% | 27 | 8/11/2022 | Controls calculated from DE 2017 internal documents.New rule increases control efficiency from 63 to 80%. Rate effectiveness is 80%. |

**NOTES:**

PFC Controls use 12% to match incremental increase from 2017 to 2018 (The effect of going from 51% to 57%).

Stage 1: Balanced Submer Used 2020 controls (additional percentage) to account for increased # of enhanced vapor recovery

Underground Tank: Breathing and Empt Used 2020 controls (additional percentage) to account for reduced stage II (less incompatability emissions)

Solvent Cleaning: 2022 OTC controls 27%

| Category | Total Control Efficiency | Cumulative/Phased In Control | Effective Date | Notes |
|---|---|---|---|---|
| Gasoline Marketing - PFCs SCC:2501011011-2501012015 | 57 | 12 | 1/1/2018 | PFC Controls use 12% to match incremental increase from 2017 to 2018 (The additional reductions needed to go from 51% to 57%). |
| Gasoline Marketing - Stage 1 (Retail) SCC: 2501060053 | 97 | 5 | 2020 | Gas stations have until 2025 to add enhanced vapor control. Conservatively use 2020 control values to account for some decommission. |
| Gasoline Marketing - Underground Tank: Breathing and Emptying (Retail) SCC: 2501060201 | 90 | 86 | Decommission of Stage II vapor recovery system by 12/31/21. | Underground Tank: Breathing and Emptying. With the removal of stage II, the control of underground tanks has increased. |
| Solvent Cleaning SCC:2415000000 | 80 | 27 | 8/11/2022 | 2022 OTC model rules implementation increased control from 60% to 80%. |

**Lighter fluid calculaton for 2017 emissions from EPA's 2016v3 modeling data:**

Data from EPA's 2016v2 modeling platform.

| country_cd | region_cd | scc | poll | EPA 2023 tpy | EPA 2016 | Calculated 2017 (tpy) | 2016-2023 GF | 2016-2017 annual gf | calc_year | date_updated | data_set_id |
|---|---|---|---|---|---|---|---|---|---|---|---|
| US | 10003 | 2460030999 | VOC | 12.70 | 12.19 | 12.27 | 1.04 | 1.01 | 2016.00 | 20220621.00 | VCPy_2016 |

**Calculated Emissions for 2017 (tpy)** **12.27**

# Appendix C

SSWD

| | |
|---|---|
| Output_Database | **BYI_2017_10003_20191003_m3_out** |
| OutputTable | MOVESOutput |
| TimeAggregation_Input | 24-hr |
| dayID | 5 |

| **Sum of emissionQuant** | **Column Labels** | | |
|---|---|---|---|
| **Row Labels** | **Carbon Monoxide (CO)** | **Oxides of Nitrogen (NOx)** | **Volatile Organic Compounds** |
| 6 | 87.4 | 16.9 | 5.5 |
| 7 | 80.9 | 15.2 | 5.3 |
| 8 | 81.4 | 16.0 | 5.3 |
| SSWD Average | 83.2 | 16.1 | 5.4 |

Based of the Sum(Daily Emission) … Can be added to give the correct Annual totals …
If all the Hours, DayTypes & Months are included

| TimeAggregation_Input | 24-hr |
|---|---|

| Sum of Daily Emission | | Pollutant | | |
|---|---|---|---|---|
| **monthID** | **dayID** | **Carbon Monoxide (CO)** | **Oxides of Nitrogen (NOx)** | **Volatile Organic Compounds** |
| **1** | 2 | 490.4 | 65.8 | 32.8 |
| | 5 | 1723.1 | 326.3 | 111.2 |
| **2** | 2 | 484.1 | 73.7 | 29.6 |
| | 5 | 1575.0 | 327.0 | 96.9 |
| **3** | 2 | 502.1 | 72.1 | 31.6 |
| | 5 | 1732.0 | 357.6 | 106.8 |
| **4** | 2 | 495.5 | 82.3 | 31.3 |
| | 5 | 1437.3 | 351.3 | 96.6 |
| **5** | 2 | 506.9 | 80.0 | 35.0 |
| | 5 | 1597.5 | 350.5 | 111.5 |
| **6** | 2 | 565.8 | 78.3 | 36.0 |
| | 5 | 1872.3 | 362.8 | 117.5 |
| **7** | 2 | 691.0 | 90.5 | 40.5 |
| | 5 | 1792.4 | 337.2 | 117.1 |
| **8** | 2 | 577.9 | 75.7 | 37.0 |
| | 5 | 1801.7 | 354.6 | 118.0 |
| **9** | 2 | 470.7 | 72.7 | 33.1 |
| | 5 | 1578.3 | 335.2 | 108.4 |
| **10** | 2 | 434.0 | 71.5 | 30.0 |
| | 5 | 1524.9 | 356.6 | 101.6 |
| **11** | 2 | 540.3 | 87.8 | 32.0 |
| | 5 | 1646.5 | 357.3 | 100.8 |
| **12** | 2 | 526.4 | 78.0 | 31.9 |
| | 5 | 1735.8 | 360.5 | 105.8 |
| **Grand Total** | | **26301.9** | **5105.4** | **1693.0** |

Based of the Sum(Daily Emission) … Can be added to give the correct Annual totals … If all the Hours, DayTypes & Months are included

| TimeAggregation_Input | 24-hr |
|---|---|

| Sum of Daily Emission | Column Labels | | |
|---|---|---|---|
| Row Labels | Carbon Monoxide (CO) | Oxides of Nitrogen (NOx) | Volatile Organic Compounds |
| 2201110101 | 0 | 0 | 0 |
| 2201110102 | 4.628330271 | 0.11934628 | 0.593030425 |
| 2201110111 | | | 5.047853821 |
| 2201110112 | | | 18.39846426 |
| 2201110113 | | | 6.608021314 |
| 2201110115 | 0 | 0 | 0 |
| 2201110116 | 0 | 0 | 0 |
| 2201110118 | | | 0.009153484 |
| 2201110119 | | | 0.001274323 |
| 2201110201 | 0 | 0 | 0 |
| 2201110215 | 0 | 0 | 0 |
| 2201110218 | | | 0 |
| 2201110219 | | | 0 |
| 2201110301 | 88.28189529 | 4.764450751 | 4.430030237 |
| 2201110311 | | | 0.005716764 |
| 2201110312 | | | 1.877830723 |
| 2201110313 | | | 0.073920205 |
| 2201110315 | 0 | 0 | 0 |
| 2201110318 | | | 0.358876459 |
| 2201110319 | | | 0.048071588 |
| 2201110401 | 324.6692319 | 18.0586841 | 14.8083131 |
| 2201110411 | | | 0.016762813 |
| 2201110412 | | | 5.4747553 |
| 2201110413 | | | 0.215621167 |
| 2201110415 | 0 | 0 | 0 |
| 2201110418 | | | 1.312411244 |
| 2201110419 | | | 0.176494601 |
| 2201110501 | 167.2264213 | 7.774494914 | 11.09659309 |
| 2201110511 | | | 0.019822658 |
| 2201110512 | | | 6.5013601 |
| 2201110513 | | | 0.255962401 |
| 2201110515 | 0 | 0 | 0 |
| 2201110518 | | | 0.670028189 |
| 2201110519 | | | 0.089862299 |
| 2201210101 | 38.46540189 | 5.841553451 | 4.765194614 |
| 2201210102 | 2413.09951 | 114.1409569 | 209.9187373 |
| 2201210111 | | | 58.77316481 |
| 2201210112 | | | 99.87295686 |
| 2201210113 | | | 89.51143486 |
| 2201210115 | 0.020002003 | 0.000233662 | 0.062900486 |
| 2201210116 | 1.254813259 | 0.004565639 | 2.770925241 |
| 2201210118 | | | 0.76166167 |
| 2201210119 | | | 0.83811612 |
| 2201210201 | 0 | 0 | 0 |
| 2201210215 | 0 | 0 | 0 |
| 2201210218 | | | 0 |
| 2201210219 | | | 0 |
| 2201210301 | 1134.387943 | 82.60605571 | 15.14163201 |
| 2201210311 | | | 0.28036137 |
| 2201210312 | | | 3.293773244 |
| 2201210313 | | | 4.38274592 |
| 2201210315 | 0.589881795 | 0.00330424 | 0.199869557 |
| 2201210318 | | | 1.236136861 |
| 2201210319 | | | 1.340698496 |
| 2201210401 | 3680.241164 | 288.021316 | 46.686223 |
| 2201210411 | | | 0.821643143 |
| 2201210412 | | | 9.602885471 |
| 2201210413 | | | 12.7842225 |
| 2201210415 | 1.91372586 | 0.011520849 | 0.616257127 |
| 2201210418 | | | 4.168698221 |
| 2201210419 | | | 4.5519817 |

| | | | |
|---|---|---|---|
| 2201210501 | 2438.220801 | 154.9342853 | 38.6933341 |
| 2201210511 | | | 0.97125075 |
| 2201210512 | | | 11.40357554 |
| 2201210513 | | | 15.17605737 |
| 2201210515 | 1.267874539 | 0.006197372 | 0.510752437 |
| 2201210518 | | | 2.802047357 |
| 2201210519 | | | 3.02145377 |
| 2201310101 | 57.27422386 | 5.973137806 | 3.622243639 |
| 2201310102 | 1908.068819 | 116.9027106 | 153.7958489 |
| 2201310111 | | | 32.26893566 |
| 2201310112 | | | 39.7156001 |
| 2201310113 | | | 50.26779929 |
| 2201310115 | 0.029782631 | 0.000238926 | 0.047813609 |
| 2201310116 | 0.99219593 | 0.004676107 | 2.030105394 |
| 2201310118 | | | 1.243931574 |
| 2201310119 | | | 0.752500323 |
| 2201310201 | 0 | 0 | 0 |
| 2201310215 | 0 | 0 | 0 |
| 2201310218 | | | 0 |
| 2201310219 | | | 0 |
| 2201310301 | 968.4218314 | 88.20745314 | 13.72358216 |
| 2201310311 | | | 0.182044684 |
| 2201310312 | | | 1.780307949 |
| 2201310313 | | | 2.827316579 |
| 2201310315 | 0.5035794 | 0.003528299 | 0.181151251 |
| 2201310318 | | | 2.251509536 |
| 2201310319 | | | 1.319021294 |
| 2201310401 | 3268.570167 | 313.7993186 | 41.94595853 |
| 2201310411 | | | 0.530890003 |
| 2201310412 | | | 5.190426543 |
| 2201310413 | | | 8.247128714 |
| 2201310415 | 1.6996565 | 0.012551979 | 0.553687059 |
| 2201310418 | | | 7.6823852 |
| 2201310419 | | | 4.531081693 |
| 2201310501 | 1922.897864 | 160.7525531 | 36.1912593 |
| 2201310511 | | | 0.630183807 |
| 2201310512 | | | 6.163723917 |
| 2201310513 | | | 9.790102643 |
| 2201310515 | 0.999906704 | 0.006430103 | 0.477724788 |
| 2201310518 | | | 4.946193911 |
| 2201310519 | | | 2.882309676 |
| 2201320101 | 45.54005417 | 10.04173411 | 4.195002674 |
| 2201320102 | 1867.916201 | 92.06690471 | 105.3286327 |
| 2201320111 | | | 17.09813783 |
| 2201320112 | | | 20.57359193 |
| 2201320113 | | | 26.65117437 |
| 2201320115 | 0.023680811 | 0.000401669 | 0.05537406 |
| 2201320116 | 0.971316503 | 0.003682677 | 1.390338174 |
| 2201320118 | | | 0.737577075 |
| 2201320119 | | | 0.422439096 |
| 2201320201 | 0 | 0 | 0 |
| 2201320215 | 0 | 0 | 0 |
| 2201320218 | | | 0 |
| 2201320219 | | | 0 |
| 2201320301 | 543.5576426 | 69.95746294 | 9.716385103 |
| 2201320311 | | | 0.082845799 |
| 2201320312 | | | 0.937591224 |
| 2201320313 | | | 1.43842172 |
| 2201320315 | 0.282649996 | 0.002798298 | 0.128256196 |
| 2201320318 | | | 1.247500732 |
| 2201320319 | | | 0.705045648 |
| 2201320401 | 1735.047441 | 242.1385811 | 26.68149041 |
| 2201320411 | | | 0.236361214 |
| 2201320412 | | | 2.679919946 |
| 2201320413 | | | 4.1125683 |
| 2201320415 | 0.902225083 | 0.00968554 | 0.352195858 |
| 2201320418 | | | 4.15709302 |
| 2201320419 | | | 2.358522834 |
| 2201320501 | 1245.235655 | 138.7944668 | 33.60084847 |
| 2201320511 | | | 0.296930259 |
| 2201320512 | | | 3.282290229 |
| 2201320513 | | | 5.035579894 |
| 2201320515 | 0.647522492 | 0.005551773 | 0.443531451 |
| 2201320518 | | | 2.861044454 |
| 2201320519 | | | 1.587933901 |
| 2201410101 | 0.211804617 | 0.05298988 | 0.024613103 |

| | | | |
|---|---|---|---|
| 2201410102 | 2.478886263 | 0.077368822 | 0.089273131 |
| 2201410111 | | | 0.003266438 |
| 2201410112 | | | 0.008169781 |
| 2201410113 | | | 0.006584874 |
| 2201410115 | 0.000110138 | 2.11959E-06 | 0.000324893 |
| 2201410116 | 0.001289021 | 3.09475E-06 | 0.001178405 |
| 2201410118 | | | 0.009574316 |
| 2201410119 | | | 0.001301759 |
| 2201410201 | 0 | 0 | 0 |
| 2201410215 | 0 | 0 | 0 |
| 2201410218 | | | 0 |
| 2201410219 | | | 0 |
| 2201410301 | 4.141220019 | 0.240017734 | 0.048476809 |
| 2201410311 | | | 0.000135318 |
| 2201410312 | | | 0.000490645 |
| 2201410313 | | | 0.000710961 |
| 2201410315 | 0.002153434 | 9.60071E-06 | 0.000639894 |
| 2201410318 | | | 0.025578996 |
| 2201410319 | | | 0.003458183 |
| 2201410401 | 18.51850709 | 0.860674549 | 0.16819058 |
| 2201410411 | | | 0.00040047 |
| 2201410412 | | | 0.001454771 |
| 2201410413 | | | 0.002107903 |
| 2201410415 | 0.009629622 | 3.4427E-05 | 0.002220116 |
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| 2202520102 | 5.800144297 | 5.2847825 | 3.362118301 |
| 2202520115 | 0.900740428 | 0.227705188 | 0.483682047 |
| 2202520116 | 0.386320634 | 0.001181882 | 0.046498757 |
| 2202520118 | | | 0 |
| 2202520119 | | | 0.114990195 |
| 2202520201 | 0 | 0 | 0 |
| 2202520215 | 0 | 0 | 0 |
| 2202520218 | | | 0 |
| 2202520219 | | | 0 |
| 2202520301 | 28.75447917 | 64.06678746 | 4.838938377 |
| 2202520315 | 0.756624391 | 0.182970019 | 0.319171105 |
| 2202520318 | | | 0 |
| 2202520319 | | | 0.263680939 |
| 2202520401 | 88.97917271 | 203.4717057 | 14.79655873 |
| 2202520415 | 2.353617673 | 0.530447487 | 0.96062202 |
| 2202520418 | | | 0 |
| 2202520419 | | | 0.886503153 |
| 2202520501 | 83.7937164 | 170.588123 | 14.66084538 |
| 2202520515 | 2.173524454 | 0.592750669 | 0.994509076 |
| 2202520518 | | | 0 |
| 2202520519 | | | 0.598064586 |
| 2202530101 | 3.288125906 | 4.864101231 | 0.640481016 |
| 2202530102 | 0.05916832 | 0.057697059 | 0.024760919 |
| 2202530115 | 0.090194354 | 0.024717354 | 0.047370967 |
| 2202530116 | 0.005458256 | 8.23648E-06 | 0.000300143 |
| 2202530118 | | | 0 |
| 2202530119 | | | 0.012892078 |
| 2202530201 | 0 | 0 | 0 |
| 2202530215 | 0 | 0 | 0 |
| 2202530218 | | | 0 |

| | | | |
|---|---|---|---|
| 2202530219 | | | 0 |
| 2202530301 | 2.636466257 | 5.653076466 | 0.414477121 |
| 2202530315 | 0.072360508 | 0.016810571 | 0.029119855 |
| 2202530318 | | | 0 |
| 2202530319 | | | 0.029191642 |
| 2202530401 | 9.120149054 | 19.49493366 | 1.435626526 |
| 2202530415 | 0.250952196 | 0.056981349 | 0.100459475 |
| 2202530418 | | | 0 |
| 2202530419 | | | 0.101906808 |
| 2202530501 | 6.797102583 | 13.93859877 | 1.099641674 |
| 2202530515 | 0.184131221 | 0.048974358 | 0.079437795 |
| 2202530518 | | | 0 |
| 2202530519 | | | 0.062923409 |
| 2202540101 | 0 | 0 | 0 |
| 2202540102 | 0.166906749 | 0.035426924 | 0.011681977 |
| 2202540115 | 0 | 0 | 0 |
| 2202540116 | 0.010851006 | 9.4793E-07 | 0.000234116 |
| 2202540118 | | | 0 |
| 2202540119 | | | 7.93602E-05 |
| 2202540201 | 0 | 0 | 0 |
| 2202540215 | 0 | 0 | 0 |
| 2202540218 | | | 0 |
| 2202540219 | | | 0 |
| 2202540301 | 1.008853709 | 2.565911586 | 0.220415478 |
| 2202540315 | 0.036293309 | 0.008107986 | 0.01489595 |
| 2202540318 | | | 0 |
| 2202540319 | | | 0.010598732 |
| 2202540401 | 3.158616693 | 8.621690429 | 0.66755539 |
| 2202540415 | 0.114490931 | 0.024736143 | 0.044780944 |
| 2202540418 | | | 0 |
| 2202540419 | | | 0.036272905 |
| 2202540501 | 2.387308033 | 5.6672282 | 0.545506211 |
| 2202540515 | 0.083678758 | 0.02094714 | 0.037493219 |
| 2202540518 | | | 0 |
| 2202540519 | | | 0.022360722 |
| 2202610101 | 19.71153247 | 53.06458497 | 3.880921483 |
| 2202610102 | 1.484086306 | 0.516547043 | 0.309576878 |
| 2202610115 | 0.677498104 | 0.486644726 | 0.525031345 |
| 2202610116 | 0.232740864 | 0 | 0.003581785 |
| 2202610118 | | | 0 |
| 2202610119 | | | 0.129087127 |
| 2202610201 | 0 | 0 | 0 |
| 2202610215 | 0 | 0 | 0 |
| 2202610218 | | | 0 |
| 2202610219 | | | 0 |
| 2202610301 | 34.48582913 | 95.99981514 | 3.395989463 |
| 2202610315 | 0.950295803 | 0.6015583 | 0.464479366 |
| 2202610318 | | | 0 |
| 2202610319 | | | 0.471991794 |
| 2202610401 | 119.2812586 | 332.0885184 | 11.74123187 |
| 2202610415 | 3.305110126 | 2.051968294 | 1.59938803 |
| 2202610418 | | | 0 |
| 2202610419 | | | 1.647675059 |
| 2202610501 | 83.43801311 | 221.3088817 | 8.944690857 |
| 2202610515 | 2.298115506 | 1.558458136 | 1.221575791 |
| 2202610518 | | | 0 |
| 2202610519 | | | 0.972262789 |
| 2202620101 | 9.248498637 | 26.42615441 | 2.041745231 |
| 2202620102 | 0.713259326 | 0.280680869 | 0.047360054 |
| 2202620115 | 0.290644147 | 0.199410669 | 0.225633996 |
| 2202620116 | 0.133379121 | 0 | 0.000694582 |
| 2202620117 | 0.681501973 | 0.249375866 | 0.49105447 |
| 2202620118 | | | 0 |
| 2202620119 | | | 0.125633629 |
| 2202620190 | 25.01968653 | 48.95380611 | 5.916014454 |
| 2202620191 | 0.292441812 | 0.497373253 | 0.044640778 |
| 2202620201 | 0 | 0 | 0 |
| 2202620215 | 0 | 0 | 0 |
| 2202620218 | | | 0 |
| 2202620219 | | | 0 |
| 2202620301 | 64.00516429 | 195.5194037 | 6.663619651 |
| 2202620315 | 1.569168474 | 0.949562283 | 0.737439708 |
| 2202620318 | | | 0 |
| 2202620319 | | | 0.788525744 |
| 2202620401 | 221.5319909 | 678.2568903 | 23.1181523 |
| 2202620415 | 5.456763294 | 3.238213873 | 2.54165069 |

| | | | |
|---|---|---|---|
| 2202620418 | | | 0 |
| 2202620419 | | | 2.751064853 |
| 2202620501 | 153.3944081 | 437.9102369 | 16.97336083 |
| 2202620515 | 3.787286534 | 2.455539077 | 1.925627416 |
| 2202620518 | | | 0 |
| 2202620519 | | | 1.632750684 |
| 2203410101 | 0.258662175 | 0.081968716 | 0.028053414 |
| 2203410102 | 0.084993314 | 0 | 0.000333486 |
| 2203410115 | 0.000134504 | 3.27875E-06 | 0.000370305 |
| 2203410116 | 4.41965E-05 | 0 | 4.40201E-06 |
| 2203410201 | 0 | 0 | 0 |
| 2203410215 | 0 | 0 | 0 |
| 2203410301 | 0.788800593 | 0.167187507 | 0.01997829 |
| 2203410315 | 0.000410177 | 6.6875E-06 | 0.000263714 |
| 2203410401 | 2.691273399 | 0.588569224 | 0.059152746 |
| 2203410415 | 0.001399462 | 2.35428E-05 | 0.000780816 |
| 2203410501 | 1.623439637 | 0.329633265 | 0.053355161 |
| 2203410515 | 0.000844189 | 1.31853E-05 | 0.000704289 |
| 2203420101 | 0.669503451 | 0.212159679 | 0.072599223 |
| 2203420102 | 0.284931259 | 0 | 0.001117798 |
| 2203420115 | 0.000348142 | 8.48639E-06 | 0.00095831 |
| 2203420116 | 0.000148164 | 0 | 1.47549E-05 |
| 2203420201 | 0 | 0 | 0 |
| 2203420215 | 0 | 0 | 0 |
| 2203420301 | 2.329083441 | 0.494610083 | 0.057114741 |
| 2203420315 | 0.001211124 | 1.97844E-05 | 0.000753916 |
| 2203420401 | 7.881193743 | 1.698752854 | 0.1716364 |
| 2203420415 | 0.004098222 | 6.79501E-05 | 0.002265599 |
| 2203420501 | 4.875241563 | 1.018668326 | 0.149875119 |
| 2203420515 | 0.002535125 | 4.07467E-05 | 0.001978352 |
| 2203430101 | 0.060597053 | 0.013751348 | 0.005693919 |
| 2203430102 | 0.025646284 | 0 | 0.000128819 |
| 2203430115 | 3.15105E-05 | 5.50054E-07 | 7.51598E-05 |
| 2203430116 | 1.33361E-05 | 0 | 1.70042E-06 |
| 2203430201 | 0 | 0 | 0 |
| 2203430215 | 0 | 0 | 0 |
| 2203430301 | 0.245044139 | 0.017194865 | 0.005038559 |
| 2203430315 | 0.000127423 | 6.87795E-07 | 6.6509E-05 |
| 2203430401 | 0.824334504 | 0.055853159 | 0.014523615 |
| 2203430415 | 0.000428654 | 2.23413E-06 | 0.000191712 |
| 2203430501 | 0.515068669 | 0.038584148 | 0.013676614 |
| 2203430515 | 0.000267836 | 1.54337E-06 | 0.000180531 |
| 2203510101 | 0.484994001 | 0.096657922 | 0.03886943 |
| 2203510102 | 0.012191039 | 0 | 4.11453E-05 |
| 2203510115 | 0.000252197 | 3.86632E-06 | 0.000513077 |
| 2203510116 | 6.33934E-06 | 0 | 5.43118E-07 |
| 2203510201 | 0 | 0 | 0 |
| 2203510215 | 0 | 0 | 0 |
| 2203510301 | 0.794583886 | 0.018945002 | 0.012944855 |
| 2203510315 | 0.000413183 | 7.578E-07 | 0.000170872 |
| 2203510401 | 2.690265157 | 0.055983504 | 0.036849171 |
| 2203510415 | 0.001398939 | 2.23934E-06 | 0.000486408 |
| 2203510501 | 1.649116473 | 0.04906761 | 0.035086566 |
| 2203510515 | 0.00085754 | 1.9627E-06 | 0.000463142 |
| 2203520101 | 1.229338873 | 0.258698448 | 0.103724959 |
| 2203520102 | 0.230200232 | 0 | 0.001499156 |
| 2203520115 | 0.000639256 | 1.03479E-05 | 0.00136917 |
| 2203520116 | 0.000119704 | 0 | 1.97888E-05 |
| 2203520201 | 0 | 0 | 0 |
| 2203520215 | 0 | 0 | 0 |
| 2203520301 | 3.071758029 | 0.146671814 | 0.061576017 |
| 2203520315 | 0.001597316 | 5.86687E-06 | 0.000812804 |
| 2203520401 | 10.05771624 | 0.44354381 | 0.171584927 |
| 2203520415 | 0.005230011 | 1.77417E-05 | 0.00226492 |
| 2203520501 | 7.851755417 | 0.454444191 | 0.217473252 |
| 2203520515 | 0.004082913 | 1.81778E-05 | 0.002870646 |
| 2203530101 | 0.136926997 | 0.028620804 | 0.011492205 |
| 2203530102 | 0.002501947 | 0 | 1.17908E-05 |
| 2203530115 | 7.12021E-05 | 1.14483E-06 | 0.000151697 |
| 2203530116 | 1.30101E-06 | 0 | 1.55639E-07 |
| 2203530201 | 0 | 0 | 0 |
| 2203530215 | 0 | 0 | 0 |
| 2203530301 | 0.334254308 | 0.014171055 | 0.006082994 |
| 2203530315 | 0.000173812 | 5.66842E-07 | 8.02955E-05 |
| 2203530401 | 1.16816113 | 0.048839882 | 0.020614911 |
| 2203530415 | 0.000607444 | 1.9536E-06 | 0.000272117 |

| | | | |
|---|---|---|---|
| 2203530501 | 0.774635304 | 0.038709221 | 0.018460767 |
| 2203530515 | 0.000402811 | 1.54837E-06 | 0.000243682 |
| 2203540101 | 0 | 0 | 0 |
| 2203540102 | 1.8748E-06 | 0 | 1.12588E-08 |
| 2203540115 | 0 | 0 | 0 |
| 2203540116 | 9.74893E-10 | 0 | 1.48616E-10 |
| 2203540201 | 0 | 0 | 0 |
| 2203540215 | 0 | 0 | 0 |
| 2203540301 | 5.06941E-05 | 4.23163E-05 | 7.10822E-06 |
| 2203540315 | 2.63609E-08 | 1.69265E-09 | 9.38286E-08 |
| 2203540401 | 0.000166383 | 0.000141913 | 2.09768E-05 |
| 2203540415 | 8.65192E-08 | 5.67653E-09 | 2.76894E-07 |
| 2203540501 | 0.000115728 | 9.04487E-05 | 1.90138E-05 |
| 2203540515 | 6.01785E-08 | 3.61795E-09 | 2.50982E-07 |
| 2203610101 | 1.889297416 | 0.381057713 | 0.15619958 |
| 2203610102 | 0.059404036 | 0 | 0.000308466 |
| 2203610115 | 0.000982435 | 1.52423E-05 | 0.002061834 |
| 2203610116 | 3.08901E-05 | 0 | 4.07176E-06 |
| 2203610201 | 0 | 0 | 0 |
| 2203610215 | 0 | 0 | 0 |
| 2203610301 | 6.139246106 | 0.155254355 | 0.092277975 |
| 2203610315 | 0.003192405 | 6.21017E-06 | 0.001218068 |
| 2203610401 | 21.5251586 | 0.532527669 | 0.313461169 |
| 2203610415 | 0.011193082 | 2.13011E-05 | 0.004137681 |
| 2203610501 | 13.50885474 | 0.450085824 | 0.278429704 |
| 2203610515 | 0.007024608 | 1.80034E-05 | 0.00367527 |
| 2205210101 | 0.012724488 | 0.00081857 | 0.000687456 |
| 2205210102 | 1.42771321 | 0.063203349 | 0.118399929 |
| 2205210111 | | | 0.026042733 |
| 2205210112 | | | 0.041394836 |
| 2205210113 | | | 0.031151045 |
| 2205210115 | 6.61673E-06 | 3.27428E-08 | 9.07442E-06 |
| 2205210116 | 0.000742411 | 2.52813E-06 | 0.00156288 |
| 2205210118 | | | 0.00032298 |
| 2205210119 | | | 0.001075635 |
| 2205210201 | 0 | 0 | 0 |
| 2205210215 | 0 | 0 | 0 |
| 2205210218 | | | 0 |
| 2205210219 | | | 0 |
| 2205210301 | 0.622695149 | 0.014675413 | 0.003179099 |
| 2205210311 | | | 0.00016523 |
| 2205210312 | | | 0.000990488 |
| 2205210313 | | | 0.002023491 |
| 2205210315 | 0.000323801 | 5.87017E-07 | 4.19641E-05 |
| 2205210318 | | | 0.000544829 |
| 2205210319 | | | 0.001719533 |
| 2205210401 | 2.032474184 | 0.051480108 | 0.009982266 |
| 2205210411 | | | 0.000483973 |
| 2205210412 | | | 0.002887816 |
| 2205210413 | | | 0.00590241 |
| 2205210415 | 0.001056887 | 2.05921E-06 | 0.000131766 |
| 2205210418 | | | 0.001843052 |
| 2205210419 | | | 0.005841061 |
| 2205210501 | 1.32358923 | 0.026912254 | 0.007736896 |
| 2205210511 | | | 0.000572459 |
| 2205210512 | | | 0.003429296 |
| 2205210513 | | | 0.007006713 |
| 2205210515 | 0.000688266 | 1.07649E-06 | 0.000102127 |
| 2205210518 | | | 0.001228723 |
| 2205210519 | | | 0.003872053 |
| 2205310101 | 0.052011887 | 0.002452734 | 0.002056682 |
| 2205310102 | 3.867542683 | 0.233148855 | 0.340651909 |
| 2205310111 | | | 0.068991496 |
| 2205310112 | | | 0.072700817 |
| 2205310113 | | | 0.086041087 |
| 2205310115 | 2.70461E-05 | 9.81095E-08 | 2.71482E-05 |
| 2205310116 | 0.002011122 | 9.32595E-06 | 0.004496605 |
| 2205310118 | | | 0.002515131 |
| 2205310119 | | | 0.003878343 |
| 2205310201 | 0 | 0 | 0 |
| 2205310215 | 0 | 0 | 0 |
| 2205310218 | | | 0 |
| 2205310219 | | | 0 |
| 2205310301 | 2.070282819 | 0.060787646 | 0.010453753 |
| 2205310311 | | | 0.000509836 |
| 2205310312 | | | 0.002822786 |

| | | | |
|---|---|---|---|
| 2205310313 | | | 0.006215336 |
| 2205310315 | 0.001076547 | 2.43151E-06 | 0.00013799 |
| 2205310318 | | | 0.004699338 |
| 2205310319 | | | 0.006729811 |
| 2205310401 | 7.064933186 | 0.21811966 | 0.033643825 |
| 2205310411 | | | 0.001486828 |
| 2205310412 | | | 0.008229976 |
| 2205310413 | | | 0.018129791 |
| 2205310415 | 0.003673766 | 8.72478E-06 | 0.000444098 |
| 2205310418 | | | 0.016085675 |
| 2205310419 | | | 0.023146433 |
| 2205310501 | 4.024945207 | 0.105889454 | 0.024428302 |
| 2205310511 | | | 0.001764935 |
| 2205310512 | | | 0.009773139 |
| 2205310513 | | | 0.021521748 |
| 2205310515 | 0.002092972 | 4.23558E-06 | 0.000322454 |
| 2205310518 | | | 0.010260608 |
| 2205310519 | | | 0.014663028 |
| 2205320101 | 0.029559093 | 0.001300004 | 0.001295708 |
| 2205320102 | 2.553720617 | 0.148398192 | 0.22345744 |
| 2205320111 | | | 0.044450824 |
| 2205320112 | | | 0.047468988 |
| 2205320113 | | | 0.049241971 |
| 2205320115 | 1.53707E-05 | 5.20002E-08 | 1.71033E-05 |
| 2205320116 | 0.001327934 | 5.93593E-06 | 0.002949638 |
| 2205320118 | | | 0.001443243 |
| 2205320119 | | | 0.002568851 |
| 2205320201 | 0 | 0 | 0 |
| 2205320215 | 0 | 0 | 0 |
| 2205320218 | | | 0 |
| 2205320219 | | | 0 |
| 2205320301 | 1.083806847 | 0.030692357 | 0.005898394 |
| 2205320311 | | | 0.000286697 |
| 2205320312 | | | 0.001610818 |
| 2205320313 | | | 0.003545888 |
| 2205320315 | 0.00056358 | 1.22769E-06 | 7.78588E-05 |
| 2205320318 | | | 0.00246015 |
| 2205320319 | | | 0.004151069 |
| 2205320401 | 3.527063499 | 0.106767711 | 0.01872115 |
| 2205320411 | | | 0.000817968 |
| 2205320412 | | | 0.004604077 |
| 2205320413 | | | 0.010137988 |
| 2205320415 | 0.00183407 | 4.27071E-06 | 0.000247119 |
| 2205320418 | | | 0.00824283 |
| 2205320419 | | | 0.013927457 |
| 2205320501 | 2.314405911 | 0.054898526 | 0.01437453 |
| 2205320511 | | | 0.00102738 |
| 2205320512 | | | 0.005640872 |
| 2205320513 | | | 0.012413338 |
| 2205320515 | 0.00120349 | 2.19594E-06 | 0.000189744 |
| 2205320518 | | | 0.005542868 |
| 2205320519 | | | 0.009207513 |
| **Grand Total** | **26301.90216** | **5105.417063** | **1693.034986** |

**Annual:**

| **Model** | **Output Database** | **CO** | **NOX** | **VOC** |
|---|---|---|---|---|
| MOVES2014b | BYI_2017_10003_20191003_out | 28806.93 | 5183.784 | 2212.762 |
| MOVES3 | BYI_2017_10003_20191003_m3_ou | 26301.9 | 5105.417 | 1693.035 |
| | Difference (Tons) | -2505.03 | -78.3667 | -519.727 |
| | Percent Change (%) | -9% | -2% | -23% |

**SSWD:**

| **Model** | **Output Database** | **CO** | **NOX** | **VOC** |
|---|---|---|---|---|
| MOVES2014b | BYI_2017_10003_20191003_out | 87.23088 | 15.69509 | 6.22809 |
| MOVES3 | BYI_2017_10003_20191003_m3_ou | 83.22924 | 16.05692 | 5.367888 |
| | Difference (Tons) | -4.00164 | 0.361834 | -0.8602 |
| | Percent Change (%) | -5% | 2% | -14% |

Table for Report:

| **2017 Onroad Emissions** | **EPA MOVES Model Version** | **2017 Annual (TPY)** | | | **2017 SSWD (TPD)** | | |
|---|---|---|---|---|---|---|---|
| | | **CO** | **NOx** | **VOC** | **CO** | **NOx** | **VOC** |
| Original BYI | MOVES2014b | 28,807 | 5,184 | 2,213 | 87.23 | 15.70 | 6.23 |
| Adjusted BYI | MOVES3 | 26,302 | 5,105 | 1,693 | 83.23 | 16.06 | 5.37 |

# Appendix D

## Annual Totals (Tons)

| | |
|---|---|
| Database | BYI_2017nr_c10003_20230414_m3_out |
| Table | movesoutput |
| outputTimePeriod | Day |

| **Sum of Daily Emission** | **Pollutant** | | |
|---|---|---|---|
| **monthID** | **VOC** | **NOx** | **CO** |
| 1 | 54.8 | 48.9 | 660.3 |
| 2 | 62.4 | 48.5 | 664.8 |
| 3 | 157.9 | 92.1 | 1,890.4 |
| 4 | 166.4 | 88.5 | 1,930.6 |
| 5 | 163.4 | 88.0 | 1,937.4 |
| 6 | 312.0 | 142.5 | 3,179.5 |
| 7 | 316.1 | 141.6 | 3,204.8 |
| 8 | 310.2 | 142.7 | 3,174.1 |
| 9 | 171.3 | 87.6 | 1,960.2 |
| 10 | 174.8 | 88.8 | 1,945.1 |
| 11 | 164.0 | 91.9 | 1,907.4 |
| 12 | 52.9 | 49.1 | 657.7 |
| **Annual Total** | 2,106.5 | 1,110.4 | 23,112.3 |

## SSWD

| | |
|---|---|
| Database | BYI_2017nr_c10003_20230414_m3_out |
| Table | movesoutput |
| outputTimePeriod | Day |
| dayID | 5 |

| **Sum of emissionQuant** | | **Pollutant** | | | | | |
|---|---|---|---|---|---|---|---|
| **FuelType** | **monthID** | **VOC** | **NOx** | **CO** | **VOC** | **NOx** | **CO** |
| **Gasoline** | 6 | 7.15 | 1.43 | 90.25 | | | |
| | 7 | 7.05 | 1.37 | 88.15 | | | |
| | 8 | 6.86 | 1.39 | 87.17 | | | |
| **Gasoline Total** | | **21.07** | **4.20** | **265.58** | 7.02 | 1.40 | 88.53 |
| **Diesel** | 6 | 0.19 | 2.07 | 0.94 | | | |
| | 7 | 0.19 | 2.01 | 0.91 | | | |
| | 8 | 0.19 | 2.01 | 0.91 | | | |
| **Diesel Total** | | **0.56** | **6.09** | **2.75** | 0.19 | 2.03 | 0.92 |
| **LPG** | 6 | 0.04 | 0.23 | 1.35 | | | |
| | 7 | 0.03 | 0.23 | 1.31 | | | |
| | 8 | 0.03 | 0.23 | 1.31 | | | |
| **LPG Total** | | **0.10** | **0.69** | **3.96** | 0.03 | 0.23 | 1.32 |
| **CNG** | 6 | 0.01 | 0.03 | 0.13 | | | |
| | 7 | 0.01 | 0.02 | 0.12 | | | |
| | 8 | 0.01 | 0.02 | 0.12 | | | |
| **CNG Total** | | **0.04** | **0.07** | **0.38** | 0.01 | 0.02 | 0.13 |
| | | | | **All Fuels** | 7.26 | 3.68 | 90.89 |

**Annual:**

| Model | Output Database | VOC | NOX | CO |
|---|---|---|---|---|
| MOVES2014b | BYI_2017nr_10003_20191003_ | 2089.8 | 1110.4 | 23112.3 |
| MOVES3 | BYI_2017nr_c10003_20230414 | 2106.5 | 1110.4 | 23112.3 |
| | Difference (Tons) | 16.7 | 0.0 | 0.0 |
| | Percent Change (%) | 1% | 0% | 0% |

**SSWD:**

| Model | Output Database | VOC | NOX | CO |
|---|---|---|---|---|
| MOVES2014b | BYI_2017nr_10003_20191003_ | 7.2 | 3.7 | 90.9 |
| MOVES3 | BYI_2017nr_c10003_20230414 | 7.3 | 3.7 | 90.9 |
| | Difference (Tons) | 0.0 | 0.0 | 0.0 |
| | Percent Change (%) | 0% | 0% | 0% |

# Appendix E

| TAB NAME | COMMENT | Complete |
|---|---|---|
| Point | Point Emissions (EGU, Non-EGU) by Facility for the 2023 Inventory. | yes |
| Point - ERC | Point Emission Reduction Credits added to the 2023 Projected Point Inventory. | yes |
| Nonpoint Summary | Summary of Nonpoint 2017/2023 Nonpoint Emissions by source category and totals. Nonpoint emissions totals adjusted from 2017 BYI submittal. Adjustments include corrections to BYI values along with additional source categories. | yes |
| MAR | Commercial Marine Vessels, Airports, and Locomotive 2017 and 2023 emission inventory by scc | yes |
| MAR Summary | Summary of 2017 and 2023 MAR emissions. | yes |
| Onroad Summary | Onroad emissions adjusted from 2017 BYI submittal. Updated model from MOVES2014b to MOVES3. | yes |
| Nonroad Summary | Nonroad emissions adjusted from 2017 BYI submittal. Updated model from MOVES2014b to MOVES3. | yes |
| Total | 2017 & 2023 SSWD and Annual Emissions Totaled | yes |
| RFP Calculation | RFP Calculation for NOX and VOC | yes |
| Contingency | Contingency Measures Calculations based on EPA's 2023 draft guidance | yes |
| Benefits | Solvent Cleaning, VOC -27% Reduction, Effective 2022 | yes |
| | PFCs, VOC - 12% Phased in Reduction, Effecive 2018 | |
| | Gas Marketing, Balance Submerged Filling, VOC - 4.8% Phased in Reduction, Partly Effective in 2023 | |
| | Gas Marketing, Underground Tank: Breathing and Emptying, VOC - 86% Phased in Reduction, Effective 2021 | |
| | All Nonroad and Onroad Mobile Measures | |

**Tab Point:** New Castle County Point Emissions (EGU, Non-EGU) by Facility for the 2023 Inventory.

| Facility ID | Datasource | 2023 Future Emissions | | | | | |
|---|---|---|---|---|---|---|---|
| | | CO (tpy) | CO (tpd) | NOX (tpy) | NOX (tpd) | VOC (tpy) | VOC (tpd) |
| 1000300001 | 2020DEDNR | 2 | 0.01 | 3 | 0.04 | 0 | 0.002 |
| 1000300003 | 2019DEDNR | 15 | 0.06 | 13 | 0.06 | 20 | 0.088 |
| 1000300005 | ERTAC 2023 Projection | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300006 | ERTAC 2023 Projection | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300007 | 2019DEDNR | 3 | 0.02 | 4 | 0.06 | 1 | 0.004 |
| | ERTAC 2023 Projection | 27 | 0.55 | 62 | 1.22 | 5 | 0.104 |
| 1000300011 | 2019DEDNR | 32 | 0.24 | 50 | 0.44 | 8 | 0.036 |
| 1000300016 | 2019DEDNR | 1044 | 5.39 | 1203 | 5.00 | 198 | 1.352 |
| | 2019DEDNR; 2021DEDNR | 3 | 0.01 | 3 | 0.01 | 0 | 0.001 |
| | ERTAC 2023 Projection | 77 | 0.28 | 88 | 0.32 | 4 | 0.014 |
| 1000300017 | 2017DEDNR | 4 | 0.01 | 2 | 0.01 | 1 | 0.015 |
| 1000300021 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.001 |
| 1000300022 | 2019DEDNR | 28 | 0.08 | 20 | 0.10 | 8 | 0.031 |
| 1000300023 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 1 | 0.005 |
| 1000300024 | 2017DEDNR | 5 | 0.02 | 7 | 0.06 | 1 | 0.004 |
| 1000300033 | 2019DEDNR | 4 | 0.02 | 3 | 0.02 | 6 | 0.027 |
| 1000300040 | 2017DEDNR | 5 | 0.03 | 2 | 0.01 | 1 | 0.008 |
| 1000300049 | 2019DEDNR | 4 | 0.03 | 5 | 0.03 | 0 | 0.002 |
| 1000300051 | 2019DEDNR | 33 | 0.11 | 24 | 0.09 | 2 | 0.008 |
| 1000300058 | 2019DEDNR | 15 | 0.09 | 22 | 0.15 | 8 | 0.032 |
| 1000300059 | 2017DEDNR | 2 | 0.01 | 2 | 0.01 | 4 | 0.020 |
| 1000300066 | 2017DEDNR | 11 | 0.05 | 2 | 0.01 | 3 | 0.011 |
| 1000300068 | 2017DEDNR | 14 | 0.09 | 4 | 0.03 | 2 | 0.011 |
| 1000300069 | 2017DEDNR | 13 | 0.07 | 2 | 0.01 | 1 | 0.008 |
| 1000300073 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 3 | 0.013 |
| 1000300077 | 2019DEDNR | 2 | 0.01 | 3 | 0.01 | 0 | 0.001 |
| 1000300080 | 2019DEDNR | 19 | 0.16 | 15 | 0.21 | 4 | 0.018 |
| 1000300090 | 2017DEDNR | 4 | 0.01 | 5 | 0.01 | 1 | 0.003 |
| 1000300093 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300107 | 2017DEDNR | 5 | 0.02 | 6 | 0.02 | 0 | 0.001 |
| 1000300111 | 2019DEDNR | 42 | 0.16 | 13 | 0.05 | 6 | 0.025 |
| 1000300115 | 2019DEDNR | 0 | 0.00 | 2 | 0.01 | 0 | 0.000 |
| 1000300125 | 2017DEDNR | 6 | 0.03 | 8 | 0.08 | 0 | 0.004 |
| 1000300126 | 2019DEDNR | 10 | 0.05 | 8 | 0.04 | 2 | 0.007 |
| 1000300131 | 2019DEDNR | 10 | 0.09 | 14 | 0.27 | 1 | 0.012 |
| 1000300133 | 2017DEDNR | 3 | 0.01 | 3 | 0.02 | 0 | 0.001 |
| 1000300142 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 1 | 0.004 |
| 1000300166 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 1 | 0.013 |
| 1000300277 | 2017DEDNR | 0 | 0.00 | 1 | 0.02 | 0 | 0.001 |
| 1000300279 | 2019DEDNR | 10 | 0.08 | 12 | 0.17 | 3 | 0.032 |
| 1000300288 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300290 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 1 | 0.003 |
| 1000300291 | 2019DEDNR | 6 | 0.23 | 4 | 0.08 | 21 | 0.052 |
| 1000300317 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| | ERTAC 2023 Projection | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300324 | 2019DEDNR | 2 | 0.01 | 1 | 0.00 | 1 | 0.005 |
| 1000300351 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.021 |
| 1000300383 | 2017DEDNR | 3 | 0.01 | 3 | 0.01 | 16 | 0.050 |
| 1000300388 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.001 |
| | ERTAC 2023 Projection | 79 | 0.56 | 459 | 3.22 | 15 | 0.108 |
| 1000300389 | 2019DEDNR | 4 | 0.01 | 5 | 0.02 | 1 | 0.004 |
| 1000300404 | 2019DEDNR | 1 | 0.00 | 0 | 0.00 | 6 | 0.025 |
| 1000300415 | 2017DEDNR | 22 | 0.07 | 5 | 0.02 | 4 | 0.013 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1000300462 | 2017DEDNR | 1 | 0.01 | 6 | 0.03 | 3 | 0.013 |
| 1000300463 | 2017DEDNR | 1 | 0.00 | 3 | 0.01 | 0 | 0.000 |
| 1000300482 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300498 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 3 | 0.020 |
| 1000300506 | 2017DEDNR | 0 | 0.01 | 1 | 0.06 | 0 | 0.003 |
| 1000300508 | 2017DEDNR | 1 | 0.00 | 1 | 0.01 | 0 | 0.001 |
| 1000300516 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 4 | 0.014 |
| 1000300599 | 2017DEDNR | 0 | 0.00 | 0 | 0.02 | 0 | 0.001 |
| 1000300600 | 2017DEDNR | 1 | 0.01 | 2 | 0.03 | 0 | 0.001 |
| 1000300622 | 2019DEDNR | 9 | 0.08 | 43 | 0.33 | 2 | 0.015 |
| 1000300646 | 2017DEDNR | 1 | 0.01 | 5 | 0.05 | 0 | 0.002 |
| 1000300673 | 2019DEDNR | 0 | 0.00 | 17 | 0.07 | 1 | 0.003 |
| 1000300686 | 2017DEDNR | 1 | 0.02 | 6 | 0.08 | 1 | 0.021 |
| 1000300687 | 2017DEDNR | 1 | 0.01 | 7 | 0.03 | 1 | 0.004 |
| 1000300782 | 2017DEDNR | 2 | 0.01 | 2 | 0.01 | 2 | 0.007 |
| 1000300785 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 1 | 0.004 |
| 1000300800 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300803 | 2017DEDNR | 0 | 0.01 | 0 | 0.05 | 0 | 0.003 |
| 1000300804 | 2017DEDNR | 1 | 0.11 | 6 | 0.63 | 0 | 0.013 |
| 1000300806 | 2017DEDNR | 0 | 0.02 | 0 | 0.02 | 0 | 0.001 |
| 1000300822 | 2017DEDNR | 0 | 0.01 | 0 | 0.03 | 0 | 0.002 |
| 1000300827 | 2017DEDNR | 0 | 0.03 | 0 | 0.02 | 0 | 0.008 |
| 1000300847 | 2017DEDNR | 3 | 0.01 | 2 | 0.01 | 0 | 0.000 |
| 1000300899 | 2019DEDNR | 6 | 0.02 | 6 | 0.02 | 6 | 0.023 |
| 1000300904 | 2017DEDNR | 0 | 0.00 | 1 | 0.02 | 0 | 0.001 |
| 1000300906 | 2017DEDNR | 11 | 0.04 | 13 | 0.05 | 1 | 0.003 |
| 1000300930 | 2017DEDNR | 0 | 0.00 | 0 | 0.00 | 2 | 0.005 |
| 1000300934 | 2019DEDNR | 7 | 0.14 | 5 | 0.11 | 1 | 0.016 |
| 1000300963 | 2021DEDNR | 0 | 0.00 | 0 | 0.00 | 0 | 0.000 |
| 1000300978 | 2020DEDNR | 1 | 0.00 | 1 | 0.00 | 6 | 0.024 |
| 1000300986 | 2019DEDNR | 0 | 0.00 | 0 | 0.00 | 51 | 0.007 |
| **Grand Total** | | 1619 | 9.22 | 2218 | 13.63 | 449 | 2.417 |

**Tab Point - ERC:** Point Emission Reduction Credits added to the 2023 Projected Point Inventory.

**Table 1: New Castle and Kent County Emission Reduction Credits**

| Held By[2,3] | Annual (tpy) | | SSWD[1] (tpd) | |
|---|---|---|---|---|
| | NOx | VOC | NOx | VOC |
| 1734 LLC | 29 | 195 | 0.08 | 0.53 |
| Calpine | 46 | 0 | 0.13 | 0.00 |
| Delaware City Industries (DCI) | 2 | 6 | 0.01 | 0.02 |
| Diamond State Port Corporation | 16 | 58 | 0.04 | 0.16 |
| DuPont | 0 | 0 | 0.00 | 0.00 |
| Lafarge | 0 | 5 | 0.00 | 0.01 |
| NRG Energy Center | 268 | 0 | 0.73 | 0.00 |
| Veolia | 9 | 6 | 0.02 | 0.02 |
| VPI | 2 | 10 | 0.01 | 0.03 |
| Division of Small Business | 53 | 137 | 0.15 | 0.38 |
| Total in New Castle and Kent Count | 425 | 417 | 1.16 | 1.14 |

1) TPD is calculated from annual emissions since seasonal factors are not available; calculation conservative because we know majority of credits will not be applied in 2023; however they are all accounted for.

3) ERCs: Emission Reduction Credits as of 2021 Audit Report; Delaware Regulation 1134 Emission Banking and Trading Program, Final August 2022Emission Reduction Credit Audit

2) Sussex County Facilities (NRG Indian River) removed because according to CAA guidelines, New Castle builds/modifications could not use Sussex credits as Sussex County has a lower classifciation under the 1979 1-hr ozone standard.

**Table 2: Point and Emission Reduction Credit Emissions**

| | ANNUAL (tpy) | | SSWD (tpd) | |
|---|---|---|---|---|
| | NOx | VOC | NOx | VOC |
| Emission Reduction Credits [1,2,3] | 425 | 417 | 1.16 | 1.14 |
| 2023 Projected Point w/o ERC | 2218 | 449 | 13.63 | 2.42 |
| 2023 Project Point w/ ERC Total | 2643 | 866 | 14.80 | 3.56 |

1) ERCs: Emission Reduction Credits as of 2021 Audit Report; Delaware Regulation 1134 Emission Banking and Trading Program, Final August 2022Emission Reduction Credit Audit

2) Verified with DE Compliance Manager that no other facilities are pursuing credits as of May 2023

3) TPD is calculated from annual emissions since seasonal factors are not available; calculation conservative because we know majority of credits will not be applied in 2023; however they are all accounted for.

**Tab Nonpoint**: Summary of the Nonpoint Emisions for 2017 Adjusted Base Year Inventory and 2023 Projected Inventory

**Table 1: 2017 and 2023 Nonpoint Inventory Summary**

| | SSWD (TPD) | | | Annual (TPY) | | |
|---|---|---|---|---|---|---|
| | CO | NOX | VOC | CO | NOX | VOC |
| **2017 Nonpoint** | 7.46 | 2.51 | 9.59 | 3678 | 1445 | 3184 |
| **2023 Nonpoint** | 7.93 | 3.00 | 9.41 | 3901 | 1701 | 3130 |
| **Tons Reduced** | -0.5 | -0.48 | 0.18 | -223 | -256 | 54 |
| **% Difference** | -6% | -19% | 1.8% | -6% | -18% | 2% |

**Table 2: 2017 and 2023 Nonpoint Inventory by Category**

| | Adjusted 2017 Base Year Inventory | | | | | | 2023 Projected Inventory | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Annual (tpy) | | | SSWD (tpd) | | | Annual (tpy) | | | SSWD (tpy) | | |
| Category | CO | NOX | VOC | CO | NOX | VOC | CO | NOX | VOC | CO | NOX | VOC |
| Ag Burning | 8 | 0 | 1 | 0.00 | 0.00 | 0.00 | 8 | 0 | 1 | 0.00 | 0.00 | 0.00 |
| Ag. Pesticides | | | 30 | | | 0.11 | | | 30 | | | 0.11 |
| AIM Coatings | | | 390 | | | 1.45 | | | 401 | | | 1.49 |
| Animal Cremation | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Animal Husbandry | | | 35 | | | 0.10 | | | 36 | | | 0.10 |
| Asphalt Paving | | | 0 | | | 0.00 | | | 0 | | | 0.00 |
| Auto Refinishing | | | 22 | | | 0.08 | | | 22 | | | 0.08 |
| CMV Evap | | | 117 | | | 0.32 | | | 98 | | | 0.27 |
| Commercial & Consumer Products | | | 1130 | | | 3.22 | | | 1161 | | | 3.31 |
| Commercial Cooking | 96 | | 35 | 0.26 | | 0.10 | 98 | | 36 | 0.27 | | 0.10 |
| Commercial Fuel | 289 | 384 | 21 | 0.43 | 0.52 | 0.03 | 330 | 443 | 24 | 0.49 | 0.60 | 0.03 |
| Dry Cleaners | | | 1 | | | 0.01 | | | 2 | | | 0.01 |
| Fuel Comb - Residential - Wood | 2385 | 40 | 353 | 5.15 | 0.09 | 0.76 | 2475 | 44 | 362 | 5.34 | 0.09 | 0.78 |
| Gasoline Marketing | | | 240 | | | 0.78 | | | 164 | | | 0.56 |
| Graphic Arts | | | 257 | | | 0.99 | | | 264 | | | 1.02 |
| Human Cremation | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Industrial Adhesives | | | 107 | | | 0.41 | | | 110 | | | 0.42 |
| Industrial Fuel | 268 | 585 | 36 | 0.80 | 1.66 | 0.10 | 329 | 715 | 44 | 0.98 | 2.03 | 0.13 |
| Industrial Surface | | | 79 | | | 0.30 | | | 78 | | | 0.30 |
| Land Clearing | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| POTW | | | 12 | | | 0.03 | | | 12 | | | 0.03 |
| Prescribed Burning | 273 | 4 | 65 | 0.00 | 0.00 | 0.00 | 273 | 4 | 65 | 0.00 | 0.00 | 0.00 |
| Res Grilling | 150 | 3 | 8 | 0.66 | 0.01 | 0.04 | 154 | 3 | 8 | 0.68 | 0.01 | 0.04 |
| Residential Fuel | 175 | 426 | 23 | 0.10 | 0.22 | 0.01 | 200 | 489 | 27 | 0.11 | 0.25 | 0.01 |
| Solvent Cleaning | | | 91 | | | 0.29 | | | 66 | | | 0.21 |
| Structure Fires | 15 | 0 | 3 | 0.03 | 0.00 | 0.01 | 15 | 0 | 3 | 0.03 | 0.00 | 0.01 |
| Traffic Markings | | | 2 | | | 0.01 | | | 2 | | | 0.01 |
| Vehicle Fires | 3 | 0 | 1 | 0.01 | 0.00 | 0.00 | 3 | 0 | 1 | 0.01 | 0.00 | 0.00 |
| Wildfires | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Gasoline Marketing - aircraft refueling | | | 3 | | | 0.01 | | | 3 | | | 0.01 |
| Gasoline Marketing - PFCs | | | 120 | | | 0.42 | | | 108 | | | 0.38 |
| Residential Open Burning | 15 | 1 | 2 | 0.01 | 0.00 | 0.00 | 15 | 1 | 2 | 0.01 | 0.00 | 0.00 |
| Grand Total | 3678 | 1445 | 3184 | 7.46 | 2.51 | 9.59 | 3901 | 1701 | 3130 | 7.93 | 3.00 | 9.41 |

**Tab MAR**: Commercial Marine Vessels, Airports, and Locomotive 2017 and 2023 emission inventory by SCC

| | | | | | | SSWD (Tons per Day) | | | Annual (tons) | | | | | SSWD (Tons per Day) | | | Annual (tons) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DE Category** | **State County FIPs** | **SCC** | **Sector** | **Emission Process Description** | **2017 Data Source** | **2017 CO** | **2017 NOX** | **2017 VOC** | **2017 CO** | **2017 NOX** | **2017 VOC** | **GF** | **GF Source** | **2023 CO** | **2023 NOX** | **2023 VOC** | **2023 CO** | **2023 NOX** | **2023 VOC** |
| Aircraft | 10003 | 2275001000 | Mobile - Aircraft | Military Aircraft | 2017 NEI EPA Calculated | 0.23 | 0.2 | 0.1 | 84.0 | 72.3 | 35.2 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.19 | 0.17 | 0.08 | 70.00 | 60.21 | 29.29 |
| Aircraft | 10003 | 2275020000 | Mobile - Aircraft | Commercial Aircraft | 2017 NEI EPA Calculated | < 0.01 | <0.01 | <0.01 | 0.5 | 0.4 | 0.1 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.02 | 0.01 | 0.00 | 6.30 | 4.55 | 1.52 |
| Aircraft | 10003 | 2275050011 | Mobile - Aircraft | General Aviation - Piston | 2017 NEI EPA Calculated | 0.76 | <0.01 | 0.01 | 278.8 | 1.5 | 3.5 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.86 | 0.00 | 0.01 | 316.29 | 1.71 | 3.96 |
| Aircraft | 10003 | 2275050012 | Mobile - Aircraft | General Aviation - Turbine | 2017 NEI EPA Calculated | 0.24 | 0.01 | 0.02 | 85.6 | 2.9 | 6.3 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.27 | 0.01 | 0.02 | 97.27 | 3.31 | 7.18 |
| Aircraft | 10003 | 2275060011 | Mobile - Aircraft | Air Taxi - Piston | 2017 NEI EPA Calculated | 0.03 | <0.01 | <0.01 | 9.2 | 0.1 | 0.1 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.02 | 0.00 | 0.00 | 7.28 | 0.04 | 0.04 |
| Aircraft | 10003 | 2275060012 | Mobile - Aircraft | Air Taxi - Turbine | 2017 NEI EPA Calculated | 0.01 | <0.01 | <0.01 | 4.3 | 0.9 | 1.2 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.01 | 0.00 | 0.00 | 3.37 | 0.72 | 0.94 |
| Aircraft | 10003 | 2270008005 | Mobile - Non-Road Equipment - Diesel | Airport Ground Support Equipment | 2017 NEI EPA Calculated | 0.00000 | 0.00001 | 0.00000 | 0.00 | 0.00 | 0.00 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.00 |
| Aircraft | 10003 | 2265008005 | Mobile - Non-Road Equipment - Gasoline | Airport Ground Support Equipment | 2017 NEI EPA Calculated | 0.00019 | 0.00001 | 0.00001 | 0.07 | 0.00 | 0.00 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.00 | 0.00 | 0.00 | 0.87 | 0.06 | 0.03 |
| Aircraft | 10003 | 2275070000 | Mobile - Non-Road Equipment - Other | Aircraft Auxiliary Power Units | 2017 NEI EPA Calculated | 0.00002 | 0.00000 | 0.00000 | 0.01 | 0.00 | 0.00 | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | 0.00 | 0.00 | 0.00 | 0.13 | 0.08 | 0.01 |
| **Aircraft Total** | | | | | | **1.27** | **0.21** | **0.13** | **463** | **78** | **47** | NA | EPA 2016v3 platform projection factors:TAF/Generic Growth Factors | **1.38** | **0.19** | **0.12** | **501.5** | **70.7** | **43.0** |
| CMV | 10003 | 2280002101 | Mobile - Commercial Marine Vessels | C1C2 Port emissions: Main Engine | 2017 NEI EPA Calculated | <0.01 | 0.05 | <0.01 | 1.4 | 17.9 | 1.7 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.00 | 0.03 | 0.00 | 1.4 | 12.6 | 1.2 |
| CMV | 10003 | 2280002102 | Mobile - Commercial Marine Vessels | C1C2 Port emissions: Auxiliary Engine | 2017 NEI EPA Calculated | 0.03 | 0.21 | 0.01 | 12.3 | 78.1 | 2.3 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.03 | 0.15 | 0.01 | 11.9 | 54.2 | 1.5 |
| CMV | 10003 | 2280002103 | Mobile - Commercial Marine Vessels | C3 Port emissions: Main Engine | 2017 NEI EPA Calculated | 0.02 | 0.12 | 0.02 | 8.0 | 44.6 | 7.9 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.03 | 0.11 | 0.03 | 10.2 | 41.7 | 10.0 |
| CMV | 10003 | 2280002104 | Mobile - Commercial Marine Vessels | C3 Port emissions: Auxiliary Engine | 2017 NEI EPA Calculated | 0.06 | 0.54 | 0.02 | 21.5 | 195.7 | 8.6 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.08 | 0.51 | 0.03 | 27.5 | 185.0 | 10.9 |
| CMV | 10003 | 2280002201 | Mobile - Commercial Marine Vessels | C1C2 Underway emissions: Main Engine | 2017 NEI EPA Calculated | 0.12 | 0.78 | 0.03 | 42.3 | 285.7 | 11.3 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.12 | 0.54 | 0.02 | 41.0 | 198.4 | 7.6 |
| CMV | 10003 | 2280002202 | Mobile - Commercial Marine Vessels | C1C2 Underway emissions: Auxiliary Engine | 2017 NEI EPA Calculated | 0.08 | 0.54 | 0.02 | 30.9 | 198.2 | 5.9 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.08 | 0.38 | 0.01 | 30.0 | 137.7 | 4.0 |
| CMV | 10003 | 2280002203 | Mobile - Commercial Marine Vessels | C3 Underway emissions: Main Engine | 2017 NEI EPA Calculated | 0.17 | 1.49 | 0.1 | 62.9 | 543.0 | 35.2 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.21 | 1.36 | 0.12 | 77.7 | 494.1 | 43.5 |
| CMV | 10003 | 2280002204 | Mobile - Commercial Marine Vessels | C3 Underway emissions: Auxiliary Engine | 2017 NEI EPA Calculated | 0.05 | 0.46 | 0.02 | 19.5 | 168.6 | 7.6 | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | 0.06 | 0.42 | 0.02 | 24.2 | 155.5 | 9.5 |
| **CMV Total** | | | | | | **0.54** | **4.2** | **0.22** | **199** | **1532** | **80** | NA | EPA 2016v3 platform projection factors: factors derived from the Regulatory Impact Analysis (RIA) Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinder | **0.60** | **3.50** | **0.24** | **223.9** | **1279.2** | **88.3** |
| Locomotives | 10003 | 2285002006 | Mobile - Locomotives | Line Haul Locomotives: Class I Operations | 2017 NEI EPA Calculated | 0.07 | 0.35 | 0.02 | 25 | 127 | 6 | NA | EPA 2016v3 platform projection factors: factors from Energy Information Administration's 2018 Annual Energy Outlook (AEO) freight rail energy use growth rate projections for 2016 thru 2030 /MGT Traffic Density Values | 0.07 | 0.30 | 0.02 | 25.8 | 109.8 | 4.7 |
| Locomotives | 10003 | 2285002007 | Mobile - Locomotives | Line Haul Locomotives: Class II / III Operations | 2017 NEI EPA Calculated | 0.01 | 0.05 | <0.01 | 2 | 19 | 1 | NA | EPA 2016v3 platform projection factors: factors from Energy Information Administration's 2018 Annual Energy Outlook (AEO) freight rail energy use growth rate projections for 2016 thru 2030 /MGT Traffic Density Values | 0.01 | 0.05 | 0.00 | 2.3 | 18.3 | 0.8 |
| Locomotives | 10003 | 2285002010 | Mobile - Locomotives | Yard Locomotives | 2017 DE Calculated Value | 0.12 | 0.78 | 0.06 | 43 | 286 | 21 | 1.075343 | 2018 AEO growth rates for rail sub-groups from EPA 2016v1 platform (Table 4-45 in TSD) | 0.13 | 0.84 | 0.06 | 46.2 | 307.5 | 22.6 |
| **Locomotives Total** | | | | | | **0.19** | **1.18** | **0.08** | **70** | **432** | **28** | NA | EPA 2016v3 platform & DE internal estimate for rail yards | **0.21** | **1.19** | **0.08** | **74.3** | **435.7** | **28.2** |

**NOTES:**
The 2023 SSWD emissions are calculated using the same 2017 SSWD temporal allocations at the scc level, except airports use temporal allocation at the category level.
SSWD emissions formated in green use the average temporal allocation of the category, since the scc level variation was not available.
Airports: The 2017 Base Year Inventory did not include air ground support emissions. They have been added to both the 2017 BYI and the 2023 emissions. The addition of these emissions were not significant to affect the BYI inventory SSWD or annual emissions.
Locomotives: The 2017 BYI includes yard locomotive emissions that were calculated internally by DE. This data is not included in the NEI for DE. The data was grown to 2023 using a national growth factor for locomotive yards used by the EPA for yards (2018 AEO rate).

**Tab MAR Summary:** Summary of 2017 and 2023 MAR emissions.

**Annual:**

| | 2017 Annual (TPY) | | | 2023 Annual (TPY) | | | Ton Reduced | | | % Difference | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CO | NOX | VOC | CO | NOX | VOC | CO | NOX | VOC | CO | NOX | VOC |
| Aircrafts | 463.0 | 78.0 | 47.0 | 501.5 | 70.7 | 43.0 | -38.51 | 7.31 | 4.02 | -8% | 9% | 9% |
| CMV | 198.7 | 1531.8 | 80.5 | 223.9 | 1279.2 | 88.3 | -25.12 | 252.58 | -7.79 | -13% | 16% | -10% |
| Rail | 70.4 | 431.7 | 27.7 | 74.3 | 435.7 | 28.2 | -3.91 | -3.93 | -0.44 | -6% | -1% | -2% |
| **Total** | **732.1** | **2041.5** | **155.2** | **799.7** | **1785.5** | **159.4** | **-67.54** | **255.96** | **-4.20** | **-9%** | **13%** | **-3%** |

**SSWD:**

| | 2017 SSWD (TPD) | | | 2023 SSWD (TPD) | | | Ton Reduced | | | % Difference | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CO | NOX | VOC | CO | NOX | VOC | CO | NOX | VOC | CO | NOX | VOC |
| Aircrafts | 1.27 | 0.21 | 0.13 | 1.38 | 0.19 | 0.12 | -0.11 | 0.02 | 0.01 | -8% | 9% | 9% |
| CMV | 0.54 | 4.20 | 0.22 | 0.60 | 3.50 | 0.24 | -0.06 | 0.70 | -0.02 | -11% | 17% | -10% |
| Rail | 0.19 | 1.18 | 0.08 | 0.21 | 1.19 | 0.08 | -0.02 | -0.01 | 0.00 | -11% | -1% | -4% |
| **Total** | **2.0** | **5.6** | **0.4** | **2.2** | **4.9** | **0.4** | **-0.19** | **0.71** | **-0.02** | **-9%** | **13%** | **-4%** |

**Summary:**

| | SSWD (TPD) | | | Annual (TPY) | | |
|---|---|---|---|---|---|---|
| | CO | NOX | VOC | CO | NOX | VOC |
| 2017 MAR | 2.00 | 5.59 | 0.43 | 732.1 | 2041.5 | 155.2 |
| 2023 MAR | 2.19 | 4.88 | 0.45 | 799.7 | 1785.5 | 159.4 |
| Tons Reduced | -0.2 | 0.71 | -0.02 | -67.5 | 256.0 | -4.2 |
| % Difference | -9% | 13% | -4% | -9% | 13% | -3% |

**Tab Nonroad Summary: No**nroad emissions adjusted from 2017 BYI submittal. Updated model from MOVES2014b to MOVES3.

# New Castle County Ozone Emissions Summary Using MOVES3 [MOVESDB20221007]

## *NON-ROAD*

| Analysis Year | Non-road SSWD Emissions (Tons/Day) | | | Non-road Annual Emissions (Tons) | | |
|---|---|---|---|---|---|---|
| | CO | NOX | VOC | CO | NOX | VOC |
| 2017 (Adjusted Base Year) | 90.9 | 3.7 | 7.3 | 23,112.3 | 1,110.4 | 2,106.5 |
| 2023 | 100.0 | 3.1 | 6.2 | 25,023.9 | 935.9 | 1,719.7 |
| Tons / Day Reduced | -9.1 | 0.6 | 1.0 | (1,911.63) | 174.52 | 386.79 |
| Percent Reduction | -10% | 17% | 14% | -8% | 16% | 18% |

**Note:**

**2017 Run**: Using 2017 BYI Input Assumptions with existing emission standards/controlled measures in MOVES3

**2023 Run**: Using 2023 National Default Assumptions with existing emission standards/controlled measures in MOVES3. Updated meteorology input table to match 2023 onroad.

**Tab Onroad Summary:** Onroad emissions adjusted from 2017 BYI submittal. Updated model from MOVES2014b to MOVES3.

## New Castle County Ozone Emissions Summary Using MOVES3 [MOVESDB20221007]

### *ON-ROAD*

| Analysis Year | Annual VMT | On-road SSWD Emissions (Tons/Day) | | | On-road Annual Emissions (Tons) | | |
|---|---|---|---|---|---|---|---|
| | | CO | NOX | VOC | CO | NOX | VOC |
| 2017 (Adjusted Base Year) | 6,095,613,480 | 83.23 | 16.06 | 5.37 | 26,301.9 | 5,105.4 | 1,693.0 |
| 2023 | 6,000,308,476 | 70.18 | 7.75 | 4.15 | 20,129.8 | 2,736.0 | 1,277.7 |
| | Tons / Day Reduced | 13.05 | 8.31 | 1.22 | 6,172.1 | 2,369.4 | 415.3 |
| | Percent Reduction | 16% | 52% | 23% | 23% | 46% | 25% |

**Note:**

**2017 Run**: Using 2017 BYI Input Assumptions with existing emission standards/ controlled measures in MOVES3

**2023 Run**: Using 2023 MVEB Input Assumptions with existing emission standards/ controlled measures in MOVES3

| | | | | |
|---|---|---|---|---|
| **2023** | **Motor Vehicle Emission Budget** | **NA** | **8.53** | **4.57** |

**Tab Total:** 2017 & 2023 SSWD and Annual Emissions Totaled

**Table 1: 2017 Adjusted Base Year Inventory - New Castle County Emissions by Source Sector**

| Source Sector | 2017 Annual (TPY) | | | 2017 SSWD (TPD) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| **Point** | 1,766 | 2,504 | 747 | 10.42 | 14.53 | 3.12 |
| **Nonpoint** | 3,678 | 1,445 | 3,184 | 7.46 | 2.51 | 9.59 |
| **Nonroad** | 23,112 | 1,110 | 2,106 | 90.89 | 3.68 | 7.26 |
| **Onroad** | 26,302 | 5,105 | 1,693 | 83.23 | 16.06 | 5.37 |
| **MAR** | 732 | 2,042 | 155 | 2.00 | 5.59 | 0.43 |
| **All Sectors** | **55,590** | **12,206** | **7,886** | **194.00** | **42.38** | **25.76** |

**Table 2: 2023 RFP Projected Inventory- New Castle County Emissions by Source Sector**

| Source Sector | 2023 Annual (TPY) | | | 2023 SSWD (TPD) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| **Point** | 1619 | 2218 | 449 | 9.22 | 13.63 | 2.42 |
| **ERC (Point)** | 0.00 | 425.00 | 417.00 | 0.00 | 1.16 | 1.14 |
| **Nonpoint** | 3901 | 1701 | 3130 | 7.93 | 3.00 | 9.41 |
| **Nonroad** | 25024 | 936 | 1720 | 100.02 | 3.06 | 6.23 |
| **Onroad w/Safety Margin** | 20130 | 2736 | 1278 | 70.18 | **8.53** | **4.57** |
| **MAR** | 800 | 1786 | 159 | 2.19 | 4.88 | 0.45 |
| **All Sectors** | **51474** | **9801** | **7153** | **189.53** | **34.26** | **24.22** |

**Table 3: 2017/2023 Inventory Tons Reduced & Percent Difference- New Castle County Emissions by Source Sector**

| | 2017/2023 Annual (TPY) | | | 2017/2023 SSWD (TPD) | | |
|---|---|---|---|---|---|---|
| | CO | NOx | VOC | CO | NOx | VOC |
| **Tons Reduced** | 4116.80 | 2404.96 | 733.03 | 4.47 | 8.11 | 1.54 |
| **% Difference** | 7% | 20% | 9% | 2% | 19% | 6% |

**Tab RFP:** Calculation RFP Calculation for NOx and VOC

## VOC Target Level for 2023 Milestone
## New Castle Nonattainment Area
### Emissions in Tons per Day

| | | Formula | |
|---|---|---|---|
| A | 2017 Base Year Inventory | | 25.76 |
| B | Biogenic Emissions (Not included in BYI) | | 0.00 |
| C | 2017 Rate-of Progress Base Year Inventory | A - B | 25.76 |
| D | FMVCP/RVP Reductions Between 2017 and 2023* | | 0.00 |
| E | 2017 Adjusted Base Year Inventory Calculated Relative to 2023 | C - D | 25.76 |
| F | Ratio | | 4.0% |
| G | Emissions Reductions Required Between 2017 and 2023 | E * F | 1.030 |
| H | Target Level for 2023 [$TL_{(2023)}$] | C - D - G | 24.73 |
| | Emission Level Obtained 2023 | | 24.22 |
| J | Surplus Emissions (tpd) | | 0.51 |

*FMVCP/RVP reductions are considered negligable by EPA Guidance and are not longer required. State Implementation Plan Requirements: 2008 National Ambient Air Quality Standards for Ozone https://www.regulations.gov/document/EPA-HQ-OAR-2010-0885-0066

## NOx Target Level for 2023 Milestone
## New Castle Nonattainment Area
### Emissions in Tons per Day

| | | Formula | |
|---|---|---|---|
| A | 2017 Base Year Inventory | | 42.38 |
| B | Biogenic Emissions (Not included in BYI) | | 0.00 |
| C | 2017 Rate-of Progress Base Year Inventory | A - B | 42.38 |
| D | FMVCP/RVP Reductions Between 2017 and 2023 | | 0.00 |
| E | 2017 Adjusted Base Year Inventory Calculated Relative to 2023 | C - D | 42.38 |
| F | Ratio | | 11.0% |
| G | Emissions Reductions Required Between 2017 and 2023 | E * F | 4.66 |
| H | Target Level for 2023 [$TL_{(2023)}$] | C - D - G | 37.72 |
| | Emission Level Obtained 2023 | | 34.26 |
| J | Surplus Emissions (tpd) | | 3.45 |

*FMVCP/RVP reductions are considered negligable by EPA Guidance and are not longer required. State Implementation Plan Requirements: 2008 National Ambient Air Quality Standards for Ozone https://www.regulations.gov/document/EPA-HQ-OAR-2010-0885-0066

**Tab Contingency:** Contingency Measures Calculations based on EPA's 2023 draft guidance

**EPA CM Draft Guidance_3-16-23**

**OYW (One Year's Worth of progress):**

(Adjusted Base Year EI - Attainment Year EI) / (Attainment Year - Base Year) / Adjusted Base Year EI x Attainment Year EI = OYW of Progress

| | |
|---|---|
| *Adjusted 2017 Base Year EI - VOC (tpd)* | 25.76 |
| *2023 Attainment Year EI - VOC (tpd)* | 24.22 |
| *Adjusted 2017 Base Year EI - Nox (tpd)* | 42.38 |
| *Attainment Year EI -Nox (tpd)* | 34.26 |
| *Base Year EI* | 2017 |
| *Attainment Year EI* | 2023 |

**Step 1: Calculate the annual average reduction needed to attain for each relevant precursor**

| | | |
|---|---|---|
| *VOC 1a.* | 1.54 | tpd |
| *VOC 1b.* | 0.26 | tpd per year |
| *NOX 1a.* | 8.11 | tpd |
| *NOX 1b.* | 1.35 | tpd per year |

**Step 2: Calculate the annual percentage reduction needed to attain.**

| | | |
|---|---|---|
| *VOC 2.* | 1.0% | annual reduction |
| *NOX 2.* | 3.2% | annual reduction |

**Step 3: Calculate the amount of reductions needed for OYW of progress**

| | | |
|---|---|---|
| *VOC 3.* | 0.24 | tpd |
| *NOx 3.* | 1.09 | tpd |

**Tab Benefits:** Emission Reductions/Benefits of Control Programs

| | 2023 Emission Reductions | |
|---|---|---|
| **Control Measure** | **VOC** | **NOx** |
| I/M | | |
| Tier I | | |
| Reform Gas | | |
| LEV | | |
| HDDE | | |
| Total Mobile | 0.80 | 7.53 |
| OTC - Solvent Cleaning (27%) | 0.08 | 0.00 |
| OTC - PFCs (12%) | 0.05 | |
| OTC - Gas Marketing, Balanced Submerged Filling (4.8%) | 0.02 | |
| OTC - Gas Marketing, Underground Tank (86%) | 0.25 | |
| Nonroad Model | 1.03 | 0.63 |
| MAR | 0.00 | 0.71 |
| **Total** | **2.24** | **8.87** |

# Appendix F

#FORMAT=FF10_POINT
#COUNTRY=US
#YEAR=2023
#PROJECTION YEAR 2023
#TYPE Point Sources
#DESC ANNUAL
#DESC Contact: ertacegu@gmail.com
#DESC ERTAC Version: 3.0
#DESC ERTAC to SMOKE Run Date: 10/25/22
#DESC Er in short to from ERTAC
#DESC Pr Code V3.0_2022-10-21
#DESC Pr Code V3.0_2022-10-21
#DESC ERTAC_for_SMOKE Inputs: 2021-10-22 (Unique PUSP files. One file for 2024 and earlier; one file for 2025 and later.)
#DESC Av NOx and HI. Pr default/OS-nOS for NOx). 2016 BYFY run and projection runs use HIZG=N for all regions except CONUS. CONUS units have HIZG=Y.
#DESC Ch Tennessee Eastman to non-EGU.
#DESC Run using --Keep_Feb29 switch

| country_cc | region_cd | tribal_code | facility_id | unit_id | rel_point_i | process_id | agy_facility | agy_unit_i | agy_rel_po | agy_proces | scc | poll | ann_value | ann_pct_re | facility_nar | erptype | stkhgt | stkdiam | stktemp | stkflow | stkvel | naics | longitude | latitude | ll_datum | horiz_coll_ | design_cap | design_cap | reg_codes | fac_source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461614 | 1E+09 | 2 | 2 | 2 | 10100404 | NOX | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461614 | 1E+09 | 2 | 2 | 2 | 10100404 | SO2 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461614 | 1E+09 | 2 | 2 | 2 | 10100404 | CO | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461614 | 1E+09 | 2 | 2 | 2 | 10100404 | VOC | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461614 | 1E+09 | 2 | 2 | 2 | 10100404 | PM10 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461614 | 1E+09 | 2 | 2 | 2 | 10100404 | PM2_5 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461614 | 1E+09 | 2 | 2 | 2 | 10100404 | NH3 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461914 | 1E+09 | 2 | 2 | 3 | 10100501 | NOX | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461914 | 1E+09 | 2 | 2 | 3 | 10100501 | SO2 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461914 | 1E+09 | 2 | 2 | 3 | 10100501 | CO | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461914 | 1E+09 | 2 | 2 | 3 | 10100501 | VOC | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461914 | 1E+09 | 2 | 2 | 3 | 10100501 | PM10 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461914 | 1E+09 | 2 | 2 | 3 | 10100501 | PM2_5 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48461914 | 1E+09 | 2 | 2 | 3 | 10100501 | NH3 | 0 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48462114 | 1E+09 | 2 | 2 | 4 | 10100604 | NOX | 17.09719 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48462114 | 1E+09 | 2 | 2 | 4 | 10100604 | SO2 | 0.146103 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48462114 | 1E+09 | 2 | 2 | 4 | 10100604 | CO | 5.075171 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48462114 | 1E+09 | 2 | 2 | 4 | 10100604 | VOC | 1.163061 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48462114 | 1E+09 | 2 | 2 | 4 | 10100604 | PM10 | 0.125799 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48462114 | 1E+09 | 2 | 2 | 4 | 10100604 | PM2_5 | 0.104026 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46233113 | 43899912 | 48462114 | 1E+09 | 2 | 2 | 4 | 10100604 | NH3 | 0.676688 | | Edge Moor | 2 | 220 | 13.5 | 261 | 6904.667 | 48.2 | 221112 | -75.5033 | 39.7372 | 1 | | 99.10191 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462514 | 1E+09 | 3 | 3 | 3 | 10100501 | NOX | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462514 | 1E+09 | 3 | 3 | 3 | 10100501 | SO2 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462514 | 1E+09 | 3 | 3 | 3 | 10100501 | CO | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462514 | 1E+09 | 3 | 3 | 3 | 10100501 | VOC | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462514 | 1E+09 | 3 | 3 | 3 | 10100501 | PM10 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462514 | 1E+09 | 3 | 3 | 3 | 10100501 | PM2_5 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462514 | 1E+09 | 3 | 3 | 3 | 10100501 | NH3 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462614 | 1E+09 | 3 | 3 | 2 | 10100404 | NOX | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462614 | 1E+09 | 3 | 3 | 2 | 10100404 | SO2 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462614 | 1E+09 | 3 | 3 | 2 | 10100404 | CO | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462614 | 1E+09 | 3 | 3 | 2 | 10100404 | VOC | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462614 | 1E+09 | 3 | 3 | 2 | 10100404 | PM10 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462614 | 1E+09 | 3 | 3 | 2 | 10100404 | PM2_5 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462614 | 1E+09 | 3 | 3 | 2 | 10100404 | NH3 | 0 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462714 | 1E+09 | 3 | 3 | 4 | 10100604 | NOX | 40.88126 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462714 | 1E+09 | 3 | 3 | 4 | 10100604 | SO2 | 0.381942 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462714 | 1E+09 | 3 | 3 | 4 | 10100604 | CO | 15.7937 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462714 | 1E+09 | 3 | 3 | 4 | 10100604 | VOC | 3.619393 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462714 | 1E+09 | 3 | 3 | 4 | 10100604 | PM10 | 0.342198 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462714 | 1E+09 | 3 | 3 | 4 | 10100604 | PM2_5 | 0.282971 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 827811 | 46232713 | 43899712 | 48462714 | 1E+09 | 3 | 3 | 4 | 10100604 | NH3 | 2.105832 | | Edge Moor | 2 | 220 | 13.5 | 285 | 10388.3 | 72.6 | 221112 | -75.5033 | 39.7372 | 1 | | 200.6083 | MW | | 1 |
| US | 10003 | | 640311 | 46482213 | 44160312 | 48487614 | 1E+09 | 3 | 3 | 2 | 20100901 | NOX | 0 | | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | | 143.6046 | MW | | 1 |
| US | 10003 | | 640311 | 46482213 | 44160312 | 48487614 | 1E+09 | 3 | 3 | 2 | 20100901 | SO2 | 0 | | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | | 143.6046 | MW | | 1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US | 10003 | 640311 | 46482213 | 44160312 | 48487614 | 1E+09 | 3 | 3 | 2 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487614 | 1E+09 | 3 | 3 | 2 | 20100901 | VOC | 0.000983 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487614 | 1E+09 | 3 | 3 | 2 | 20100901 | PM10 | 0.025515 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487614 | 1E+09 | 3 | 3 | 2 | 20100901 | PM2_5 | 0.024826 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487614 | 1E+09 | 3 | 3 | 2 | 20100901 | NH3 | 15.57646 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487714 | 1E+09 | 3 | 3 | 1 | 20100201 | NOX | 157.5501 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487714 | 1E+09 | 3 | 3 | 1 | 20100201 | SO2 | 1.475671 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487714 | 1E+09 | 3 | 3 | 1 | 20100201 | CO | 31.90923 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487714 | 1E+09 | 3 | 3 | 1 | 20100201 | VOC | 5.118678 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487714 | 1E+09 | 3 | 3 | 1 | 20100201 | PM10 | 0.74149 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487714 | 1E+09 | 3 | 3 | 1 | 20100201 | PM2_5 | 0.454463 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482213 | 44160312 | 48487714 | 1E+09 | 3 | 3 | 1 | 20100201 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 143.6046 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488014 | 1E+09 | 1 | 1 | 2 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488014 | 1E+09 | 1 | 1 | 2 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488014 | 1E+09 | 1 | 1 | 2 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488014 | 1E+09 | 1 | 1 | 2 | 20100901 | VOC | 0.003952 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488014 | 1E+09 | 1 | 1 | 2 | 20100901 | PM10 | 0.102619 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488014 | 1E+09 | 1 | 1 | 2 | 20100901 | PM2_5 | 0.099869 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488014 | 1E+09 | 1 | 1 | 2 | 20100901 | NH3 | 15.84983 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488114 | 1E+09 | 1 | 1 | 1 | 20100201 | NOX | 149.6615 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488114 | 1E+09 | 1 | 1 | 1 | 20100201 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488114 | 1E+09 | 1 | 1 | 1 | 20100201 | CO | 20.72684 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488114 | 1E+09 | 1 | 1 | 1 | 20100201 | VOC | 4.945628 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488114 | 1E+09 | 1 | 1 | 1 | 20100201 | PM10 | 0.716425 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488114 | 1E+09 | 1 | 1 | 1 | 20100201 | PM2_5 | 0.439098 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482013 | 44160212 | 48488114 | 1E+09 | 1 | 1 | 1 | 20100201 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 139.1401 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487814 | 1E+09 | 2 | 2 | 2 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487814 | 1E+09 | 2 | 2 | 2 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487814 | 1E+09 | 2 | 2 | 2 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487814 | 1E+09 | 2 | 2 | 2 | 20100901 | VOC | 0.00264 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487814 | 1E+09 | 2 | 2 | 2 | 20100901 | PM10 | 0.06855 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487814 | 1E+09 | 2 | 2 | 2 | 20100901 | PM2_5 | 0.066698 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487814 | 1E+09 | 2 | 2 | 2 | 20100901 | NH3 | 15.41714 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487914 | 1E+09 | 2 | 2 | 1 | 20100201 | NOX | 149.6105 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487914 | 1E+09 | 2 | 2 | 1 | 20100201 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487914 | 1E+09 | 2 | 2 | 1 | 20100201 | CO | 26.5293 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487914 | 1E+09 | 2 | 2 | 1 | 20100201 | VOC | 4.895719 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487914 | 1E+09 | 2 | 2 | 1 | 20100201 | PM10 | 0.709193 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487914 | 1E+09 | 2 | 2 | 1 | 20100201 | PM2_5 | 0.434666 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 640311 | 46482113 | 44160812 | 48487914 | 1E+09 | 2 | 2 | 1 | 20100201 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 206 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 140.0707 | MW | 1 |
| US | 10003 | 588311 | 46161413 | 43834312 | 48915714 | 1E+09 | 67 | 68 | 2 | 10100701 | NOX | 88.47509 | Delaware C | 2 | 500 | 20 | 250 | 12808.83 | 40.8 | 32411 | -75.6337 | 39.5936 | 1 | 54.73731 | MW | 1 |
| US | 10003 | 588311 | 46161413 | 43834312 | 48915714 | 1E+09 | 67 | 68 | 2 | 10100701 | SO2 | 10.24298 | Delaware C | 2 | 500 | 20 | 250 | 12808.83 | 40.8 | 32411 | -75.6337 | 39.5936 | 1 | 54.73731 | MW | 1 |
| US | 10003 | 588311 | 46161413 | 43834312 | 48915714 | 1E+09 | 67 | 68 | 2 | 10100701 | CO | 77.36381 | Delaware C | 2 | 500 | 20 | 250 | 12808.83 | 40.8 | 32411 | -75.6337 | 39.5936 | 1 | 54.73731 | MW | 1 |
| US | 10003 | 588311 | 46161413 | 43834312 | 48915714 | 1E+09 | 67 | 68 | 2 | 10100701 | VOC | 3.935157 | Delaware C | 2 | 500 | 20 | 250 | 12808.83 | 40.8 | 32411 | -75.6337 | 39.5936 | 1 | 54.73731 | MW | 1 |
| US | 10003 | 588311 | 46161413 | 43834312 | 48915714 | 1E+09 | 67 | 68 | 2 | 10100701 | PM10 | 25.88516 | Delaware C | 2 | 500 | 20 | 250 | 12808.83 | 40.8 | 32411 | -75.6337 | 39.5936 | 1 | 54.73731 | MW | 1 |
| US | 10003 | 588311 | 46161413 | 43834312 | 48915714 | 1E+09 | 67 | 68 | 2 | 10100701 | PM2_5 | 21.73537 | Delaware C | 2 | 500 | 20 | 250 | 12808.83 | 40.8 | 32411 | -75.6337 | 39.5936 | 1 | 54.73731 | MW | 1 |
| US | 10003 | 588311 | 46161413 | 43834312 | 48915714 | 1E+09 | 67 | 68 | 2 | 10100701 | NH3 | 2.683421 | Delaware C | 2 | 500 | 20 | 250 | 12808.83 | 40.8 | 32411 | -75.6337 | 39.5936 | 1 | 54.73731 | MW | 1 |
| US | 10003 | 2457411 | 40424813 | 38557112 | 48045314 | 1E+09 | 1 | 1 | 1 | 20100101 | NOX | 0.012238 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 29.16667 | MW | 1 |
| US | 10003 | 2457411 | 40424813 | 38557112 | 48045314 | 1E+09 | 1 | 1 | 1 | 20100101 | SO2 | 0 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 29.16667 | MW | 1 |
| US | 10003 | 2457411 | 40424813 | 38557112 | 48045314 | 1E+09 | 1 | 1 | 1 | 20100101 | CO | 0.000347 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 29.16667 | MW | 1 |
| US | 10003 | 2457411 | 40424813 | 38557112 | 48045314 | 1E+09 | 1 | 1 | 1 | 20100101 | VOC | 3.48E-05 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 29.16667 | MW | 1 |
| US | 10003 | 2457411 | 40424813 | 38557112 | 48045314 | 1E+09 | 1 | 1 | 1 | 20100101 | PM10 | 0.000582 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 29.16667 | MW | 1 |
| US | 10003 | 2457411 | 40424813 | 38557112 | 48045314 | 1E+09 | 1 | 1 | 1 | 20100101 | PM2_5 | 0.000402 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 29.16667 | MW | 1 |
| US | 10003 | 2457411 | 40424813 | 38557112 | 48045314 | 1E+09 | 1 | 1 | 1 | 20100101 | NH3 | 2.17E-05 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 29.16667 | MW | 1 |
| US | 10003 | 2457411 | 40424713 | 1.07E+08 | 48045414 | 1E+09 | 2 | 2 | 1 | 20100101 | NOX | 0.002675 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 26.98667 | MW | 1 |
| US | 10003 | 2457411 | 40424713 | 1.07E+08 | 48045414 | 1E+09 | 2 | 2 | 1 | 20100101 | SO2 | 0 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 26.98667 | MW | 1 |
| US | 10003 | 2457411 | 40424713 | 1.07E+08 | 48045414 | 1E+09 | 2 | 2 | 1 | 20100101 | CO | 0.00021 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 26.98667 | MW | 1 |
| US | 10003 | 2457411 | 40424713 | 1.07E+08 | 48045414 | 1E+09 | 2 | 2 | 1 | 20100101 | VOC | 2.11E-05 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 26.98667 | MW | 1 |
| US | 10003 | 2457411 | 40424713 | 1.07E+08 | 48045414 | 1E+09 | 2 | 2 | 1 | 20100101 | PM10 | 0.000352 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 26.98667 | MW | 1 |
| US | 10003 | 2457411 | 40424713 | 1.07E+08 | 48045414 | 1E+09 | 2 | 2 | 1 | 20100101 | PM2_5 | 0.000243 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 26.98667 | MW | 1 |
| US | 10003 | 2457411 | 40424713 | 1.07E+08 | 48045414 | 1E+09 | 2 | 2 | 1 | 20100101 | NH3 | 1.31E-05 | Christiana ! | 2 | 36 | 13.5 | 965 | 10332.78 | 72.2 | 221112 | -75.5371 | 39.7302 | 1 | 26.98667 | MW | 1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US | 10003 | 2425311 | 40248813 | 38379712 | 48463714 | 1E+09 | 2 | 2 | 1 | 20100101 | NOX | 0.004086 | Delaware C | 2 | 21 | 12.2 | 875 | 6452.383 | 55.2 | 221112 | -75.6341 | 39.5881 | 1 | 15.67416 | MW | 1 |
| US | 10003 | 2425311 | 40248813 | 38379712 | 48463714 | 1E+09 | 2 | 2 | 1 | 20100101 | SO2 | 0 | Delaware C | 2 | 21 | 12.2 | 875 | 6452.383 | 55.2 | 221112 | -75.6341 | 39.5881 | 1 | 15.67416 | MW | 1 |
| US | 10003 | 2425311 | 40248813 | 38379712 | 48463714 | 1E+09 | 2 | 2 | 1 | 20100101 | CO | 0.000321 | Delaware C | 2 | 21 | 12.2 | 875 | 6452.383 | 55.2 | 221112 | -75.6341 | 39.5881 | 1 | 15.67416 | MW | 1 |
| US | 10003 | 2425311 | 40248813 | 38379712 | 48463714 | 1E+09 | 2 | 2 | 1 | 20100101 | VOC | 3.22E-05 | Delaware C | 2 | 21 | 12.2 | 875 | 6452.383 | 55.2 | 221112 | -75.6341 | 39.5881 | 1 | 15.67416 | MW | 1 |
| US | 10003 | 2425311 | 40248813 | 38379712 | 48463714 | 1E+09 | 2 | 2 | 1 | 20100101 | PM10 | 0.000538 | Delaware C | 2 | 21 | 12.2 | 875 | 6452.383 | 55.2 | 221112 | -75.6341 | 39.5881 | 1 | 15.67416 | MW | 1 |
| US | 10003 | 2425311 | 40248813 | 38379712 | 48463714 | 1E+09 | 2 | 2 | 1 | 20100101 | PM2_5 | 0.000372 | Delaware C | 2 | 21 | 12.2 | 875 | 6452.383 | 55.2 | 221112 | -75.6341 | 39.5881 | 1 | 15.67416 | MW | 1 |
| US | 10003 | 2425311 | 40248813 | 38379712 | 48463714 | 1E+09 | 2 | 2 | 1 | 20100101 | NH3 | 2.01E-05 | Delaware C | 2 | 21 | 12.2 | 875 | 6452.383 | 55.2 | 221112 | -75.6341 | 39.5881 | 1 | 15.67416 | MW | 1 |
| US | 10003 | 827811 | 46232613 | 43900112 | 48463114 | 1E+09 | 1 | 1 | 1 | 20100101 | NOX | 0.001574 | Edge Moor | 2 | 26 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.5033 | 39.7372 | 1 | 20.71333 | MW | 1 |
| US | 10003 | 827811 | 46232613 | 43900112 | 48463114 | 1E+09 | 1 | 1 | 1 | 20100101 | SO2 | 0 | Edge Moor | 2 | 26 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.5033 | 39.7372 | 1 | 20.71333 | MW | 1 |
| US | 10003 | 827811 | 46232613 | 43900112 | 48463114 | 1E+09 | 1 | 1 | 1 | 20100101 | CO | 0.000103 | Edge Moor | 2 | 26 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.5033 | 39.7372 | 1 | 20.71333 | MW | 1 |
| US | 10003 | 827811 | 46232613 | 43900112 | 48463114 | 1E+09 | 1 | 1 | 1 | 20100101 | VOC | 1.27E-05 | Edge Moor | 2 | 26 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.5033 | 39.7372 | 1 | 20.71333 | MW | 1 |
| US | 10003 | 827811 | 46232613 | 43900112 | 48463114 | 1E+09 | 1 | 1 | 1 | 20100101 | PM10 | 0.001396 | Edge Moor | 2 | 26 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.5033 | 39.7372 | 1 | 20.71333 | MW | 1 |
| US | 10003 | 827811 | 46232613 | 43900112 | 48463114 | 1E+09 | 1 | 1 | 1 | 20100101 | PM2_5 | 0.000834 | Edge Moor | 2 | 26 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.5033 | 39.7372 | 1 | 20.71333 | MW | 1 |
| US | 10003 | 827811 | 46232613 | 43900112 | 48463114 | 1E+09 | 1 | 1 | 1 | 20100101 | NH3 | 9.78E-06 | Edge Moor | 2 | 26 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.5033 | 39.7372 | 1 | 20.71333 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 1.07E+08 | 1.23E+08 | 1E+09 | 4 | 0 | 5 | 10100401 | NOX | 0 | Edge Moor | 2 | 62 | 10 | 585 | 858 | 61.3 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 1.07E+08 | 1.23E+08 | 1E+09 | 4 | 0 | 5 | 10100401 | SO2 | 0 | Edge Moor | 2 | 62 | 10 | 585 | 858 | 61.3 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 1.07E+08 | 1.23E+08 | 1E+09 | 4 | 0 | 5 | 10100401 | CO | 0 | Edge Moor | 2 | 62 | 10 | 585 | 858 | 61.3 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 1.07E+08 | 1.23E+08 | 1E+09 | 4 | 0 | 5 | 10100401 | VOC | 0 | Edge Moor | 2 | 62 | 10 | 585 | 858 | 61.3 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 1.07E+08 | 1.23E+08 | 1E+09 | 4 | 0 | 5 | 10100401 | PM10 | 0 | Edge Moor | 2 | 62 | 10 | 585 | 858 | 61.3 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 1.07E+08 | 1.23E+08 | 1E+09 | 4 | 0 | 5 | 10100401 | PM2_5 | 0 | Edge Moor | 2 | 62 | 10 | 585 | 858 | 61.3 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 1.07E+08 | 1.23E+08 | 1E+09 | 4 | 0 | 5 | 10100401 | NH3 | 0.0006 | Edge Moor | 2 | 62 | 10 | 585 | 858 | 61.3 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461114 | 1E+09 | 4 | 4 | 2 | 10100501 | NOX | 0 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461114 | 1E+09 | 4 | 4 | 2 | 10100501 | SO2 | 0 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461114 | 1E+09 | 4 | 4 | 2 | 10100501 | CO | 0.001072 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461114 | 1E+09 | 4 | 4 | 2 | 10100501 | VOC | 4.29E-05 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461114 | 1E+09 | 4 | 4 | 2 | 10100501 | PM10 | 0.000825 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461114 | 1E+09 | 4 | 4 | 2 | 10100501 | PM2_5 | 0.000684 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461114 | 1E+09 | 4 | 4 | 2 | 10100501 | NH3 | 0.000172 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461214 | 1E+09 | 4 | 4 | 1 | 10100401 | NOX | 0 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461214 | 1E+09 | 4 | 4 | 1 | 10100401 | SO2 | 0 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461214 | 1E+09 | 4 | 4 | 1 | 10100401 | CO | 0.046208 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461214 | 1E+09 | 4 | 4 | 1 | 10100401 | VOC | 0.007024 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461214 | 1E+09 | 4 | 4 | 1 | 10100401 | PM10 | 0.089472 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461214 | 1E+09 | 4 | 4 | 1 | 10100401 | PM2_5 | 0.088042 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461214 | 1E+09 | 4 | 4 | 1 | 10100401 | NH3 | 0 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461314 | 1E+09 | 4 | 4 | 3 | 10100601 | NOX | 4.510818 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461314 | 1E+09 | 4 | 4 | 3 | 10100601 | SO2 | 0.723163 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461314 | 1E+09 | 4 | 4 | 3 | 10100601 | CO | 5.798635 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461314 | 1E+09 | 4 | 4 | 3 | 10100601 | VOC | 0.379673 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461314 | 1E+09 | 4 | 4 | 3 | 10100601 | PM10 | 0.060017 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461314 | 1E+09 | 4 | 4 | 3 | 10100601 | PM2_5 | 0.061116 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 827811 | 46233313 | 43899812 | 48461314 | 1E+09 | 4 | 4 | 3 | 10100601 | NH3 | 0.2209 | Edge Moor | 2 | 275 | 21 | 315 | 26099.5 | 75.4 | 221112 | -75.5033 | 39.7372 | 1 | 432.3254 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487014 | 1E+09 | 6 | 6 | 1 | 20100201 | NOX | 0.802205 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487014 | 1E+09 | 6 | 6 | 1 | 20100201 | SO2 | 0.037862 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487014 | 1E+09 | 6 | 6 | 1 | 20100201 | CO | 0.093203 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487014 | 1E+09 | 6 | 6 | 1 | 20100201 | VOC | 0.129535 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487014 | 1E+09 | 6 | 6 | 1 | 20100201 | PM10 | 0.183223 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487014 | 1E+09 | 6 | 6 | 1 | 20100201 | PM2_5 | 0.183223 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487014 | 1E+09 | 6 | 6 | 1 | 20100201 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487114 | 1E+09 | 6 | 6 | 2 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487114 | 1E+09 | 6 | 6 | 2 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487114 | 1E+09 | 6 | 6 | 2 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487114 | 1E+09 | 6 | 6 | 2 | 20100901 | VOC | 6.08E-05 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487114 | 1E+09 | 6 | 6 | 2 | 20100901 | PM10 | 0.000505 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487114 | 1E+09 | 6 | 6 | 2 | 20100901 | PM2_5 | 0.000505 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 48487114 | 1E+09 | 6 | 6 | 2 | 20100901 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 90910614 | 1E+09 | 6 | 6 | 3 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 90910614 | 1E+09 | 6 | 6 | 3 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 90910614 | 1E+09 | 6 | 6 | 3 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 90910614 | 1E+09 | 6 | 6 | 3 | 20100901 | VOC | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 90910614 | 1E+09 | 6 | 6 | 3 | 20100901 | PM10 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US | 10003 | 640311 | 46482513 | 44160712 | 90910614 | 1E+09 | 6 | 6 | 3 | 20100901 | PM2_5 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482513 | 44160712 | 90910614 | 1E+09 | 6 | 6 | 3 | 20100901 | NH3 | 0.060183 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 148.4516 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486814 | 1E+09 | 7 | 7 | 2 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486814 | 1E+09 | 7 | 7 | 2 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486814 | 1E+09 | 7 | 7 | 2 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486814 | 1E+09 | 7 | 7 | 2 | 20100901 | VOC | 9.54E-05 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486814 | 1E+09 | 7 | 7 | 2 | 20100901 | PM10 | 0.001538 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486814 | 1E+09 | 7 | 7 | 2 | 20100901 | PM2_5 | 0.001538 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486814 | 1E+09 | 7 | 7 | 2 | 20100901 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486914 | 1E+09 | 7 | 7 | 1 | 20100201 | NOX | 0.817423 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486914 | 1E+09 | 7 | 7 | 1 | 20100201 | SO2 | 0.038388 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486914 | 1E+09 | 7 | 7 | 1 | 20100201 | CO | 0.094426 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486914 | 1E+09 | 7 | 7 | 1 | 20100201 | VOC | 0.131151 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486914 | 1E+09 | 7 | 7 | 1 | 20100201 | PM10 | 0.243073 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486914 | 1E+09 | 7 | 7 | 1 | 20100201 | PM2_5 | 0.243073 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 48486914 | 1E+09 | 7 | 7 | 1 | 20100201 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 90910714 | 1E+09 | 7 | 7 | 3 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 90910714 | 1E+09 | 7 | 7 | 3 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 90910714 | 1E+09 | 7 | 7 | 3 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 90910714 | 1E+09 | 7 | 7 | 3 | 20100901 | VOC | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 90910714 | 1E+09 | 7 | 7 | 3 | 20100901 | PM10 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 90910714 | 1E+09 | 7 | 7 | 3 | 20100901 | PM2_5 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46482613 | 44160512 | 90910714 | 1E+09 | 7 | 7 | 3 | 20100901 | NH3 | 0.060972 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 149.2134 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488214 | 1E+09 | 8 | 8 | 1 | 20100201 | NOX | 0.901943 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488214 | 1E+09 | 8 | 8 | 1 | 20100201 | SO2 | 0.038529 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488214 | 1E+09 | 8 | 8 | 1 | 20100201 | CO | 0.093681 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488214 | 1E+09 | 8 | 8 | 1 | 20100201 | VOC | 0.128314 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488214 | 1E+09 | 8 | 8 | 1 | 20100201 | PM10 | 0.369184 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488214 | 1E+09 | 8 | 8 | 1 | 20100201 | PM2_5 | 0.369184 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488214 | 1E+09 | 8 | 8 | 1 | 20100201 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488314 | 1E+09 | 8 | 8 | 2 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488314 | 1E+09 | 8 | 8 | 2 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488314 | 1E+09 | 8 | 8 | 2 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488314 | 1E+09 | 8 | 8 | 2 | 20100901 | VOC | 0.036521 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488314 | 1E+09 | 8 | 8 | 2 | 20100901 | PM10 | 0.004787 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488314 | 1E+09 | 8 | 8 | 2 | 20100901 | PM2_5 | 0.004787 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 48488314 | 1E+09 | 8 | 8 | 2 | 20100901 | NH3 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 90910814 | 1E+09 | 8 | 8 | 3 | 20100901 | NOX | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 90910814 | 1E+09 | 8 | 8 | 3 | 20100901 | SO2 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 90910814 | 1E+09 | 8 | 8 | 3 | 20100901 | CO | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 90910814 | 1E+09 | 8 | 8 | 3 | 20100901 | VOC | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 90910814 | 1E+09 | 8 | 8 | 3 | 20100901 | PM10 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 90910814 | 1E+09 | 8 | 8 | 3 | 20100901 | PM2_5 | 0 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 640311 | 46481913 | 44160612 | 90910814 | 1E+09 | 8 | 8 | 3 | 20100901 | NH3 | 0.060491 | Hay Road | 2 | 188 | 15.5 | 200 | 17136.42 | 90.8 | 221112 | -75.5072 | 39.7436 | 1 | 146.6038 | MW | 1 |
| US | 10003 | 2425411 | 40248713 | 38379612 | 48463614 | 1E+09 | 1 | 1 | 1 | 20100101 | NOX | 0.016917 | West Subst | 2 | 27 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.6289 | 39.7283 | 1 | 18.84455 | MW | 1 |
| US | 10003 | 2425411 | 40248713 | 38379612 | 48463614 | 1E+09 | 1 | 1 | 1 | 20100101 | SO2 | 0 | West Subst | 2 | 27 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.6289 | 39.7283 | 1 | 18.84455 | MW | 1 |
| US | 10003 | 2425411 | 40248713 | 38379612 | 48463614 | 1E+09 | 1 | 1 | 1 | 20100101 | CO | 0.001627 | West Subst | 2 | 27 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.6289 | 39.7283 | 1 | 18.84455 | MW | 1 |
| US | 10003 | 2425411 | 40248713 | 38379612 | 48463614 | 1E+09 | 1 | 1 | 1 | 20100101 | VOC | 0.000163 | West Subst | 2 | 27 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.6289 | 39.7283 | 1 | 18.84455 | MW | 1 |
| US | 10003 | 2425411 | 40248713 | 38379612 | 48463614 | 1E+09 | 1 | 1 | 1 | 20100101 | PM10 | 0.002727 | West Subst | 2 | 27 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.6289 | 39.7283 | 1 | 18.84455 | MW | 1 |
| US | 10003 | 2425411 | 40248713 | 38379612 | 48463614 | 1E+09 | 1 | 1 | 1 | 20100101 | PM2_5 | 0.001883 | West Subst | 2 | 27 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.6289 | 39.7283 | 1 | 18.84455 | MW | 1 |
| US | 10003 | 2425411 | 40248713 | 38379612 | 48463614 | 1E+09 | 1 | 1 | 1 | 20100101 | NH3 | 0.000102 | West Subst | 2 | 27 | 12.2 | 860 | 8184.2 | 70 | 221112 | -75.6289 | 39.7283 | 1 | 18.84455 | MW | 1 |

# Appendix G

# Delaware Regulation 1134
# Emission Banking and Trading Program
# Emission Reduction Credit Audit

## FINAL August 2022

**BACKGROUND:**

Ground-level ozone, one of the principal components of "smog," is an air pollutant that harms human health and the environment. High levels of ozone can damage the respiratory system and cause breathing problems, throat irritation, coughing, chest pains, and greater susceptibility to respiratory infection. The Clean Air Act (CAA) requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants that are common in outdoor air, considered harmful to public health and the environment, and that come from numerous and diverse sources.

The NAAQS for ozone is currently set at 0.070 ppm (2015 8-hour ozone NAAQS), which is expected to provide protection of public health and environment (80 FR 65291)[1]. New Castle County of Delaware was designated nonattainment as a part of the Philadelphia-Wilmington-Atlantic City Marginal Nonattainment Area (NAA) under the 2015 8-hour ozone NAAQS.

The Clean Air Act requires new emission sources in non-attainment areas for ozone to offset Volatile Organic Compound (VOC) and Nitrogen Oxides (NOx) emissions, which are ozone precursors, depending on the non-attainment level for the area. The purpose for requiring offsetting emissions decreases is to allow an area to move towards attainment of the ozone NAAQS while still allowing for industrial growth.

This can be accomplished through the implementation of an emission banking and trading program, which provides incentives to make progress toward attainment of air quality standards. The 1990 CAA allows for the use of market-based approaches, including emission trading, to assist in attaining and maintaining the NAAQS, for all criteria pollutants. Emissions trading programs have two key components: a limit (or cap) on pollution, and tradable allowances equal to the limit that authorize allowance holders to emit a specific quantity (e.g., one ton) of the pollutant.

An emission reduction credit (ERC) is a credit earned by a company when it reduces its air emissions. ERCs are discrete quantities of actual emissions expressed in tons of pollutant reduced. ERCs are reductions in emissions in one place that can be used to compensate for (or offset) emission increases which occur in a non-attainment area. These reductions can be generated through the shutdown of individual pieces of equipment or entire facilities. These credits can then be sold by the companies that hold them, to offset new emissions sources.

Delaware's regulation 7 **DE Admin. Code** 1134, *Emission Banking and Trading Program* ("Regulation 1134") was developed to establish a voluntary emission banking and trading program.

[1] National Ambient Air Quality Standards for Ozone. EPA Final Rule. 80 FR 65292. October 26, 2015. https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf

In accordance with the Clean Air Act Section 173(c)(1)-(2), Offsets:

*"(1) The owner or operator of a new or modified major stationary source may comply with any offset requirement in effect under this part for increased emissions of any air pollutant only by obtaining emission reductions of such air pollutant from the same source or other sources in the same nonattainment area, except that the State may allow the owner or operator of a source to obtain such emission reductions in another nonattainment area if (A) the other area has an equal or higher nonattainment classification than the area in which the source is located and (B) emissions from such other area contribute to a violation of the national ambient air quality standard in the nonattainment area in which the source is located. Such emission reductions shall be, by the time a new or modified source commences operation, in effect and enforceable and shall assure that the total tonnage of increased emissions of the air pollutant from the new or modified source shall be offset by an equal or greater reduction, as applicable, in the actual emissions of such air pollutant from the same or other sources in the area…"*

In accordance with Section 14.0 of Regulation 1134, the Delaware Division of Air Quality (AQ) is required to conduct periodic audits of its emission banking and trading program, to ensure that the goals of the program are being met. In accordance with Section 14.3 of Regulation 1134, the audit was legal noticed in two general circulation newspapers as well as posted on the Division's website on July 17, 2022, and included a public comment period of 30 days after publication of the notice, until August 17, 2022. No comments were received from the public on the audit.

**DELAWARE'S COMMITMENT TO IMPROVING AIR QUALITY:**

The Delaware Division of Air Quality is comprised of engineers, scientists and planners who work to protect human health and the environment. In addition to implementing a strictly regulated ERC program, Delaware AQ applies more stringent requirements on industrial sources than what is required by the CAA and federal regulations.

Emissions from any new sources must not impact the state's attainment or maintenance of health-based federal air quality standards (NAAQS) and sources are required to have an air quality permit at very low levels. Delaware's threshold for requiring these stringent levels of pollution control is lower than neighboring states. Equipment emitting more than 10 lbs pollution/day requires a permit.

AQ staff are highly trained to review the detailed permit applications and determine if the level of control the facility has proposed meets the rigorous control requirement established by state regulations. These air permits may require additional controls to minimize the impacts of emissions. In addition, the permits can include monitoring, recordkeeping and reporting requirements. AQ staff inspect facilities on a routine basis to determine compliance with state and federal requirements.

Some additional examples of AQ's efforts to improve air quality in Delaware include, but are not limited to:

- Continuous development and revision of state regulations to reduce air pollution in all communities
- Programs to reduce vehicle and diesel emissions, promoting clean fuel and alternative vehicle use
- Strict 'open burning' policies throughout the state of Delaware
- Close collaboration with neighboring states and the EPA, ensuring all matters related to air pollution are handled in an efficient and timely fashion, keeping in line with (if not exceeding) federal regulations

**EMISSION OFFSETS:**

In Delaware the generated ERCs are used to fulfill two emission offset requirements, Nonattainment New Source Review and Coastal Zone Act Program, as detailed below.

**Nonattainment New Source Review**

Major stationary sources of air pollution and major modifications to major stationary sources are required by the Clean Air Act to a obtain an air pollution permit before commencing construction. The process is called new source review (NSR) and is required whether the major source or modification is planned for an area where the NAAQS are exceeded (non-attainment areas). Permits for sources in attainment areas are referred to as prevention of significant air quality deterioration (PSD) permits; while permits for sources located in non-attainment areas are referred to as Non-attainment Area (NAA) permits. The entire program, including both PSD and NAA permit reviews, is referred to as the NSR program.

Non-attainment New Source Review (NNSR) requires new major sources, or major modifications at existing sources, within non-attainment areas to offset the annual emissions increase from the new source or modification and to provide a net air quality benefit. (7 **DE Admin. Code** 1125, or "Regulation 1125"). Emissions offset by NNSR are based upon non-attainment area classification severity, using a ratio, which is specified in Section 2.0 of Regulation 1125.

The EPA revised the 1-hour ozone NAAQS to an 8-hour NAAQS of 0.080 ppm (62 FR 38856)[2] in 1997, and again revised the ozone NAAQS to an 8-hour NAAQS of 0.075 ppm in 2008 (73 FR 16436)[3]. Under the 1997 8-hour ozone NAAQS, the entire state of Delaware was designated a part of the Philadelphia moderate NAA. Under the 2008 8-hour ozone NAAQS, New Castle County was designated a part of the Philadelphia marginal NAA, while Sussex County was designated a standalone marginal NAA. Therefore, Delaware continued to be subject to the CAA requirements through the 1997 and 2008 ozone NAAQS due to its inclusion in a non-attainment area.

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[2] National Ambient Air Quality Standards for Ozone. EPA Final Rule. 62 FR 38856. July 18, 1997. https://www.govinfo.gov/content/pkg/FR-1997-07-18/pdf/97-18580.pdf
[3] National Ambient Air Quality Standards for Ozone. EPA Final Rule. 73 FR 16436. March 27, 2008. https://www.govinfo.gov/content/pkg/FR-2008-03-27/pdf/E8-5645.pdf

On April 30, 2004 (84 FR 23857)[4], EPA designated all three Delaware counties as moderate nonattainment under the 1997 8-hour ozone NAAQS, as part of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area. EPA granted the area a 1-year extension of its attainment date (from 2010 to 2011) on January 21, 2011 (76 FR 3840)[5]. On March 26, 2012, EPA determined that the area had attained the 8-hour ozone NAAQS by its attainment date and also that it qualified for a clean data determination, which suspended most CAA air quality planning requirements based on air quality monitoring data showing that the area met the NAAQS for the most recent three prior years. Therefore, the area was never formally redesignated to attainment prior to EPA's revocation of the 1997 8-hour NAAQS on March 6, 2015 (44 FR 12264)[6], effective April 6, 2015.

Classifications from the 1979 1-hr ozone standard still apply as the most stringent:

- Kent Co. - Severe under 1-hr standard; requires 1.3:1 offsets for nitrogen oxides (NOx) and volatile organic compounds (VOC)
- New Castle Co. - Severe under 1-hr standard; requires 1.3:1 offsets for NOx and VOC
- Sussex Co. - Marginal under 1-hr standard (but considered Moderate since Delaware is part of the Ozone Transport Region, or OTR); requires 1.15:1 offsets for NOx and VOC

Per the Clean Air Act Section 173(c)(1)-(2), Offsets, emission offsets may be obtained from a non-attainment area which 1) is equal or higher in classification; and 2) contributes to non-attainment in the area.

## Coastal Zone Act Program

The Coastal Zone Act (CZA) Program regulates new and existing manufacturing and heavy industrial activities in Delaware's Coastal Zone, which generally runs the length of the state along the Delaware River, the Delaware Bay, the Inland Bays and the Atlantic Ocean, as shown in **Figure 1**.

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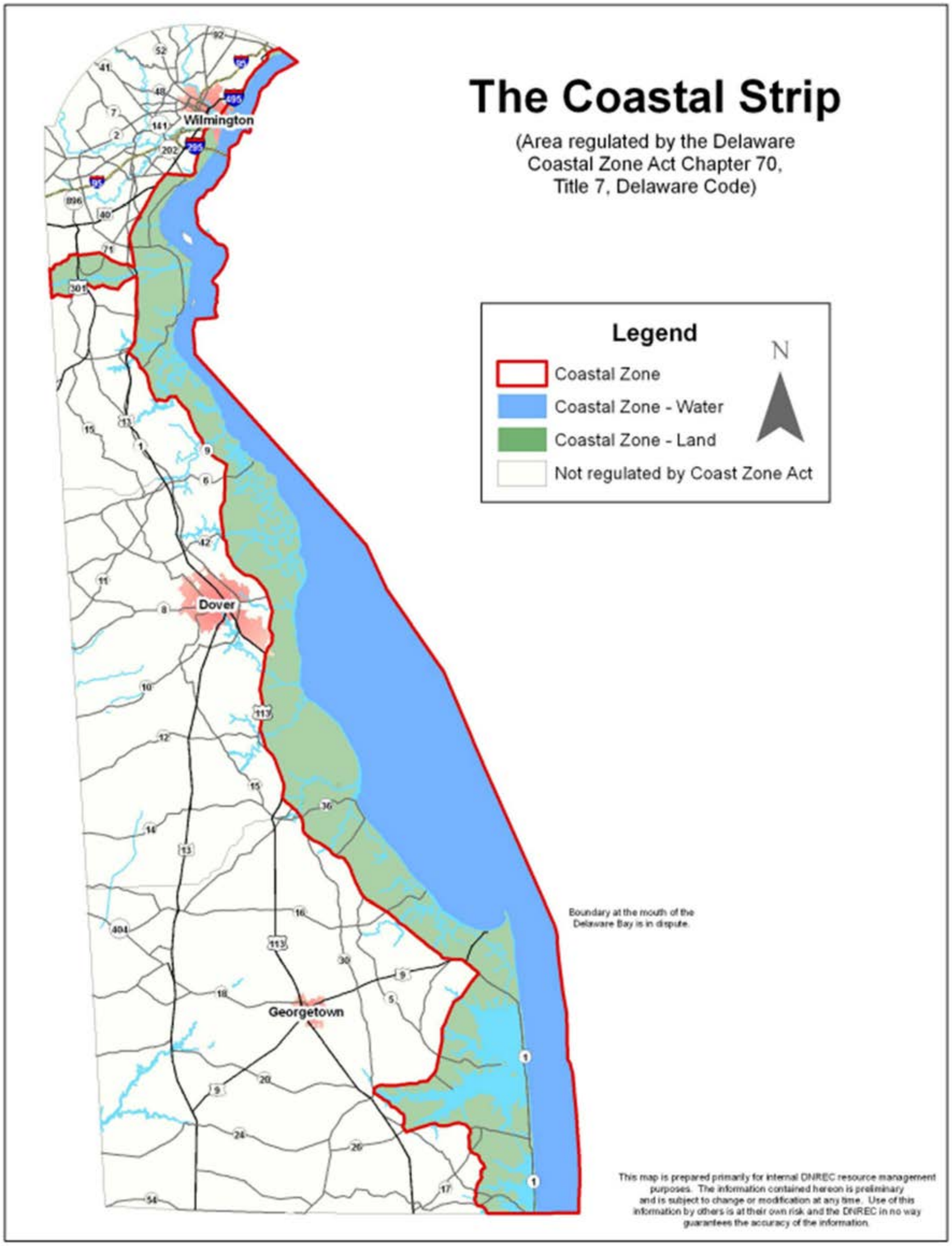
[4] Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas With Deferred Effective Dates. EPA Final Rule. 84 FR 23857. April 30, 2004. https://www.govinfo.gov/content/pkg/FR-2004-04-30/pdf/04-9152.pdf

[5] Approval of One-Year Extension for Attaining the 1997 8-Hour Ozone Standard for the Delaware, Maryland, and Pennsylvania Portions of the Philadelphia-Wilmington-Atlantic City Moderate Nonattainment Area. EPA Final Rule. 76 FR 3840. January 21, 2011. https://www.govinfo.gov/content/pkg/FR-2011-01-21/pdf/2011-1262.pdf

[6] Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements. EPA Final Rule. 44 FR 12264. March 6, 2015. https://www.govinfo.gov/content/pkg/FR-2015-03-06/pdf/2015-04012.pdf

**Figure 1 – The Delaware Coastal Zone Map**



Delaware's Coastal Zone Act (CZA) was passed in 1971. The intent was to "strike the correct balance between" introducing new industry to the state and protecting the state's environment, natural beauty, and outdoor recreation opportunities. The CZA provides to the Secretary of the Department of Natural Resources and Environmental Control (DNREC) and the Coastal Zone Industrial Control Board the authority to promulgate regulations to carry out the requirements contained within the Act. DNREC's Coastal Zone Program was developed to accomplish two key goals:

1) Promote improvement of the environment within the Coastal Zone and
2) Providing existing and new industries in Delaware's Coastal Zone with the flexibility necessary to stay competitive and to prosper.

In accordance with 7 **DE Admin. Code** 101, *Regulations Governing Delaware's Coastal Zone*, Section 9.0; projects that will result in negative environmental impact require an offset proposal for a project that benefits Delaware:

*" 9.1.1 Any application for a permit for an activity or facility that will result in any negative environmental impact shall contain an offset proposal for a project that benefits Delaware. Offset projects shall more than offset the negative environmental impacts associated with the proposed project or activity requiring a permit, including on an annual basis, if applicable. The applicant shall propose an offset project that is clearly and demonstrably more beneficial to the environment in Delaware than the harm done by the negative environmental impacts associated with the proposed project."*

Companies have historically used AQ's ERCs as an option to fulfill the CZA requirements for project offsets.

**EMISSION REDUCTION CREDITS:**

In Delaware, ERCs are created via requirements specified in 7 **DE Admin. Code** 1134, Section 8.5:

*"Prior to certifying an emission reduction, the Department will make the following adjustments to both the ozone season and non-ozone season emission reductions that are submitted to the Department for certification:*

*8.5.1 Credit for all emission reductions, except any reductions generated by shutdowns or generated prior to October 6, 1997, will be reduced by the value of 10% of the total reductions to provide a net air quality benefit.*

*8.5.2 Credit for emission reductions generated by shutdowns will be reduced by the value of 50% of the total reductions. 25% of the total reductions will be retired to provide a net air quality benefit and 25% will be held in a separate account by the Delaware Department of State, Division of Small Business, for economic development purposes after certification by the Department pursuant to 8.6 of this regulation.*

*8.5.3 Credit for reductions generated before October 6, 1997 will be adjusted by a discount factor relating to the uncertainty of the emission estimation method used. The amount of the discount will be determined by the Department on a case-by-case basis. Factors that the Department will take into consideration in determining the uncertainty of the emission estimation method used include the nature of the reduction, the validity of the baseline data, and any previous review or inspection of relevant test methods by the Department. The Department will then reduce the adjusted amount by the value of 10% to provide a net air quality benefit."*

ERCs do not have an expiration date and they are retired after use. They are only created for NOx and VOC, both of which are ozone precursors. Regulation 1134 specifies the various components of a typical banking system: qualifying emission reductions, quantifying emission reductions, certifying ERCs, banking and accounting of ERCs, and trading and use of ERCs.

In accordance with Regulation 1134, Section 8.5; for partial facility shutdowns, credit for emission reductions are reduced by the value of 10% of the total reductions to provide a net air quality benefit. For total facility shutdowns, 50% of the created ERCs are allotted to the applicant; 25% are allotted to the Division of Small Business for future economic development purposes; and 25% are immediately retired to provide a net air quality benefit. AQ tracks the creation, transfer, and use of ERCs. AQ does not own or sell credits. ERCs are created at the voluntary request by an applicant. Such requests must be submitted within 1 year after the emission reduction occurs.

ERCs are broken down into "ozone season" and "non-ozone season" for every calendar year. In Regulation 1134, ozone season is defined as the period between April 1 and October 31. Non-ozone season would then be the period between November 1 and March 31.

**<u>Certification of Credits</u>**

7 **DE Admin. Code** 1134, Section 4.0 sets the guidelines for generating an Emission Reduction Credit:

*"4.1 An emission reduction is valid as an ERC only after certification by the Department. Emission reductions generated for the purpose of creating ERCs must meet, at a minimum, all of the following criteria:*

*4.1.1 The reductions must be created from decreases of VOC or NOx emissions;*

*4.1.2 The emissions must be included in the 1990 or subsequent emission inventory;*

*4.1.3 The reductions must have occurred after January 1, 1991;*

*4.1.4 The emission reduction must be equal to or greater than one ton per year; and*

*4.1.5 The reductions must be real, surplus, permanent, quantifiable, and enforceable."*

In accordance with 7 **DE Admin. Code** 1134, Section 4.0, facilities that would like to create ERCs from shutdowns of facilities and/or equipment are required to submit an application for certification of an emission reduction to AQ. AQ reviews each application to determine if the reductions are real, surplus, permanent, quantifiable, and enforceable as defined in Section 2.0 of Regulation 1134:

*"Real (reductions) means reductions in actual emissions released into the atmosphere."*

*"Surplus (reductions) means actual emission reductions below the baseline (see 6.0 of this regulation) not required by regulations or proposed regulations, and not used by the source to meet any state or federal regulatory requirement.[7]"*

*"Enforceable means any standard, requirement, limitation or condition established by an applicable federal or state regulation or specified in a permit issued or order entered thereunder, or contained in a SIP approved by the Administrator of the U.S. Environmental Protection Agency (EPA), and which can be enforced by the Department and the Administrator of the EPA."*

*"Permanent (reductions) means that the actual emission reductions submitted to the Department for certification have been incorporated in a permit or a permit condition or, in the case of a shutdown, the permit to operate for the emission unit or units has been voided."*

*"Quantifiable (reductions) means that the amount, rate and characteristics of emission reductions can be determined by methods that are considered reliable by the Department and the Administrator of the EPA."*

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[7] In order to establish the amount of an emission reduction that is surplus and thus eligible for credit, an ozone season and a non-ozone season emission baseline must be established for each emission unit or units associated with a particular emission reduction. The formula for calculation of the ozone season and non-ozone season emission baselines can be found in 7 **DE Admin. Code** 1134, Section 6.3.

**Table 1** lists all facilities/businesses contributing to the Total Certified ERCs, starting from the most recent activity:

**Table 1 – Individual Facility/Business ERC Contributions in Delaware**

| Facility/Business Name and Activity Date | VOC (tons) | | $NO_X$ (tons) | |
|---|---|---|---|---|
| | Ozone Season | Non-Ozone Season | Ozone Season | Non-Ozone Season |
| | | | | |
| **Transfer of all ERCs from Formosa to Veolia 9/11/19** | **-** | **-** | **-** | **-** |
| | | | | |
| **Formosa Shutdown 5/21/19:** | **26** | **21** | **14** | **14** |
| *Held by Formosa* | 13 | 11 | 7 | 7 |
| *Held by Division of Small Business* | 7 | 5 | 4 | 3 |
| *Retired by DNREC* | 6 | 5 | 3 | 4 |
| | | | | |
| **Transfer of all ERCs from Chemours to Diamond State Port Corporation 5/15/18** | **-** | **-** | **-** | **-** |
| | | | | |
| **Chemours Edge Moor Shutdown 12/28/17:** | **68** | **48** | **18** | **13** |
| *Held by Chemours* | 34 | 24 | 9 | 7 |
| *Held by Division of Small Business* | 17 | 12 | 5 | 3 |
| *Retired by DNREC* | 17 | 12 | 4 | 3 |
| | | | | |
| **Kaneka Shutdown 1/29/04:** | **11** | **7** | **3** | **1** |
| *Held by DCI* | 4 | 2 | 1 | 1 |
| *Held by Division of Small Business* | 2 | 2 | 1 | 0 |
| *Retired by DNREC* | 3 | 2 | 1 | 0 |
| *Used by Uniqema under Coastal Zone Regulations* | 2 -- 1 from DCI and 1 from DEDO | 1 from DCI | 0 | 0 |
| | | | | |

| Facility/Business Name and Activity Date | VOC (tons) | | $NO_X$ (tons) | |
|---|---|---|---|---|
| | Ozone Season | Non-Ozone Season | Ozone Season | Non-Ozone Season |
| | | | | |
| **DuPont Holly Run Shutdown:** | **0** | **0** | **13** | **9** |
| *Held by DuPont* | 0 | 0 | 0 | 0 |
| *Held by Division of Small Business* | 0 | 0 | 3 | 2 |
| *Retired by DNREC* | 0 | 0 | 3 | 2 |
| *Used by DuPont as part of Red Lion NOX Compliance Program* | 0 | 0 | 7 from DuPont | 5 from DuPont |
| | | | | |
| **Metachem Shutdown:** | **31** | **21** | **36** | **27** |
| *Held by Division of Small Business* | 23 | 16 | 27 | 20 |
| *Retired by DNREC* | 8 | 5 | 9 | 7 |
| | | | | |
| **Lafarge Shutdown:** | **7** | **4** | **45** | **28** |
| *Held by Lafarge* | 3 | 2 | 0 | 0 |
| *Held by Division of Small Business* | 2 | 1 | 11 | 7 |
| *Retired by DNREC* | 2 | 1 | 11 | 7 |
| *Used in Main Channel Deepening* | | | 23 from Lafarge | 14 from Lafarge |
| | | | | |
| **VPI Mirrex Shutdown:** | **12** | **8** | **3** | **1** |
| *Held by VPI* | 6 | 4 | 1 | 1 |
| *Held by Division of Small Business* | 3 | 2 | 1 | 0 |
| *Retired by DNREC* | 3 | 2 | 1 | 0 |
| | | | | |
| **Chrysler Shutdown 10/12/10:** | **233** | **156** | **17** | **40** |
| *Held by 1734 LLC* | 117 | 78 | 9 | 20 |
| *Held by Division of Small Business* | 58 | 39 | 4 | 10 |
| *Retired by DNREC* | 58 | 39 | 4 | 10 |
| | | | | |
| **Calpine Switch to Gas:** | **0** | **0** | **181** | **128** |
| *Held by Calpine* | 0 | 0 | 27 | 19 |
| *Retired by DNREC* | 0 | 0 | 17 | 12 |
| *Used by Garrison Energy Center, LLC* | 0 | 0 | 81 | 57 |
| *Used by Hay Road Energy Center Compressor Upgrade* | 0 | 0 | 56 | 40 |

| Facility/Business Name and Activity Date | VOC (tons) | | $NO_X$ (tons) | |
|---|---|---|---|---|
| | Ozone Season | Non-Ozone Season | Ozone Season | Non-Ozone Season |
| | | | | |
| **NRG Energy Center** | **0** | **0** | **135** | **163** |
| *Held by NRG* | 0 | 0 | 121 | 147 |
| *Retired by DNREC* | 0 | 0 | 14 | 16 |
| | | | | |
| **NRG Indian River** | **3** | **2** | **370** | **266** |
| *Held by NRG* | 3 | 2 | 333 | 239 |
| *Retired by DNREC* | 0 | 0 | 37 | 27 |
| **Total Certified:** | **391** | **267** | **835** | **690** |

Current Bank totals are determined by subtracting Delaware's Total Used/Retired ERCs from all available Total Certified Credits. **Table 2** breaks these totals down further:

**Table 2 – Certified, Used, Retired and Bank ERCs**

| Retired/Used by | VOC (tons) | | $NO_X$ (tons) | |
|---|---|---|---|---|
| | Ozone Season | Non-Ozone Season | Ozone Season | Non-Ozone Season |
| **Total Certified:** | **391** | **267** | **835** | **690** |
| ***Retired*** | **-97** | **-66** | **-104** | **-88** |
| *From Division of Small Business, Used by FujiFilm (December 2021)* | -1 | 0 | -1 | -1 |
| *From Division of Small Business, Used by ArgoRefiner (2020)* | -1 | -1 | 0 | -1 |
| *Used by Veolia (September 2019)* | -9 | -9 | -3 | -2 |
| *From Division of Small Business, Used by Essential Minerals (2018)* | 0 | -2 | 0 | -1 |
| *From Division of Small Business, Used by NALCO (2016)* | 0 | 0 | 0 | -1 |
| *From Division of Small Business, Used by MAGCO (2016)* | 0 | 0 | 0 | -3 |
| *From Division of Small Business, Used by Green Recovery Technologies (2015)* | -1 | -1 | -4 | -3 |
| *From Division of Small Business, Used by TECHMER (2015)* | -4 | -4 | 0 | 0 |
| *From Division of Small Business, Used by CRODA (2014)* | -3 | -1 | -2 | -1 |
| *From Division of Small Business, Used by MAGCO (2009)* | 0 | 0 | -8 | -5 |
| *From Division of Small Business, used by Grantham Lane Associates(2009)* | 0 | 0 | -1 | -1 |
| *From Division of Small Business, Used by Tapeta under Coastal Zone Regulations (2007)* | -1 | 0 | -3 | -2 |
| *From Division of Small Business, Used by Voight and Schweitzer under Coastal Zone Regulations (2007)* | 0 | 0 | -4 | -3 |
| *From DCI /Division of Small Business(VOC 1-nonozone), Used by Uniqema under Coastal Zone Regulations (2004)* | -2 | -1 | 0 | 0 |

| Retired/Used by | VOC (tons) | | NOX (tons) | |
|---|---|---|---|---|
| | **Ozone Season** | **Non-Ozone Season** | **Ozone Season** | **Non-Ozone Season** |
| *From Division of Small Business, Used by Ion Power under Coastal Zone Regulations (2004)* | -1 | 0 | 0 | 0 |
| *From the Baltimore, Maryland Severe Nonattainment Area, Used by RecyClean Plastics under Coastal Zone Regulations (2002)** | 0 | 0 | -1 | -1 |
| *From the Baltimore, Maryland Severe Nonattainment Area, Used by Printpack under Coastal Zone Regulations (2001)** | -23 | -12 | -2 | -1 |
| *Used by DuPont as part of Red Lion NOx Compliance Program* | 0 | 0 | -7 | -5 |
| *From Lafarge; used in Main Channel Deepening* | 0 | 0 | -23 | -14 |
| *From Division of Small Business; used by CRODA* | -3 | -1 | -2 | -1 |
| *From Division of Small Business; used by PBF* | -11 | -16 | 0 | 0 |
| *Used by Garrison Energy Center, LLC* | 0 | 0 | -81 | -57 |
| *Used by Hay Road Energy Center Compressor Upgrade* | 0 | 0 | -56 | -40 |
| ***Total Retired/Used*** | **-157** | **-114** | **-302** | **-231** |
| ***Total In Bank*** | **234** | **153** | **533** | **459** |

*These ERCs were purchased from Maryland but were applied to a project that was located in Delaware. Therefore, the potential emissions that were offset were originated from Delaware.

The current status of all ERCs certified by the Department pursuant to 7 **DE Admin. Code** 1134, Emission Banking and Trading Program, since its inception are shown in **Table 3**:

**Table 3 - The current ERCs in Delaware, as of 12/31/21.**

| Held By | VOC (tons) | | $NO_X$ (tons) | |
|---|---|---|---|---|
| | Ozone Season | Non-Ozone Season | Ozone Season | Non-Ozone Season |
| *1734 LLC* | 117 | 78 | 9 | 20 |
| *Calpine* | 0 | 0 | 27 | 19 |
| *Delaware City Industries (DCI)* | 4 | 2 | 1 | 1 |
| *Diamond State Port Corporation* | 34 | 24 | 9 | 7 |
| *DuPont* | 0 | 0 | 0 | 0 |
| *Lafarge* | 3 | 2 | 0 | 0 |
| *NRG Energy Center* | 0 | 0 | 121 | 147 |
| *NRG Indian River* | 3 | 2 | 333 | 239 |
| *Veolia* | 4 | 2 | 4 | 5 |
| *VPI* | 6 | 4 | 1 | 1 |
| *Division of Small Business* | 86 | 51 | 31 | 22 |
| **Total Currently in Delaware's Bank (12/31/21)** | **257** | **165** | **536** | **461** |

**PROGRAM EVALUATION:**

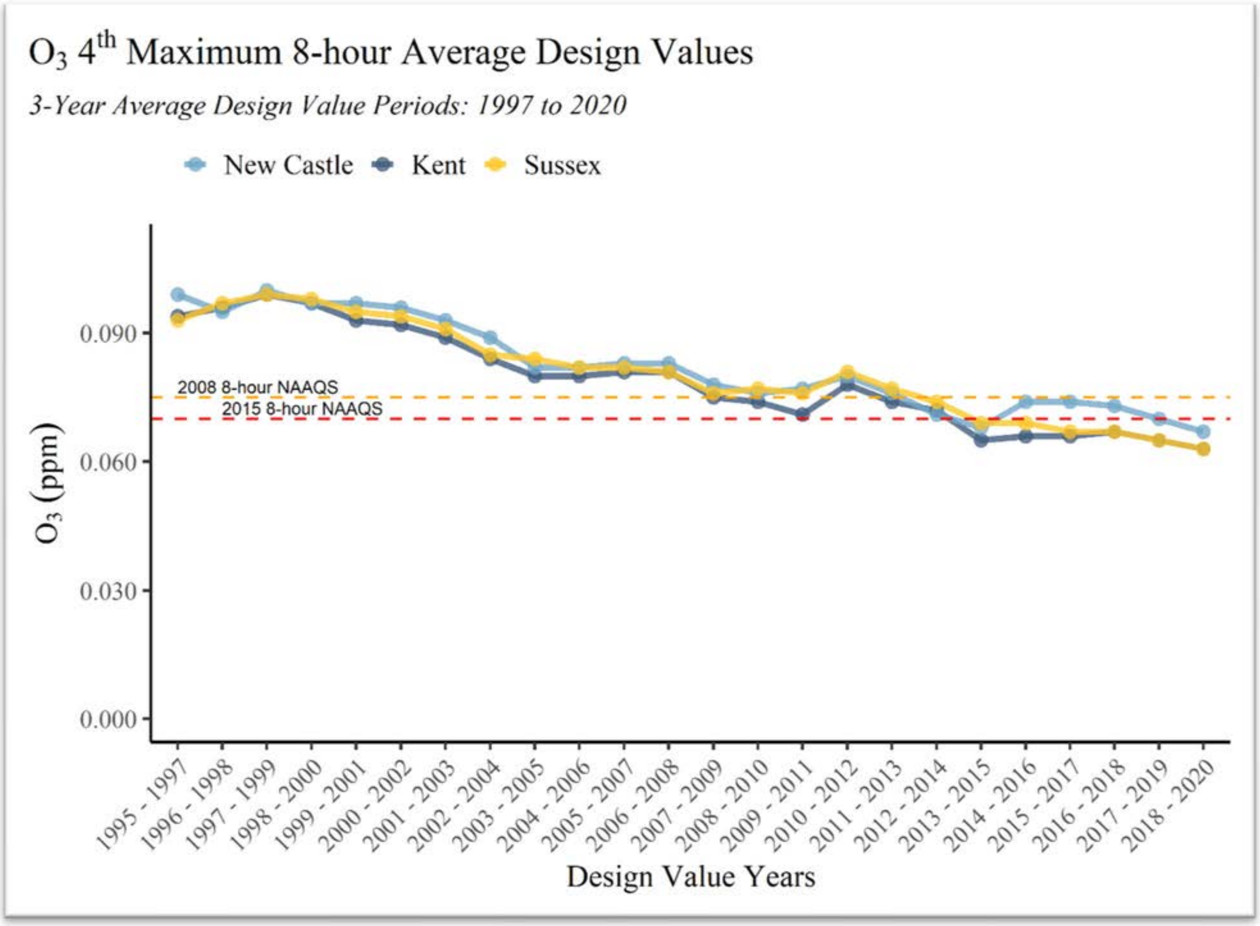
As part of the ERC program audit, AQ is required to evaluate the effectiveness of the program, as specified in Regulation 1134, Section 14.2:

> *"The Department shall conduct an audit of the emission banking and trading program within three years from October 6, 1997, and every three years thereafter to ensure that the program is achieving the goals specified in 1.0 of this regulation. The audits will evaluate whether the emission banking and trading program:*
>
> > *14.2.1 Is consistent with the maintenance of NAAQS and does not interfere with Reasonable Further Progress (RFP) towards attainment of NAAQS;*
> >
> > *14.2.2 Requirements for monitoring, record keeping, reporting and enforcement have resulted in a sufficiently high level of compliance; and*
> >
> > *14.2.3 Has caused any localized adverse effects to the public health, safety or welfare or the environment."*

14.2.1: Consistent with NAAQS

As shown below in **Figure 2**, ozone levels in Delaware have steadily declined since 1997. In addition, the most recent ozone levels for 2020 are below the 2015 8-hour ozone NAAQS of 0.070 ppm (80 FR 65292)[8]. The continued decrease in ambient ozone concentrations demonstrates that the offset program is consistent with the maintenance of NAAQS.

**Figure 2 – County Level Ozone Values in Delaware**




14.2.1: Does Not Interfere with Reasonable Further Progress (RFP) towards attainment of NAAQS

Reasonable further progress means incremental reductions in emission of an air pollutant which are sufficient to provide for attainment of the NAAQS. Every three years, Delaware conducts an emissions inventory which is an accounting of the amount of pollutants discharged into the atmosphere. These inventories included the calculation of VOCs and NOx air emissions. Actual VOC and NOx missions from facilities are reported directly to AQ. Therefore, once a company has shut down there will be no more emissions from that facility and/or unit in the inventory.

[8] Ibid. 1.

Changes in emissions over time can be analysed by looking at differences between individual inventories. For the purposes of the 1997 8-hour Ozone NAAQS, the Clean Air Act requires a demonstration that areas classified moderate and above, demonstrate Reasonable Further Progress (RFP) towards attainmetn of the NAAQS by achieving at least a 15% emissions reduction of VOCs and NOx[9].

Delaware developed a 2002 Base Year Inventory for the purposes of calculating Reasonable Further Progress for the for the Delaware portion of the Philadelphia 1997 8-hour ozone moderate non-attainment area (75 FR 2452)[10] **(Tables 4 and 5)**.

**Table 4 - 2002 Base Year VOC Emissions by Source Sector[11]**

| Source Sector | Summer Season Weekday[12] (TPD) | | | |
|---|---|---|---|---|
| | Kent | New Castle | Sussex | State Total |
| Point | 0.49 | 9.42 | 13.35 | 23.26 |
| Non-point | 5.75 | 20.02 | 7.31 | 33.08 |
| On-road | 5.45 | 16.98 | 9.95 | 32.38 |
| Non-road | 5.17 | 12.24 | 9.36 | 26.77 |
| **All Sectors** | **16.86** | **56.66** | **39.97** | **115.49** |

**Table 5 - 2002 Base Year NOx Emissions by Source Sector[13]**

| Source Sector | Summer Season Weekday[14] (TPD) | | | |
|---|---|---|---|---|
| | Kent | New Castle | Sussex | State Total |
| Point | 5.06 | 44.09 | 24.95 | 74.10 |
| Non-point | 0.45 | 1.95 | 0.77 | 3.17 |
| On-road | 13.97 | 36.56 | 18.50 | 69.03 |
| Non-road | 15.02 | 24.62 | 13.15 | 52.79 |
| **All Sectors** | **34.50** | **107.22** | **57.37** | **199.09** |

[9] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Reasonable Further Progress Plan, 2002 Base Year Inventory, Reasonably Available Control Measures, Contingency Measures, and Transportation Conformity Budgets for the Delaware Portion of the Philadelphia 1997 8-Hour Ozone Moderate Nonattainment Area. EPA Proposed Rule. 75 FR 2452. January 15, 2010. https://www.govinfo.gov/content/pkg/FR-2010-01-15/pdf/2010-745.pdf

[10] Ibid. 5.

[11] Ibid. 4.

[12] The 2002 Base Year Inventory for the 1997 8 hour Ozone Non-attainment Area for the purposes of determining Reasonable Further Progress were calculated for Summer Season Weekdays: weekdays in June, July, and August.

[13] Ibid. 4.

[14] Ibid 4.

In **Tables 6 and 7**, a reduction of 15% was applied to the 2002 Base Year Inventory data, to calculate the 15% RFP reduction.

**Table 6 - 2002 VOC Emissions – Reasonable Further Progress, 15% Reduction**

| Source Sector | Summer Season Weekday (TPD) | | | |
|---|---|---|---|---|
| | Kent | New Castle | Sussex | State Total |
| Point | 0.42 | 8.01 | 11.35 | 19.78 |
| Non-point | 5.66 | 17.02 | 6.21 | 28.89 |
| On-road | 5.37 | 14.43 | 8.46 | 28.26 |
| Non-road | 5.09 | 10.40 | 7.96 | 23.45 |
| **All Sectors** | **16.54** | **49.86** | **33.98** | **100.38** |

**Table 7 - 2002 NOx Emissions – Reasonable Further Progress, 15% Reduction**

| Source Sector | Summer Season Weekday (TPD) | | | |
|---|---|---|---|---|
| | Kent | New Castle | Sussex | State Total |
| Point | 4.30 | 37.48 | 21.21 | 62.99 |
| Non-point | 0.38 | 1.66 | 0.65 | 2.69 |
| On-road | 11.87 | 31.08 | 15.73 | 58.68 |
| Non-road | 12.77 | 20.93 | 11.18 | 44.88 |
| **All Sectors** | **29.32** | **91.15** | **48.77** | **169.24** |

The 2002 Base Year Inventory totals were also compared to inventory data from the most recent Emissions Inventory in 2017 **(Tables 8 and 9),** to determine what percentage change in emissions has occurred between 2002 and 2017. As shown in **Tables 8 and 9**; there has been an overall decrease in emissions from 2002-2017 of 54.46% for VOCs and 67.31% for NOx.

**Table 8 - 2017 VOC Emissions by Source Sector[15]**

| **Source Sector** | **Annual (TPD)** | | | | |
|---|---|---|---|---|---|
| | **Kent** | **New Castle** | **Sussex** | **State Total** | **Total % Decrease from 2002** |
| Point | 0.27 | 2.05 | 0.20 | 2.52 | |
| Non-point | 3.58 | 9.01 | 6.30 | 18.90 | |
| On-road | 2.24 | 5.94 | 3.57 | 11.74 | |
| Non-road | 3.87 | 6.15 | 9.41 | 19.43 | |
| **All Sectors** | **9.97** | **23.15** | **19.48** | **52.59** | **54.46%** |

**Table 9 - 2017 NOx Emissions by Source Sector[16]**

| **Source Sector** | **Annual (TPD)** | | | | |
|---|---|---|---|---|---|
| | **Kent** | **New Castle** | **Sussex** | **State Total** | **Total % Decrease from 2002** |
| Point | 0.42 | 6.86 | 0.65 | 7.92 | |
| Non-point | 1.13 | 3.95 | 2.55 | 7.63 | |
| On-road | 5.10 | 14.07 | 8.14 | 27.31 | |
| Non-road | 5.17 | 8.64 | 8.42 | 22.23 | |
| **All Sectors** | **11.82** | **33.52** | **19.75** | **65.09** | **67.31%** |

To determine if the 15% RFP reduction has been achieved, the total statewide inventory for 2017 (**Tables 8 and 9**) was added to the tons of banked ERCs that are still available for use, adjusted to Tons Per Day (Table 3), and compared to the total statewide 15% RFP tons in **Tables 6 and 7.** For both VOCs and NOx, the 2017 totals + the total ERCs available were below the calculated 15% RFP in **Tables 6 and 7**:

**VOC**

$$\text{2017 total (52.59 TPD)} + \frac{\text{Total ERCs}}{365}\left(\frac{257+165}{365}\right) = \mathbf{53.75\ TPD} \leq \text{15\% RFP } (\mathbf{100.38\ TPD})$$

**NOx**

$$\text{2017 total (65.09 TPD)} + \frac{\text{Total ERCs}}{365}\left(\frac{536+461}{365}\right) = \mathbf{67.82\ TPD} \leq \text{15\% RFP } (\mathbf{169.24\ TPD})$$

[15] 2017 Annual emissions are used for comparison to the 2002 data, since 7 DE Admin. Code 1134 applies to the entire year, not just Summer Season Weekdays.
[16] Ibid. 14.

14.2.2: Program Compliance

Facilities that would like to create ERCs from shutdowns of facilities and/or equipment are required to submit an application for certification of an emission reduction to AQ. AQ then reviews the request to determine if it is true, accurate and complete. To ensure that the ERCs are permanent, AQ conducts inspections to ensure that facilities are permanently shut down. Periodic inspections of operating facilities ensure that specific pieces of equipment are permanently rendered inoperable, or removed from the site.

14.2.3 Effects to the Public Health, Safety or Welfare or the Environment

As shown in **Figure 2**, the most recent ozone levels for 2020 are below the 2015 8-hour ozone NAAQS of 0.070 ppm. Therefore, Delaware is currently meeting the current health based ozone NAAQS.

## CONCLUSION

This report shows that the program, as outlined by 7 DE Admin Code 1134, is meeting the goals listed in sections 1.0 and 14.2 of the regulation. The Division of Air Quality does not recommend any changes to the regulation at this time.

# Appendix H

SSWD

| | |
|---|---|
| Output_Database | **mveb_c10003_y2023_annual_out** |
| OutputTable | MOVESrunOutput |
| TimeAggregation_Input | 24-hr |
| dayID | 5 |

| **Sum of emissionQuant** | **Column Labels** | | |
|---|---|---|---|
| **Row Labels** | **Carbon Monoxide (CO)** | **Oxides of Nitrogen (NOx)** | **Volatile Organic Compounds** |
| 6 | 65.2 | 7.9 | 4.0 |
| 7 | 73.8 | 7.7 | 4.2 |
| 8 | 71.5 | 7.7 | 4.2 |
| SSWD Average | 70.2 | 7.75 | 4.15 |

Based of the Sum(Daily Emission) … Can be added to give the correct Annual totals … If all the Hours, DayTypes & Months are included

| TimeAggregation_Input | 24-hr |
|---|---|

| Sum of Daily Emission | | Pollutant | | |
|---|---|---|---|---|
| **monthID** | **dayID** | **Carbon Monoxide (CO)** | **Oxides of Nitrogen (NOx)** | **Volatile Organic Compounds** |
| **1** | 2 | 387.3 | 55.9 | 25.0 |
| | 5 | 1169.1 | 166.1 | 73.2 |
| **2** | 2 | 351.5 | 52.2 | 22.2 |
| | 5 | 1058.1 | 155.0 | 64.8 |
| **3** | 2 | 400.9 | 59.9 | 25.8 |
| | 5 | 1207.0 | 178.0 | 74.6 |
| **4** | 2 | 371.3 | 59.4 | 25.6 |
| | 5 | 1115.7 | 176.5 | 73.7 |
| **5** | 2 | 389.3 | 59.9 | 29.1 |
| | 5 | 1165.2 | 177.7 | 83.8 |
| **6** | 2 | 467.5 | 57.0 | 30.4 |
| | 5 | 1396.4 | 169.2 | 86.2 |
| **7** | 2 | 546.8 | 57.1 | 33.1 |
| | 5 | 1634.8 | 169.6 | 93.9 |
| **8** | 2 | 531.5 | 57.4 | 32.5 |
| | 5 | 1584.3 | 170.4 | 92.5 |
| **9** | 2 | 412.2 | 54.3 | 28.7 |
| | 5 | 1230.0 | 161.3 | 81.7 |
| **10** | 2 | 384.2 | 58.4 | 26.8 |
| | 5 | 1153.8 | 173.4 | 76.9 |
| **11** | 2 | 384.3 | 57.7 | 25.2 |
| | 5 | 1158.0 | 171.5 | 72.4 |
| **12** | 2 | 406.1 | 59.9 | 25.4 |
| | 5 | 1224.8 | 178.1 | 74.1 |
| **Grand Total** | | **20129.8** | **2736.0** | **1277.7** |

Based of the Sum(Daily Emission) … Can be added to give the correct Annual totals … If all the Hours, DayTypes & Months are included

| TimeAggregation_Input | 24-hr |
|---|---|

| **Sum of Daily Emission** | **Column Labels** | | |
|---|---|---|---|
| **Row Labels** | **Carbon Monoxide (CO)** | **Oxides of Nitrogen (NOx)** | **Volatile Organic Compounds** |
| 2201110101 | 0 | 0 | 0 |
| 2201110102 | 4.198761414 | 0.106882647 | 0.537607062 |
| 2201110111 | | | 4.282835361 |
| 2201110112 | | | 19.56452123 |
| 2201110113 | | | 9.527822657 |
| 2201110115 | 0 | 0 | 0 |
| 2201110116 | 0 | 0 | 0 |
| 2201110118 | | | 0.008990109 |
| 2201110119 | | | 0.001141817 |
| 2201110201 | 42.23471116 | 2.38101434 | 1.904214393 |
| 2201110215 | 0 | 0 | 0 |
| 2201110218 | | | 0.207212716 |
| 2201110219 | | | 0.026652638 |
| 2201110301 | 134.971139 | 7.467520719 | 6.817897701 |
| 2201110311 | | | 0.007922905 |
| 2201110312 | | | 3.026528771 |
| 2201110313 | | | 0.165773979 |
| 2201110315 | 0 | 0 | 0 |
| 2201110318 | | | 0.63241292 |
| 2201110319 | | | 0.081346031 |
| 2201110401 | 101.8877445 | 5.660542574 | 4.89517157 |
| 2201110411 | | | 0.005186437 |
| 2201110412 | | | 1.9827731 |
| 2201110413 | | | 0.108640904 |
| 2201110415 | 0 | 0 | 0 |
| 2201110418 | | | 0.486215721 |
| 2201110419 | | | 0.062733454 |
| 2201110501 | 222.1050137 | 10.32309837 | 15.25970835 |
| 2201110511 | | | 0.025136797 |
| 2201110512 | | | 9.571914473 |
| 2201110513 | | | 0.524296149 |
| 2201110515 | 0 | 0 | 0 |
| 2201110518 | | | 1.049250652 |
| 2201110519 | | | 0.135281715 |
| 2201210101 | 21.99843353 | 2.78987599 | 2.090577497 |
| 2201210102 | 1483.928944 | 73.31533357 | 112.8184609 |
| 2201210111 | | | 45.16502839 |
| 2201210112 | | | 98.43420043 |
| 2201210113 | | | 108.1520319 |
| 2201210115 | 0.011439182 | 0.000111595 | 0.027595627 |
| 2201210116 | 0.771643334 | 0.002932612 | 1.489202853 |
| 2201210118 | | | 0.475878861 |
| 2201210119 | | | 0.650381874 |
| 2201210201 | 535.2233743 | 22.15198033 | 3.938447516 |
| 2201210215 | 0.278316417 | 0.000886078 | 0.051987494 |
| 2201210218 | | | 0.42368558 |
| 2201210219 | | | 0.574176187 |
| 2201210301 | 1178.719004 | 50.927443 | 10.89875317 |

| | | | |
|---|---|---|---|
| 2201210311 | | | 0.281853621 |
| 2201210312 | | | 3.206852899 |
| 2201210313 | | | 7.124185357 |
| 2201210315 | 0.612934177 | 0.0020371 | 0.143863523 |
| 2201210318 | | | 1.073200913 |
| 2201210319 | | | 1.449128407 |
| 2201210401 | 1511.609671 | 65.55279886 | 12.823675 |
| 2201210411 | | | 0.316162384 |
| 2201210412 | | | 3.60600938 |
| 2201210413 | | | 8.012564643 |
| 2201210415 | 0.78603777 | 0.002622114 | 0.169272556 |
| 2201210418 | | | 1.344712747 |
| 2201210419 | | | 1.825388959 |
| 2201210501 | 3256.274893 | 116.3237427 | 34.54301277 |
| 2201210511 | | | 1.171555977 |
| 2201210512 | | | 13.30447236 |
| 2201210513 | | | 29.5572257 |
| 2201210515 | 1.693263173 | 0.004652953 | 0.455967631 |
| 2201210518 | | | 2.901692843 |
| 2201210519 | | | 3.904812896 |
| 2201310101 | 31.877618 | 2.661480249 | 1.913978157 |
| 2201310102 | 1256.972793 | 80.559983 | 96.60398543 |
| 2201310111 | | | 26.71419296 |
| 2201310112 | | | 45.13336606 |
| 2201310113 | | | 72.33443086 |
| 2201310115 | 0.016576356 | 0.000106459 | 0.025264513 |
| 2201310116 | 0.653625597 | 0.003222401 | 1.275173353 |
| 2201310118 | | | 0.738038847 |
| 2201310119 | | | 0.782504153 |
| 2201310201 | 680.1877843 | 28.27652144 | 4.741638966 |
| 2201310215 | 0.353697795 | 0.001131061 | 0.062589597 |
| 2201310218 | | | 0.904057403 |
| 2201310219 | | | 0.937658111 |
| 2201310301 | 1544.70408 | 71.61729929 | 14.28923054 |
| 2201310311 | | | 0.297639746 |
| 2201310312 | | | 2.721676163 |
| 2201310313 | | | 7.569015971 |
| 2201310315 | 0.803246143 | 0.002864692 | 0.188617793 |
| 2201310318 | | | 2.472296051 |
| 2201310319 | | | 2.555822411 |
| 2201310401 | 1376.732616 | 61.73751571 | 11.3091986 |
| 2201310411 | | | 0.221384009 |
| 2201310412 | | | 2.027878754 |
| 2201310413 | | | 5.640684886 |
| 2201310415 | 0.715900941 | 0.002469501 | 0.149281472 |
| 2201310418 | | | 2.075148056 |
| 2201310419 | | | 2.156434579 |
| 2201310501 | 2760.266253 | 111.388335 | 31.77410309 |
| 2201310511 | | | 0.877202894 |
| 2201310512 | | | 8.002414043 |
| 2201310513 | | | 22.25518466 |
| 2201310515 | 1.435336326 | 0.004455538 | 0.419418812 |
| 2201310518 | | | 4.568973923 |
| 2201310519 | | | 4.704425783 |
| 2201320101 | 6.514710057 | 0.839284707 | 0.465769825 |
| 2201320102 | 1097.042369 | 59.29845329 | 65.75391757 |
| 2201320111 | | | 15.54802324 |
| 2201320112 | | | 24.2964929 |
| 2201320113 | | | 35.25773587 |
| 2201320115 | 0.003387648 | 3.35714E-05 | 0.006148164 |
| 2201320116 | 0.570462091 | 0.00237194 | 0.867951627 |
| 2201320118 | | | 0.22321328 |

| | | | |
|---|---|---|---|
| 2201320119 | | | 0.233549472 |
| 2201320201 | 66.35951871 | 3.960774657 | 0.616891654 |
| 2201320215 | 0.034506936 | 0.000158431 | 0.008142964 |
| 2201320218 | | | 0.106168622 |
| 2201320219 | | | 0.106317469 |
| 2201320301 | 168.6190823 | 10.2030564 | 2.114375667 |
| 2201320311 | | | 0.033736218 |
| 2201320312 | | | 0.337208405 |
| 2201320313 | | | 0.81702261 |
| 2201320315 | 0.087681839 | 0.000408123 | 0.027909752 |
| 2201320318 | | | 0.286014375 |
| 2201320319 | | | 0.285442802 |
| 2201320401 | 192.9541913 | 12.09446454 | 2.160682417 |
| 2201320411 | | | 0.034325673 |
| 2201320412 | | | 0.345184878 |
| 2201320413 | | | 0.836633534 |
| 2201320415 | 0.100336202 | 0.000483779 | 0.028521015 |
| 2201320418 | | | 0.331199292 |
| 2201320419 | | | 0.33275394 |
| 2201320501 | 412.3812896 | 21.62712004 | 6.979065471 |
| 2201320511 | | | 0.124556076 |
| 2201320512 | | | 1.242725507 |
| 2201320513 | | | 3.01112438 |
| 2201320515 | 0.214438479 | 0.000865085 | 0.092123748 |
| 2201320518 | | | 0.692459831 |
| 2201320519 | | | 0.689166824 |
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| 2202420419 | | | 0.030973499 |
| 2202420501 | 4.816531163 | 8.2818216 | 0.165745774 |
| 2202420515 | 0.13000769 | 0.105298204 | 0.057949183 |
| 2202420518 | | | 0 |
| 2202420519 | | | 0.055039024 |
| 2202430101 | 0.526480596 | 1.30382911 | 0.101526017 |
| 2202430102 | 0.5262122 | 0.460508621 | 0.10862315 |
| 2202430115 | 0.01774515 | 0.015089007 | 0.011463714 |
| 2202430116 | 0.107196475 | 1.15346E-06 | 0.000734455 |
| 2202430118 | | | 0 |
| 2202430119 | | | 0.005077155 |
| 2202430201 | 0.97259747 | 2.08777269 | 0.119777586 |
| 2202430215 | 0.032292175 | 0.014566827 | 0.012955799 |
| 2202430218 | | | 0 |
| 2202430219 | | | 0.020189677 |
| 2202430301 | 2.500840437 | 5.2368107 | 0.337078865 |
| 2202430315 | 0.0831979 | 0.040935071 | 0.036979538 |
| 2202430318 | | | 0 |
| 2202430319 | | | 0.045152515 |
| 2202430401 | 1.615746191 | 3.343143217 | 0.211656565 |
| 2202430415 | 0.053858384 | 0.024985387 | 0.022863463 |
| 2202430418 | | | 0 |
| 2202430419 | | | 0.030422859 |
| 2202430501 | 4.580681226 | 10.43576653 | 0.678315016 |
| 2202430515 | 0.144434454 | 0.093665272 | 0.078974921 |
| 2202430518 | | | 0 |
| 2202430519 | | | 0.071100608 |
| 2202510101 | 0.513594304 | 1.341527167 | 0.064940158 |
| 2202510102 | 0.048127196 | 0.040206968 | 0.005301029 |
| 2202510115 | 0.009707494 | 0.016079455 | 0.008379312 |
| 2202510116 | 0.016089113 | 5.42586E-09 | 3.65781E-05 |

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|---|---|---|---|
| 2202510118 | | | 0 |
| 2202510119 | | | 0.003447012 |
| 2202510201 | 0.309704672 | 0.637837007 | 0.019925859 |
| 2202510215 | 0.005173452 | 0.004696077 | 0.002372162 |
| 2202510218 | | | 0 |
| 2202510219 | | | 0.00516208 |
| 2202510301 | 0.769717839 | 1.50105117 | 0.052786775 |
| 2202510315 | 0.01304853 | 0.012536421 | 0.006220607 |
| 2202510318 | | | 0 |
| 2202510319 | | | 0.010674624 |
| 2202510401 | 0.610780303 | 1.204420759 | 0.041002494 |
| 2202510415 | 0.010407175 | 0.009350808 | 0.004744235 |
| 2202510418 | | | 0 |
| 2202510419 | | | 0.009243652 |
| 2202510501 | 1.391840609 | 2.763286864 | 0.099857293 |
| 2202510515 | 0.021839152 | 0.027737948 | 0.012662481 |
| 2202510518 | | | 0 |
| 2202510519 | | | 0.014584787 |
| 2202520101 | 24.74184163 | 40.41866579 | 2.548171477 |
| 2202520102 | 2.839401644 | 5.72030588 | 2.44837835 |
| 2202520115 | 0.297068458 | 0.347954227 | 0.268047881 |
| 2202520116 | 0.601666837 | 0.00032215 | 0.009710097 |
| 2202520118 | | | 0 |
| 2202520119 | | | 0.115627817 |
| 2202520201 | 15.38477633 | 20.08215987 | 0.973276071 |
| 2202520215 | 0.166276355 | 0.114786068 | 0.082450412 |
| 2202520218 | | | 0 |
| 2202520219 | | | 0.202334707 |
| 2202520301 | 39.93912094 | 55.35407057 | 2.780972004 |
| 2202520315 | 0.446063991 | 0.359767147 | 0.248598514 |
| 2202520318 | | | 0 |
| 2202520319 | | | 0.451581723 |
| 2202520401 | 29.30778267 | 38.96263957 | 1.96456961 |
| 2202520415 | 0.32387251 | 0.238074579 | 0.169889084 |
| 2202520418 | | | 0 |
| 2202520419 | | | 0.354753987 |
| 2202520501 | 72.73573471 | 112.5668904 | 5.420339757 |
| 2202520515 | 0.790755179 | 0.84380119 | 0.532521197 |
| 2202520518 | | | 0 |
| 2202520519 | | | 0.637339447 |
| 2202530101 | 1.521836 | 2.543095227 | 0.14538297 |
| 2202530102 | 0.031739866 | 0.068196347 | 0.018083654 |
| 2202530115 | 0.014588726 | 0.022328066 | 0.015730782 |
| 2202530116 | 0.008510962 | 2.16927E-06 | 5.90727E-05 |
| 2202530118 | | | 0 |
| 2202530119 | | | 0.007797611 |
| 2202530201 | 0.937995704 | 1.129339036 | 0.056739699 |
| 2202530215 | 0.008436428 | 0.007027979 | 0.004737518 |
| 2202530218 | | | 0 |
| 2202530219 | | | 0.013141069 |
| 2202530301 | 2.450150624 | 3.111068994 | 0.155734705 |
| 2202530315 | 0.022245418 | 0.020987556 | 0.013616398 |
| 2202530318 | | | 0 |
| 2202530319 | | | 0.031329111 |
| 2202530401 | 1.821469729 | 2.252451381 | 0.113689729 |
| 2202530415 | 0.016491393 | 0.014763651 | 0.009738683 |
| 2202530418 | | | 0 |
| 2202530419 | | | 0.024051557 |
| 2202530501 | 4.35746908 | 6.2844302 | 0.293767818 |
| 2202530515 | 0.038766281 | 0.048038444 | 0.028459167 |
| 2202530518 | | | 0 |
| 2202530519 | | | 0.045276136 |

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|---|---|---|---|
| 2202540101 | 0 | 0 | 0 |
| 2202540102 | 0.115953976 | 0.063270225 | 0.009033692 |
| 2202540115 | 0 | 0 | 0 |
| 2202540116 | 0.01837338 | 5.50622E-07 | 0.000102252 |
| 2202540118 | | | 0 |
| 2202540119 | | | 8.07008E-05 |
| 2202540201 | 0.528403579 | 1.1373627 | 0.077465262 |
| 2202540215 | 0.013758276 | 0.005845743 | 0.005933823 |
| 2202540218 | | | 0 |
| 2202540219 | | | 0.007865951 |
| 2202540301 | 1.372766437 | 2.783693841 | 0.209906173 |
| 2202540315 | 0.034299668 | 0.017490395 | 0.016530432 |
| 2202540318 | | | 0 |
| 2202540319 | | | 0.017203209 |
| 2202540401 | 0.86731037 | 1.770017771 | 0.130632206 |
| 2202540415 | 0.022157005 | 0.010111778 | 0.010071977 |
| 2202540418 | | | 0 |
| 2202540419 | | | 0.011670561 |
| 2202540501 | 2.52303344 | 5.152709971 | 0.396373405 |
| 2202540515 | 0.056739435 | 0.040222829 | 0.032980421 |
| 2202540518 | | | 0 |
| 2202540519 | | | 0.025721895 |
| 2202610101 | 9.474036157 | 26.18644036 | 0.920753334 |
| 2202610102 | 0.780999851 | 0.807123779 | 0.228575316 |
| 2202610115 | 0.09633924 | 0.385171563 | 0.244535499 |
| 2202610116 | 0.336109615 | 0 | 0.000578886 |
| 2202610118 | | | 0 |
| 2202610119 | | | 0.064910101 |
| 2202610201 | 15.538301 | 28.79543383 | 0.7843398 |
| 2202610215 | 0.145554123 | 0.353563304 | 0.202441945 |
| 2202610218 | | | 0 |
| 2202610219 | | | 0.254622685 |
| 2202610301 | 32.94960861 | 59.91409543 | 1.653348246 |
| 2202610315 | 0.308734233 | 0.754488199 | 0.421905476 |
| 2202610318 | | | 0 |
| 2202610319 | | | 0.486399639 |
| 2202610401 | 23.47981956 | 42.61167286 | 1.179253201 |
| 2202610415 | 0.22070871 | 0.530553017 | 0.301242907 |
| 2202610418 | | | 0 |
| 2202610419 | | | 0.360302985 |
| 2202610501 | 37.5421742 | 69.27567329 | 1.830749383 |
| 2202610515 | 0.332558383 | 0.93093111 | 0.46662976 |
| 2202610518 | | | 0 |
| 2202610519 | | | 0.421118155 |
| 2202620101 | 11.30726601 | 31.31061799 | 1.26724051 |
| 2202620102 | 0.511159577 | 0.471381091 | 0.035786354 |
| 2202620115 | 0.150490379 | 0.421682521 | 0.273509534 |
| 2202620116 | 0.212969114 | 0 | 0.00016356 |
| 2202620117 | 0.411078857 | 0.399118325 | 0.547950399 |
| 2202620118 | | | 0 |
| 2202620119 | | | 0.165040507 |
| 2202620190 | 33.05517634 | 47.54391914 | 3.770851289 |
| 2202620191 | 1.19078478 | 2.256031166 | 0.181771028 |
| 2202620201 | 149.438576 | 305.582222 | 8.6366293 |
| 2202620215 | 1.784864677 | 3.05223656 | 1.789411403 |
| 2202620218 | | | 0 |
| 2202620219 | | | 2.243852581 |
| 2202620301 | 119.8696417 | 237.2977724 | 6.872948557 |
| 2202620315 | 1.427296271 | 2.478828194 | 1.411544024 |
| 2202620318 | | | 0 |
| 2202620319 | | | 1.616643011 |
| 2202620401 | 121.2640897 | 241.1634953 | 6.981292929 |

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| 2202620415 | 1.451797357 | 2.466381116 | 1.43200921 |
| 2202620418 | | | 0 |
| 2202620419 | | | 1.70429612 |
| 2202620501 | 118.9942836 | 231.2485859 | 6.596747843 |
| 2202620515 | 1.326664034 | 2.689104684 | 1.367093817 |
| 2202620518 | | | 0 |
| 2202620519 | | | 1.243444701 |
| 2203410101 | 2.351959781 | 0.51123511 | 0.250497548 |
| 2203410102 | 0.042752991 | 0 | 0.000111853 |
| 2203410115 | 0.00122302 | 2.04494E-05 | 0.003306566 |
| 2203410116 | 2.22315E-05 | 0 | 1.47646E-06 |
| 2203410201 | 5.515638314 | 0.169483058 | 0.069864181 |
| 2203410215 | 0.002868133 | 6.77933E-06 | 0.000922208 |
| 2203410301 | 11.00387476 | 0.367435578 | 0.203872016 |
| 2203410315 | 0.005722015 | 1.46974E-05 | 0.00269111 |
| 2203410401 | 9.717434686 | 0.308293646 | 0.148747347 |
| 2203410415 | 0.005053065 | 1.23317E-05 | 0.001963464 |
| 2203410501 | 21.7630998 | 0.87171118 | 0.647079366 |
| 2203410515 | 0.01131682 | 3.48685E-05 | 0.008541462 |
| 2203420101 | 0.568009407 | 0.123434845 | 0.060524142 |
| 2203420102 | 0.14334642 | 0 | 0.000375519 |
| 2203420115 | 0.000295365 | 4.93739E-06 | 0.000798919 |
| 2203420116 | 7.45401E-05 | 0 | 4.95685E-06 |
| 2203420201 | 1.769755047 | 0.054223786 | 0.022734791 |
| 2203420215 | 0.000920272 | 2.16895E-06 | 0.000300099 |
| 2203420301 | 3.656938224 | 0.124020385 | 0.065305569 |
| 2203420315 | 0.001901607 | 4.96081E-06 | 0.000862034 |
| 2203420401 | 3.920189156 | 0.12431597 | 0.061489836 |
| 2203420415 | 0.002038498 | 4.97264E-06 | 0.000811665 |
| 2203420501 | 7.353713386 | 0.312231419 | 0.204283004 |
| 2203420515 | 0.003823928 | 1.24892E-05 | 0.002696536 |
| 2203430101 | 0.070444383 | 0.01489813 | 0.007350275 |
| 2203430102 | 0.022456779 | 0 | 7.61192E-05 |
| 2203430115 | 3.66311E-05 | 5.95925E-07 | 9.70236E-05 |
| 2203430116 | 1.16775E-05 | 0 | 1.00477E-06 |
| 2203430201 | 0.383455865 | 0.009728531 | 0.005740563 |
| 2203430215 | 0.000199397 | 3.89141E-07 | 7.57754E-05 |
| 2203430301 | 0.911962463 | 0.027073052 | 0.018939121 |
| 2203430315 | 0.000474221 | 1.08292E-06 | 0.000249996 |
| 2203430401 | 0.61315712 | 0.016508994 | 0.011029904 |
| 2203430415 | 0.000318841 | 6.6036E-07 | 0.000145595 |
| 2203430501 | 1.439204594 | 0.057429439 | 0.04597507 |
| 2203430515 | 0.000748387 | 2.29718E-06 | 0.000606872 |
| 2203510101 | 0.77040052 | 0.155615932 | 0.072740758 |
| 2203510102 | 0.025938887 | 0 | 6.34308E-05 |
| 2203510115 | 0.000400609 | 6.22464E-06 | 0.000960177 |
| 2203510116 | 1.34882E-05 | 0 | 8.37286E-07 |
| 2203510201 | 1.128201366 | 0.01528051 | 0.014288748 |
| 2203510215 | 0.000586664 | 6.11221E-07 | 0.000188612 |
| 2203510301 | 2.557957329 | 0.047212002 | 0.045878508 |
| 2203510315 | 0.001330137 | 1.88848E-06 | 0.000605596 |
| 2203510401 | 2.170122287 | 0.034444505 | 0.032606042 |
| 2203510415 | 0.001128464 | 1.37778E-06 | 0.0004304 |
| 2203510501 | 3.76394975 | 0.108530876 | 0.103584526 |
| 2203510515 | 0.001957253 | 4.34124E-06 | 0.001367317 |
| 2203520101 | 2.81677157 | 0.572861147 | 0.266173203 |
| 2203520102 | 0.390157927 | 0 | 0.00191711 |
| 2203520115 | 0.001464721 | 2.29145E-05 | 0.003513488 |
| 2203520116 | 0.000202882 | 0 | 2.53059E-05 |
| 2203520201 | 5.455249443 | 0.100262853 | 0.084605594 |
| 2203520215 | 0.002836732 | 4.01051E-06 | 0.001116794 |
| 2203520301 | 13.35683624 | 0.308115126 | 0.272872583 |

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| 2203520315 | 0.006945553 | 1.23246E-05 | 0.003601917 |
| 2203520401 | 10.1951794 | 0.211219988 | 0.181575598 |
| 2203520415 | 0.005301491 | 8.44879E-06 | 0.002396799 |
| 2203520501 | 21.10290233 | 0.688903891 | 0.604169151 |
| 2203520515 | 0.010973508 | 2.75562E-05 | 0.007975031 |
| 2203530101 | 0.181767736 | 0.036871159 | 0.017105039 |
| 2203530102 | 0.004127617 | 0 | 1.45131E-05 |
| 2203530115 | 9.45192E-05 | 1.47485E-06 | 0.000225787 |
| 2203530116 | 2.14636E-06 | 0 | 1.91573E-07 |
| 2203530201 | 0.353260181 | 0.006609971 | 0.005830152 |
| 2203530215 | 0.000183695 | 2.64399E-07 | 7.6958E-05 |
| 2203530301 | 0.88322456 | 0.019160261 | 0.017043634 |
| 2203530315 | 0.000459277 | 7.66411E-07 | 0.000224976 |
| 2203530401 | 0.671206936 | 0.013698475 | 0.012140966 |
| 2203530415 | 0.000349028 | 5.47939E-07 | 0.000160261 |
| 2203530501 | 1.38134817 | 0.040762229 | 0.036116431 |
| 2203530515 | 0.000718301 | 1.63049E-06 | 0.000476738 |
| 2203540101 | 0 | 0 | 0 |
| 2203540102 | 1.05148E-06 | 0 | 4.68261E-09 |
| 2203540115 | 0 | 0 | 0 |
| 2203540116 | 5.4677E-10 | 0 | 6.18104E-11 |
| 2203540201 | 1.76569E-05 | 1.55671E-05 | 2.16783E-06 |
| 2203540215 | 9.18156E-09 | 6.22683E-10 | 2.86154E-08 |
| 2203540301 | 4.09234E-05 | 3.48748E-05 | 6.09125E-06 |
| 2203540315 | 2.12802E-08 | 1.39499E-09 | 8.04045E-08 |
| 2203540401 | 2.6553E-05 | 2.35319E-05 | 3.62522E-06 |
| 2203540415 | 1.38076E-08 | 9.41275E-10 | 4.78529E-08 |
| 2203540501 | 6.71256E-05 | 5.19927E-05 | 1.25701E-05 |
| 2203540515 | 3.49053E-08 | 2.07971E-09 | 1.65925E-07 |
| 2203610101 | 2.189048493 | 0.442168323 | 0.205191098 |
| 2203610102 | 0.11032489 | 0 | 0.00043351 |
| 2203610115 | 0.001138305 | 1.76867E-05 | 0.002708522 |
| 2203610116 | 5.7369E-05 | 0 | 5.72234E-06 |
| 2203610201 | 8.512396914 | 0.125930068 | 0.114692811 |
| 2203610215 | 0.004426449 | 5.03721E-06 | 0.001513946 |
| 2203610301 | 17.03602394 | 0.298740336 | 0.274686106 |
| 2203610315 | 0.008858736 | 1.19496E-05 | 0.00362586 |
| 2203610401 | 12.52468454 | 0.204752016 | 0.187715717 |
| 2203610415 | 0.006512838 | 8.19008E-06 | 0.002477847 |
| 2203610501 | 15.85433787 | 0.407717592 | 0.376478772 |
| 2203610515 | 0.008244254 | 1.63087E-05 | 0.004969523 |
| 2205210112 | | | 0 |
| 2205210113 | | | 0 |
| 2205210312 | | | 0 |
| 2205210313 | | | 0 |
| 2205210412 | | | 0 |
| 2205210413 | | | 0 |
| 2205210512 | | | 0 |
| 2205210513 | | | 0 |
| 2205310112 | | | 0 |
| 2205310113 | | | 0 |
| 2205310312 | | | 0 |
| 2205310313 | | | 0 |
| 2205310412 | | | 0 |
| 2205310413 | | | 0 |
| 2205310512 | | | 0 |
| 2205310513 | | | 0 |
| 2205320112 | | | 0 |
| 2205320113 | | | 0 |
| 2205320312 | | | 0 |
| 2205320313 | | | 0 |
| 2205320412 | | | 0 |

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| 2205320413 | | | 0 |
| 2205320512 | | | 0 |
| 2205320513 | | | 0 |
| 2205320213 | | | 0 |
| 2205310213 | | | 0 |
| 2205210213 | | | 0 |
| 2201610213 | | | 3.82472E-06 |
| 2201540213 | | | 0.010118544 |
| 2201530213 | | | 0.002618446 |
| 2201520213 | | | 0.038115242 |
| 2201510213 | | | 5.5018E-05 |
| 2201430213 | | | 0.000252215 |
| 2201420213 | | | 0.000829363 |
| 2201410213 | | | 0.002544922 |
| 2201320213 | | | 0.222094154 |
| 2201310213 | | | 1.956527173 |
| 2201210213 | | | 2.0184803 |
| 2201110213 | | | 0.036204691 |
| 2205320212 | | | 0 |
| 2205310212 | | | 0 |
| 2205210212 | | | 0 |
| 2201610212 | | | 5.8613E-06 |
| 2201540212 | | | 0.004860752 |
| 2201530212 | | | 0.001946296 |
| 2201520212 | | | 0.021036782 |
| 2201510212 | | | 1.13902E-05 |
| 2201430212 | | | 0.000205579 |
| 2201420212 | | | 0.000360042 |
| 2201410212 | | | 0.001104691 |
| 2201320212 | | | 0.091650319 |
| 2201310212 | | | 0.703514829 |
| 2201210212 | | | 0.908568899 |
| 2201110212 | | | 0.660951483 |
| 2201610211 | | | 1.59333E-06 |
| 2201540211 | | | 0.000482711 |
| 2201530211 | | | 0.00075974 |
| 2201520211 | | | 0.004727851 |
| 2201510211 | | | 3.07281E-06 |
| 2201430211 | | | 1.69286E-05 |
| 2201420211 | | | 0.000193386 |
| 2201410211 | | | 0.000359713 |
| 2201320211 | | | 0.009132173 |
| 2201310211 | | | 0.076857634 |
| 2201210211 | | | 0.079788128 |
| 2201110211 | | | 0.001728366 |
| 2209310501 | 0 | 0 | |
| 2209210501 | 0 | 0 | |
| 2209310401 | 0 | 0 | |
| 2209210401 | 0 | 0 | |
| 2209310301 | 0 | 0 | |
| 2209210301 | 0 | 0 | |
| 2209310201 | 0 | 0 | |
| 2209210201 | 0 | 0 | |
| 2209310102 | 0 | 0 | |
| 2209210102 | 0 | 0 | |
| 2209310101 | 0 | 0 | |
| 2209210101 | 0 | 0 | |
| **Grand Total** | **20129.81668** | **2735.985953** | **1277.692152** |

# Appendix I

## Annual Totals (Tons)

| | |
|---|---|
| Database | c10003y2023_20230412_rfp_out |
| Table | movesoutput |
| outputTimePeriod | Day |

| **Sum of Daily Emission** | **Pollutant** | | |
|---|---|---|---|
| **monthID** | **VOC** | **NOx** | **CO** |
| 1 | 53.6 | 38.3 | 716.3 |
| 2 | 54.3 | 38.1 | 718.9 |
| 3 | 140.6 | 76.4 | 2,073.3 |
| 4 | 137.9 | 75.4 | 2,087.6 |
| 5 | 137.0 | 73.9 | 2,108.9 |
| 6 | 233.5 | 124.2 | 3,405.0 |
| 7 | 241.0 | 122.9 | 3,449.2 |
| 8 | 236.3 | 123.5 | 3,427.1 |
| 9 | 141.7 | 73.3 | 2,130.6 |
| 10 | 142.0 | 75.1 | 2,103.9 |
| 11 | 143.8 | 76.6 | 2,081.8 |
| 12 | 58.2 | 38.0 | 721.4 |
| **Annual Total** | 1,719.7 | 935.9 | 25,023.9 |

## SSWD

| | |
|---|---|
| Database | c10003y2023_20230412_rfp_out |
| Table | movesoutput |
| outputTimePeriod | Day |
| dayID | 5 |

| **Sum of emissionQuant** | | **Pollutant** | | | | | |
|---|---|---|---|---|---|---|---|
| **FuelType** | **monthID** | **VOC** | **NOx** | **CO** | **VOC** | **NOx** | **CO** |
| **Gasoline** | 6 | 6.11 | 1.44 | 99.71 | | | |
| | 7 | 6.15 | 1.36 | 97.93 | | | |
| | 8 | 6.00 | 1.38 | 97.21 | | | |
| **Gasoline Total** | | **18.26** | **4.18** | **294.86** | 6.085437 | 1.392634 | 98.286079 |
| **Diesel** | 6 | 0.11 | 1.45 | 0.52 | | | |
| | 7 | 0.11 | 1.41 | 0.50 | | | |
| | 8 | 0.11 | 1.41 | 0.50 | | | |
| **Diesel Total** | | **0.32** | **4.27** | **1.52** | 0.107513 | 1.422023 | 0.507014 |
| **LPG** | 6 | 0.03 | 0.22 | 1.14 | | | |
| | 7 | 0.03 | 0.22 | 1.10 | | | |
| | 8 | 0.03 | 0.22 | 1.10 | | | |
| **LPG Total** | | **0.08** | **0.66** | **3.35** | 0.026263 | 0.218827 | 1.117033 |
| **CNG** | 6 | 0.01 | 0.02 | 0.11 | | | |
| | 7 | 0.01 | 0.02 | 0.11 | | | |
| | 8 | 0.01 | 0.02 | 0.11 | | | |
| **CNG Total** | | **0.03** | **0.07** | **0.32** | 0.010112 | 0.022118 | 0.106211 |
| | | | | **All Fuels** | 6.23 | 3.06 | 100.02 |

| | |
|---|---|
| Database | c10003y2023_20230412_rfp_out |
| Table | movesoutput |
| outputTimePeriod | Day |

| **Sum of Daily Emission** | **Pollutant** | | |
|---|---|---|---|
| **SCC** | **VOC** | **NOx** | **CO** |
| 2260001010 | 10.9 | 0.1 | 12.3 |
| 2260001030 | 1.1 | 0.1 | 6.5 |
| 2260001060 | 0.3 | 0.1 | 9.9 |
| 2260002006 | 2.3 | 0.1 | 9.5 |
| 2260002009 | 0.1 | 0.0 | 0.4 |
| 2260002021 | 0.1 | 0.0 | 0.4 |
| 2260002027 | 0.0 | 0.0 | 0.0 |
| 2260002039 | 5.8 | 0.1 | 24.7 |
| 2260002054 | 0.0 | 0.0 | 0.1 |
| 2260003030 | 0.3 | 0.0 | 1.3 |
| 2260003040 | 0.0 | 0.0 | 0.1 |
| 2260004015 | 1.1 | 0.0 | 4.3 |
| 2260004016 | 9.3 | 0.4 | 38.7 |
| 2260004020 | 21.4 | 0.7 | 60.3 |
| 2260004021 | 185.7 | 4.2 | 661.6 |
| 2260004025 | 23.0 | 0.9 | 77.3 |
| 2260004026 | 92.8 | 3.6 | 361.5 |
| 2260004030 | 13.9 | 0.6 | 52.8 |
| 2260004031 | 92.8 | 3.4 | 402.9 |
| 2260004071 | 0.0 | 0.0 | 0.1 |
| 2260005035 | 0.0 | 0.0 | 0.2 |
| 2260006005 | 1.7 | 0.1 | 5.9 |
| 2260006010 | 11.6 | 0.4 | 37.9 |
| 2260006035 | 0.1 | 0.0 | 0.3 |
| 2260007005 | 0.0 | 0.0 | 0.0 |
| 2265001010 | 0.5 | 0.1 | 4.6 |
| 2265001030 | 5.3 | 0.6 | 56.4 |
| 2265001050 | 11.9 | 4.4 | 565.0 |
| 2265001060 | 0.3 | 0.1 | 9.4 |
| 2265002003 | 0.1 | 0.0 | 4.7 |
| 2265002006 | 0.0 | 0.0 | 0.0 |
| 2265002009 | 0.3 | 0.1 | 8.4 |
| 2265002015 | 0.2 | 0.1 | 8.6 |
| 2265002021 | 0.4 | 0.2 | 18.2 |
| 2265002024 | 0.2 | 0.1 | 7.8 |
| 2265002027 | 0.0 | 0.0 | 0.4 |
| 2265002030 | 0.3 | 0.1 | 13.8 |
| 2265002033 | 0.1 | 0.1 | 3.8 |
| 2265002039 | 0.7 | 0.3 | 35.2 |
| 2265002042 | 0.4 | 0.1 | 15.9 |
| 2265002045 | 0.0 | 0.0 | 0.4 |
| 2265002054 | 0.0 | 0.0 | 2.1 |
| 2265002057 | 0.0 | 0.0 | 0.2 |
| 2265002060 | 0.0 | 0.0 | 0.3 |
| 2265002066 | 0.2 | 0.1 | 11.9 |
| 2265002072 | 0.1 | 0.1 | 4.5 |
| 2265002078 | 0.1 | 0.0 | 2.6 |
| 2265002081 | 0.0 | 0.0 | 0.3 |
| 2265003010 | 1.6 | 1.7 | 65.5 |
| 2265003020 | 1.7 | 4.9 | 44.1 |
| 2265003030 | 1.5 | 1.0 | 62.2 |
| 2265003040 | 6.3 | 2.1 | 191.2 |
| 2265003050 | 0.1 | 0.1 | 5.4 |
| 2265003060 | 0.1 | 0.0 | 5.5 |

| | | | | |
|---|---|---|---|---|
| 2265003070 | | 0.1 | 0.4 | 3.7 |
| 2265004010 | | 47.1 | 7.0 | 605.0 |
| 2265004011 | | 48.2 | 9.0 | 758.3 |
| 2265004015 | | 4.2 | 0.6 | 51.4 |
| 2265004016 | | 32.6 | 5.3 | 458.7 |
| 2265004025 | | 0.3 | 0.0 | 3.4 |
| 2265004026 | | 1.3 | 0.2 | 21.9 |
| 2265004030 | | 0.4 | 0.1 | 6.4 |
| 2265004031 | | 29.9 | 8.3 | 932.9 |
| 2265004040 | | 6.3 | 1.4 | 191.7 |
| 2265004041 | | 3.4 | 1.1 | 156.2 |
| 2265004046 | | 4.1 | 1.4 | 175.8 |
| 2265004051 | | 3.7 | 0.6 | 52.8 |
| 2265004055 | | 69.6 | 18.5 | 2,570.1 |
| 2265004056 | | 44.5 | 15.5 | 2,123.8 |
| 2265004066 | | 4.7 | 2.5 | 217.9 |
| 2265004071 | | 130.2 | 50.1 | 5,898.2 |
| 2265004075 | | 2.9 | 0.7 | 73.3 |
| 2265004076 | | 6.3 | 1.6 | 167.5 |
| 2265005010 | | 0.0 | 0.0 | 0.5 |
| 2265005015 | | 0.0 | 0.0 | 0.5 |
| 2265005025 | | 0.0 | 0.0 | 0.4 |
| 2265005030 | | 0.0 | 0.0 | 0.4 |
| 2265005035 | | 0.1 | 0.1 | 3.5 |
| 2265005040 | | 0.4 | 0.1 | 12.7 |
| 2265005045 | | 0.0 | 0.1 | 0.6 |
| 2265005055 | | 0.0 | 0.1 | 1.5 |
| 2265005060 | | 0.0 | 0.0 | 0.3 |
| 2265006005 | | 34.9 | 11.4 | 1,387.1 |
| 2265006010 | | 9.0 | 3.0 | 274.6 |
| 2265006015 | | 3.8 | 1.5 | 130.9 |
| 2265006025 | | 8.7 | 3.3 | 361.5 |
| 2265006030 | | 17.1 | 5.1 | 556.9 |
| 2265006035 | | 0.6 | 0.2 | 28.5 |
| 2265007010 | | 0.0 | 0.0 | 0.0 |
| 2265008005 | | 0.0 | 0.0 | 0.0 |
| 2267001060 | | 0.0 | 0.0 | 0.1 |
| 2267002003 | | 0.0 | 0.0 | 0.0 |
| 2267002015 | | 0.0 | 0.0 | 0.0 |
| 2267002021 | | 0.0 | 0.0 | 0.0 |
| 2267002024 | | 0.0 | 0.0 | 0.0 |
| 2267002030 | | 0.0 | 0.0 | 0.1 |
| 2267002033 | | 0.0 | 0.0 | 0.2 |
| 2267002039 | | 0.0 | 0.0 | 0.1 |
| 2267002045 | | 0.0 | 0.0 | 0.1 |
| 2267002054 | | 0.0 | 0.0 | 0.0 |
| 2267002057 | | 0.0 | 0.0 | 0.1 |
| 2267002060 | | 0.0 | 0.0 | 0.1 |
| 2267002066 | | 0.0 | 0.0 | 0.0 |
| 2267002072 | | 0.0 | 0.0 | 0.3 |
| 2267002081 | | 0.0 | 0.0 | 0.1 |
| 2267003010 | | 0.2 | 1.0 | 5.7 |
| 2267003020 | | 7.2 | 61.8 | 316.2 |
| 2267003030 | | 0.0 | 0.4 | 2.1 |
| 2267003040 | | 0.0 | 0.1 | 0.5 |
| 2267003050 | | 0.0 | 0.0 | 0.2 |
| 2267003070 | | 0.0 | 0.3 | 1.4 |
| 2267004066 | | 0.1 | 0.8 | 4.0 |
| 2267005055 | | 0.0 | 0.0 | 0.0 |
| 2267006005 | | 0.5 | 3.0 | 13.3 |
| 2267006010 | | 0.0 | 0.3 | 1.9 |

| | | | | |
|---|---|---|---|---|
| 2267006015 | | 0.0 | 0.2 | 1.4 |
| 2267006025 | | 0.0 | 0.3 | 1.9 |
| 2267006030 | | 0.0 | 0.0 | 0.0 |
| 2268002081 | | 0.0 | 0.0 | 0.0 |
| 2268003020 | | 2.1 | 5.0 | 24.6 |
| 2268003060 | | 0.0 | 0.0 | 0.0 |
| 2268005055 | | 0.0 | 0.0 | 0.0 |
| 2268005060 | | 0.0 | 0.0 | 0.2 |
| 2268006005 | | 0.7 | 1.2 | 5.2 |
| 2268006010 | | 0.0 | 0.0 | 0.0 |
| 2268006015 | | 0.0 | 0.0 | 0.1 |
| 2268006020 | | 0.3 | 0.6 | 3.3 |
| 2270001060 | | 0.0 | 0.2 | 0.2 |
| 2270002003 | | 0.1 | 1.2 | 0.3 |
| 2270002006 | | 0.0 | 0.0 | 0.0 |
| 2270002009 | | 0.0 | 0.1 | 0.1 |
| 2270002015 | | 0.2 | 3.5 | 1.1 |
| 2270002018 | | 0.1 | 1.8 | 0.8 |
| 2270002021 | | 0.0 | 0.2 | 0.1 |
| 2270002024 | | 0.0 | 0.3 | 0.1 |
| 2270002027 | | 0.1 | 1.1 | 0.4 |
| 2270002030 | | 0.1 | 2.8 | 0.8 |
| 2270002033 | | 0.3 | 4.4 | 1.3 |
| 2270002036 | | 0.3 | 6.4 | 1.7 |
| 2270002039 | | 0.0 | 0.2 | 0.1 |
| 2270002042 | | 0.0 | 0.2 | 0.1 |
| 2270002045 | | 0.1 | 2.5 | 0.6 |
| 2270002048 | | 0.1 | 1.2 | 0.4 |
| 2270002051 | | 0.4 | 16.1 | 1.4 |
| 2270002054 | | 0.0 | 0.7 | 0.2 |
| 2270002057 | | 0.2 | 4.8 | 1.8 |
| 2270002060 | | 0.7 | 14.2 | 4.3 |
| 2270002066 | | 3.8 | 20.7 | 17.3 |
| 2270002069 | | 0.4 | 9.9 | 2.6 |
| 2270002072 | | 3.8 | 19.2 | 18.4 |
| 2270002075 | | 0.1 | 2.2 | 0.4 |
| 2270002078 | | 0.0 | 0.1 | 0.1 |
| 2270002081 | | 0.2 | 2.5 | 1.1 |
| 2270003010 | | 0.5 | 3.3 | 2.5 |
| 2270003020 | | 0.3 | 15.6 | 1.5 |
| 2270003030 | | 0.2 | 6.0 | 1.2 |
| 2270003040 | | 0.4 | 7.5 | 1.9 |
| 2270003050 | | 0.1 | 0.6 | 0.4 |
| 2270003060 | | 1.9 | 55.4 | 7.6 |
| 2270003070 | | 0.1 | 3.4 | 0.7 |
| 2270004031 | | 0.0 | 0.0 | 0.0 |
| 2270004046 | | 1.9 | 23.0 | 7.8 |
| 2270004056 | | 0.5 | 5.1 | 2.0 |
| 2270004066 | | 2.0 | 27.2 | 9.4 |
| 2270004071 | | 0.1 | 2.0 | 0.5 |
| 2270004076 | | 0.0 | 0.1 | 0.0 |
| 2270005010 | | 0.0 | 0.0 | 0.0 |
| 2270005015 | | 1.6 | 23.5 | 10.2 |
| 2270005020 | | 0.2 | 2.7 | 1.0 |
| 2270005025 | | 0.0 | 0.0 | 0.0 |
| 2270005030 | | 0.0 | 0.0 | 0.0 |
| 2270005035 | | 0.0 | 0.2 | 0.1 |
| 2270005045 | | 0.0 | 0.2 | 0.1 |
| 2270005055 | | 0.0 | 0.5 | 0.2 |
| 2270005060 | | 0.0 | 0.3 | 0.1 |
| 2270006005 | | 2.2 | 24.4 | 9.0 |

| | | | | |
|---|---|---|---|---|
| 2270006010 | | 0.5 | 5.8 | 2.2 |
| 2270006015 | | 0.4 | 9.4 | 2.4 |
| 2270006025 | | 1.3 | 8.1 | 6.4 |
| 2270006030 | | 0.1 | 0.8 | 0.3 |
| 2270006035 | | 0.0 | 0.4 | 0.1 |
| 2270007015 | | 0.0 | 0.0 | 0.0 |
| 2270008005 | | 0.0 | 0.2 | 0.1 |
| 2270010010 | | 0.0 | 0.4 | 0.1 |
| 2282005010 | | 511.6 | 143.8 | 2,375.0 |
| 2282005015 | | 83.8 | 67.7 | 1,220.9 |
| 2282010005 | | 62.2 | 69.0 | 761.4 |
| 2282020005 | | 3.4 | 55.8 | 12.5 |
| 2282020010 | | 0.0 | 0.2 | 0.1 |
| 2285002015 | | 0.0 | 0.3 | 0.2 |
| 2285004015 | | 0.0 | 0.0 | 0.8 |
| **Grand Total** | | **1,719.7** | **935.9** | **25,023.9** |

# Appendix J

# Delaware
# Reasonably Available Control Technology (RACT) State Implementation Plan (SIP) Under the 2015 8-Hour Ozone National Ambient Air Quality Standard (NAAQS)

# FINAL REPORT

Submitted to:

**U.S. Environmental Protection Agency**

**Region 3 – Philadelphia, PA**

Prepared by:

**Department of Natural Resources & Environmental Control**

**Division of Air Quality**

**Airshed Planning & Inventory Program**

State Street Commons
100 W. Water Street, Suite 6A
Dover, DE 19904

**August 2020**

# Table of Contents

# 1. INTRODUCTION

This document contains Delaware's State Implementation Plan (SIP) revision for meeting the Reasonably Available Control Technology (RACT) requirements of the Clean Air Act (CAA) under the 8-hour ozone National Ambient Air Quality Standard (NAAQS) set forth by US Environmental Protection Agency (EPA) in 2015. The document is hereafter referred to as "Delaware's 2015 8-hour ozone RACT SIP revision," or simply as "the 2015 RACT SIP."

## 1.1. Background and Requirements

Ground-level ozone, one of the principal components of "smog," is a serious air pollutant that harms human health and the environment. High levels of ozone can damage the respiratory system and cause breathing problems, throat irritation, coughing, chest pains, and greater susceptibility to respiratory infection. High levels of ozone also cause serious damage to forests and agricultural crops, resulting in economic losses to logging and farming operations.

In October 2015, the EPA revised the 2008 8-hour ozone NAAQS of 0.075 parts per million (ppm) to 0.070 ppm (80 FR 65291). The 2015 8-hour ozone NAAQS of 0.070 ppm is expected to provide better protections of public health and environment. In a final rule dated June 4, 2018 (83 FR 25776), the EPA designated 51 areas in the country as nonattainment for the 2015 8-hour ozone NAAQS. New Castle County of Delaware was designated nonattainment as a part of the Philadelphia-Wilmington-Atlantic City Marginal Nonattainment Area (NAA) under the 2015 8-hour ozone NAAQS. Since this marginal NAA is centered by the City of Philadelphia, it is often referred to as "the Philadelphia NAA." In the same final rule, Kent and Sussex Counties were designated as attainment (83 FR 25776). The EPA made the designations of these three counties based on their 2014-2016 design values,[1] and the effective date of the designations was August 3, 2018. Figure 1 provides a visual of Delaware's three counties and New Castle County as part of the Philadelphia NAA.

Ozone is generally not directly emitted to the atmosphere. It is formed in the atmosphere by photochemical reactions among volatile organic compounds (VOC), oxides of nitrogen ($NO_X$), and carbon monoxide (CO) in the presence of sunlight. Consequently, in order to reduce ozone concentrations in the ambient air, the CAA requires all ozone nonattainment areas, and areas in the Ozone Transport Region (OTR) established pursuant to Section 184 of the CAA,[2] to implement relevant control measures on VOC and $NO_X$ emission sources to achieve emission reductions.[3]

[1] The air quality design value at a monitoring site is defined as the 3-year average annual fourth-highest daily maximum 8-hour average ozone concentration is also the air quality design value for the site. (40 CFR Part 50, Appendix I, Interpretation of the 8-Hour Primary and Secondary National Ambient Air Quality Standards for Ozone)

[2] Congress established the Ozone Transport Region (OTR) in the federal Clean Air Act in order to address air pollution in downwind states that is caused by activities in upwind states. The OTR is essentially a single, 13-state ozone nonattainment area. The original member states of the OTR are: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, parts of Virginia, and the District of Columbia.

[3] Since CO's role in forming ozone is relatively insignificant, the CAA does not specify requirements on CO emission reductions regarding attainment of ozone standard.

Among effective control measures, the Reasonably Available Control Technology (RACT) controls are a major group for reducing VOC and $NO_X$ emissions from stationary sources.

The EPA has defined the RACT as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility (44 FR 53762). Section 182 of the CAA sets forth two separate RACT requirements for ozone nonattainment areas.

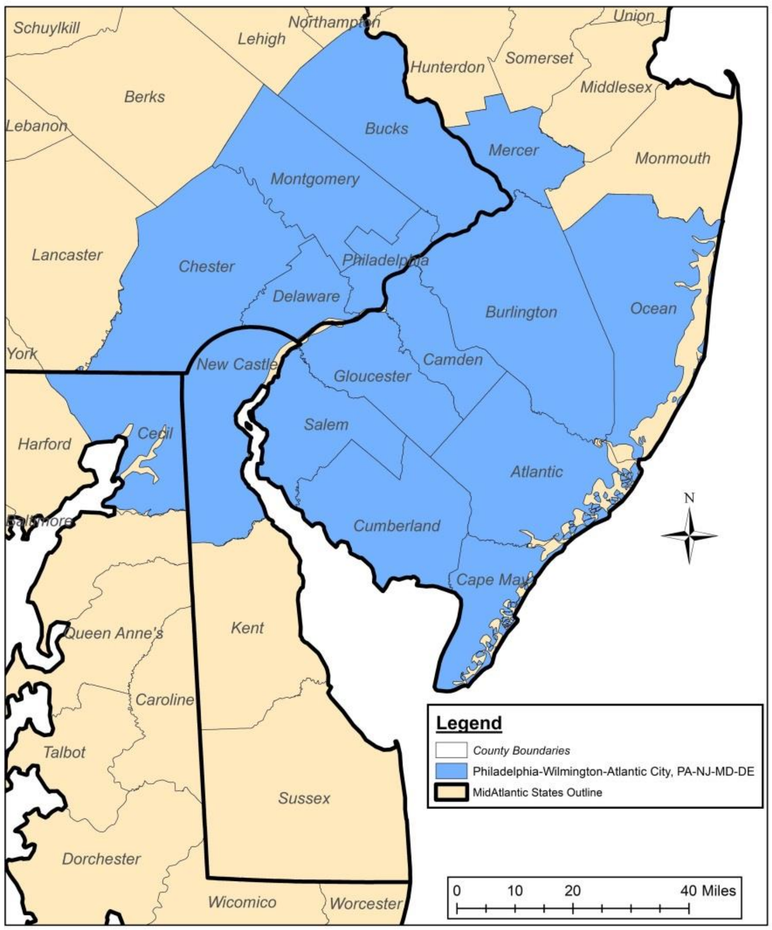


**Figure 1. Map of the Philadelphia Nonattainment Area Under the 2015 8-hour ozone NAAQS.**

The first requirement, contained in section 182(a)(2)(A) of the CAA, and referred to as RACT fix-up, requires the correction of RACT rules for which EPA identified deficiencies before the Act was amended in 1990. Delaware has no deficiencies to correct under this section of the CAA.

The second requirement, set forth in section 182(b)(2) of the CAA, applies to moderate or worse ozone nonattainment areas (NAAs) as well as to all areas within the OTR, including all of Delaware, and requires these areas to implement RACT controls on all major VOC and $NO_X$ emission sources and on all sources and source categories covered by Control Technique Guidelines (CTGs) and Alternate Control Techniques (ACTs) issued by EPA.

Under section 183 of the CAA, EPA is required to develop and issue by certain timeframes relevant guidance documents for RACT controls that help states meet the requirements of Section 182(b)(2). This requirement upon EPA includes developing (1) CTGs for controls of VOC emissions from stationary sources, and (2) ACTs for controls of VOC and $NO_X$ emissions from stationary sources. The controls in both CTG and ACT documents provide a basis for RACT determination.

Historically, the EPA has issued three groups of CTG documents, establishing a "presumptive norm" for RACT controls for various categories of VOC sources: Group I, issued before January 1978 including 15 CTGs; Group II, issued in 1978 including 9 CTGs; and Group III, issued in the early 1980s including 5 CTGs. Sources not covered by the issued CTGs are referred to as non-CTG sources. The EPA has also issued numerous ACTs for various categories of VOCs and $NO_X$ sources. In addition, the EPA updated some CTGs in the 2006-2008 periods. All published CTG and ACT documents, along with other documentation, are listed in Section 5 of this document.

Section 182(b)(2) of the CAA requires states with ozone nonattainment areas classified as moderate or worse to implement RACT controls for all pre-enactment (i.e., pre-1990) CTG source categories, for all sources subject to post-enactment (i.e., post-1990) CTGs, and for all non-CTG major sources in their nonattainment areas. In addition, Section 184(b)(1) of the CAA requires states within the OTR to implement RACT controls with respect to all CTG-ACT sources, whether those sources are in nonattainment or attainment areas.

As a general guidance from EPA, a state should use current EPA CTG/ACT guidance and other information available in making RACT determination.[4] The EPA also points out that while the CTGs and ACTs provide a starting point for the RACT control analysis, RACT level controls can change over time as new technology becomes available or the cost of existing technology adjusts, and states are encouraged to use the latest information available in other forms when making RACT determinations, whether that information is in CTGs, ACTs, or in other guidance or forms that are available, or through information submitted during the public review process.[5]

Under the 1-hour ozone NAAQS of 0.12 ppm,[6] Kent County and New Castle County of Delaware were designated as a part of the Philadelphia severe ozone NAA, and Sussex County was designated as a marginal ozone nonattainment area within the OTR. Therefore, all three counties were subject to the RACT requirements under the 1-hour ozone NAAQS. Consequently, in the 1990s, Delaware implemented numerous RACT controls throughout the state to meet the CAA's RACT requirements. These RACT controls were promulgated in Delaware's Administrative Code under 7 **DE Admin. Code** 1124 for VOC sources and 7 **DE Admin. Code** 1112 for $NO_X$ sources.

[4] EPA's current CTGs and ACTs are located at: https://www.epa.gov/ground-level-ozone-pollution/control-techniques-guidelines-and-alternative-control-techniques.

[5] RACT Qs & As-Reasonably Available Control Technology (RACT): Questions and Answers. William T. Harnett, Director, Air Quality Policy Division, EPA, May 18, 2006.

[6] EPA promulgated the 1-hour ozone NAAQS in 1979 (44 FR 8202).

The EPA revised the 1-hour ozone NAAQS to an 8-hour NAAQS of 0.08 ppm (62 FR 38856) in 1997, and again revised the ozone NAAQS to an 8-hour NAAQS of 0.075 ppm in 2008 (73 FR 16436). Under the 1997 8-hour ozone NAAQS, the entire state of Delaware was designated a part of the Philadelphia moderate NAA. Under the 2008 8-hour ozone NAAQS, New Castle County was designated a part of the Philadelphia marginal NAA, while Sussex County was designated a standalone marginal NAA. Therefore, Delaware continued to be subject to the CAA RACT requirements through the 1997 and 2008 ozone NAAQS due to its inclusion in nonattainment areas and its inclusion in the OTR.

Delaware promulgated and revised its RACT regulations, and again demonstrated that it completely complied with the CAA RACT requirements for all three counties in SIP revisions under each of the 1997 and 2008 8-hour ozone NAAQS.[7] The EPA's approvals were based on thorough reviews of all Delaware's RACT-related regulations. Such approval indicated that Delaware fulfilled the CAA RACT requirements under the 1997 and 2008 8-hour ozone NAAQS.

As aforementioned, the EPA revised the 2008 8-hour ozone NAAQS to a new 0.070 ppm level in 2015 (80 FR 65291). Under the 2015 8-hour ozone NAAQS, only New Castle County is designated as (marginal) nonattainment, while Kent and Sussex Counties are designated as attainment. Since Delaware is located within the OTR, under Section 184(b)(1) of the CAA, all three counties of Delaware are subject to the RACT requirements set forth in the CAA Section 182(b)(2), regardless of which counties are classified as nonattainment.

The EPA requires that Delaware meets the RACT requirements for all three counties through (1) certifying that previously-adopted RACT controls in its SIP revisions approved by EPA under the 1997 and 2008 8-hour ozone NAAQS represent adequate RACT control levels for attainment purposes under the new 2015 8-hour ozone NAAQS, or (2) adopting new or updated more stringent regulations that represent adequate RACT control levels under the new 2015 8-hour ozone NAAQS.

Certification shall be accompanied by appropriate supporting information such as consideration of information received during the public comment period and consideration of new data, that may supplement existing RACT guidance documents that were developed for the 1997 and 2008 8-hour ozone NAAQS, such that the state SIPs accurately reflect RACT for the new 2015 8-hour ozone NAAQS based on the current availability of technically and economically feasible controls. Adoption of new RACT regulations shall occur when states have new stationary sources not covered by existing RACT regulations, or when new data or technical information indicates that a previously adopted RACT measure does not represent a newly-available RACT control level. Delaware has decided to use certification in this SIP revision to demonstrate its fulfillment of the CAA RACT requirements under the 2015 8-hour ozone NAAQS.

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[7] Delaware submitted its RACT SIP revision for the 1997 8-hour ozone NAAQS in 2006, which was approved by the EPA in July 2008 (73 FR 42681). Delaware submitted its RACT SIP revision for the 2008 8-hour ozone NAAQS in 2015, which was approved by the EPA in December 2017 (82 FR 57849).

For purposes of meeting the 2015 8-hour ozone NAAQS RACT requirement, a State's RACT analysis only needs to include an evaluation of RACT for CTG sources and for non-CTG major sources based on the area's 8-hour classification. However, under "anti-backsliding" requirements[8] of the CAA and EPA's ozone implementation rule for the 2008 8-hour ozone NAAQS (80 FR 12264);[9] a State may not remove RACT requirements for sources that were subject to RACT for the 1-hour ozone NAAQS, but would not have been subject to RACT based on the area's 8-hour classification.[5, 10]

Under the 1-hour ozone NAAQS, Delaware's New Castle County and Kent County were designated as severe NAAs and adopted major source thresholds for VOC and NOx of 25 tons per year (tpy), in accordance with Section 182(d) of the CAA. In contrast, according to Section 184(b)(2) of the CAA, the major source threshold is set at 50 tpy for non-CTG stationary VOC sources and 100 tpy for stationary $NO_X$ sources, for states within the OTR.

Therefore, under the "anti-backsliding" requirements, sources between the 1-hour ozone NAAQS thresholds and 184(b)(2) CAA thresholds must remain subject to Delaware RACT. Therefore, 25-50 tpy VOC sources and 25-100 tpy NOx sources remain subject to Delaware RACT rules for New Castle and Kent County in this document.

It should be noted that all of Delaware's RACT regulations apply state-wide. Under the 1-hour ozone NAAQS, major source thresholds for VOC and NOx in Delaware's Sussex County were 50 tpy and 100 tpy, respectively, due to its inclusion in the OTR. Therefore, Sussex County is not affected by "anti-backsliding" requirements.

In summary, through this RACT SIP revision Delaware demonstrates that 1) its ozone-related SIP regulations meet the CAA's RACT requirements for the 50 tpy CTG and non-CTG major VOC sources and for all 100 tpy $NO_X$ sources, and 2) that all CTG covered source categories are addressed at the emission thresholds set in the CTG or in the "Blue Book" (Reference 63) for those CTG categories for which the CTG set no emission threshold.

This demonstration is an analysis and certification that the control measures in Delaware SIP-approved regulations are based on currently available technically and economically feasible controls, and they represent RACT control levels adequate for implementing the 2015 8-hour ozone NAAQS.

### 1.2. Responsibilities

The agency with direct responsibility for developing and submitting this SIP document is Delaware Department of Natural Resources and Environmental Control (DNREC), Division of

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[8] Anti-backsliding measures ensure that certain emission controls remain in place and air quality in the nonattainment areas does not get worse after a prior ozone NAAQS is revoked.
[9] The EPA has not revoked the 2008 ozone NAAQS, and therefore there are no new "anti-backsliding" provisions which are specific to EPA's implementation of the 2015 8-hour ozone NAAQS.
[10] The anti-backsliding provisions may be found at 40 CFR 51.905 and 51.1105 and apply to all former 1-hour nonattainment areas.

Air Quality (DAQ), under the Division Director, David F. Fees, P.E.. The working responsibility for Delaware's air quality SIP planning falls within DAQ's Planning Section, with Acting Section Manager Valerie Gray. Renae Held, Airshed Planning and Inventory Program Manager is supervising this SIP revision development. Mark A. Prettyman, Environmental Scientist in the Airshed Planning and Inventory Program, is the project leader and principal author of this document.

# 2. DETERMINATION OF COMPLIANCE OF VOC RACT REQUIREMENTS

## 2.1. Certification of VOC RACT Requirements

Delaware's VOC RACT controls are contained in 7 **DE Admin. Code** 1124, "Control of Volatile Organic Compound Emissions" (hereafter in this document referred to as Regulation 1124). Various sections in Regulation 1124, covering corresponding VOC sources, were originally developed and implemented into Delaware SIP under the 1-hour ozone NAAQS or the 1997 8-hour ozone NAAQS, and have been periodically updated based on advancements in technology. All major sources in Delaware and all CTG/ACT covered sources with applicability cut-off levels consistent with the "Blue Book" (Reference 63) are covered by adequate RACT controls in the corresponding Regulation 1124 sections.

Identification and certification/adoption of Regulation 1124 VOC RACT controls for meeting the 2015 8-hour ozone NAAQS is provided in Table 1. Explanations for the columns of Table 1 are as follows:

Column 1: Identifies each section of Regulation 1124 that contains a Delaware VOC RACT rule. The effective date of each section is also provided in this column. In general, Regulation 1124 sections requires major VOC emitting sources to comply with the relevant deadlines specified in the CAA and EPA's implementation rules for the NAAQS.

Column 2: Identifies the underlying basis for each RACT control rule and its implementation.

Column 3: Identifies the date the RACT rule was approved into the Delaware SIP, along with the Federal Register citation.

Column 4: Explains briefly the RACT control applicability and requirements.

Column 5: Certifies that the rule represents the current RACT requirement under the 2015 8-hour ozone NAAQS.

Notes for Column 5:

(1) Each section of Regulation 1124 was approved by the EPA as adequate under the 2008 8-hour ozone NAAQS.

(2) When certifying that a current SIP-approved rule represents the RACT level under the ozone NAAQS, DAQ affirms that it is not aware of any significant change in the RACT control technology after the previous RACT SIP determination that would affect this RACT SIP compliance determination. In other words, the current SIP-approved rule still sets up the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

(3) Any discussion on cost effectiveness is relative only to this RACT SIP, and is not relevant as to whether or not control of a particular source or source category is cost effective relative to Delaware's entire SIP.

It should be pointed out that Delaware's minor source permitting program under 7 **DE Admin. Code** 1102, "Permits" (hereafter in this RACT SIP referred to as Regulation 1102), requires a detailed administrative and technical review of Delaware sources that emit air contaminants at levels far below the major source threshold and CTG cut-offs. For example, permits are required for the emission of 10 pounds per day or more of "aggregate" air contaminants, and registrations for emissions between 0.2 and 10 lb/day of air contaminants. This permitting program gives additional confidence that all major and CTG covered sources are controlled by RACT or better controls.

**Table 1. Delaware VOC RACT Control List and Determination of Compliance under the 2015 8-hour Ozone NAAQS**

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| Section 8.0 Handling, Storage, and Disposal of Volatile Organic Compounds (VOCs)<br><br>03/11/2011 | CTG for Industrial Cleaning Solvents. EPA 453/R-06-001, September 2006. | Final Rule<br>Federal Register Date: 04/13/2012<br>77 FR 22224 | This section applies to any facility subject to any of Sections 10.0 through 50.0 of Regulation 1124, with a few exceptions as specified in 8.3.1 of this section, when the facility deals with activities involving handling, storage and disposal of VOCs and VOC-containing solvents.<br><br>The section establishes for the regulated facilities (1) work practice standards, (2) control requirements, (3) testing methods and procedures, and (4) recordkeeping requirements, to reinforce effective control of VOC emissions from using VOCs or VOC-containing solvents in the regulated facilities. | Yes.<br><br>Section 8.0 was not included in Delaware's RACT SIP under the 1997 ozone NAAQS. It was updated in 2011 to fully implement relevant RACT requirements regarding handling, storage and disposal of VOCs and VOC-containing solvents as specified in the 2006 CTG.<br><br>The requirements set up the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 10.0 Aerospace Coatings<br><br>08/11/2002 | CTG for Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations. EPA-453/R-97-004, December 1997. | Final Rule<br>Federal Register Date: 03/24/2004<br>69 FR 13737 | This section applies to any aerospace manufacturing and rework facility<br><br>In brief, this section establishes vapor pressure limits, VOC content limits, emission limits and/or work practice standards for: (a) hand-wipe, spray gun, or flush cleaning operations, (b) primer, topcoat, self-priming topcoat, and specialty coating operations, (c) chemical milling maskant application, (d) | Yes.<br><br>This section was updated in 2002 to fully implement the RACT-level controls specified in the 1997 CTG.<br><br>It was approved by the EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section. |

| **Column 1: Regulation 1124 Section** | **Column 2: Basis for RACT Control** | **Column 3: As SIP Revision Approved by EPA** | **Column 4: RACT Rule Applicability and Requirements** | **Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS?** |
|---|---|---|---|---|
| | | | depainting of aerospace vehicles, and (e) handling and storing of VOC. | The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 11.0 Mobile Equipment Repair and Refinishing<br><br>10/11/2010 | OTC Alternate Model Rule "Motor Vehicle Mobile Equipment Repair and Refinishing (MVMERR)", adopted in September 2009 and based on<br>(1) CTG for Miscellaneous Metal and Plastic Parts Coatings (MMPPC)," EPA-453/R-08-003, September 2008.<br>(2) National Emission Standards for Hazardous Air Pollutants (NESHAP): Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources; Final Rule January 9, 2008 (73 FR 1738).<br><br>Alternative Control Techniques (ACT) for Reduction of Volatile | Revision with effective date of 10/11/2010 expected to be submitted to EPA in March 2020. | This section applies to any person who applies coatings to mobile equipment for beautification or protection in the State of Delaware.<br><br>It establishes: (a) Requirements for using improved transfer efficiency coating and application equipment; (b) requirements for enclosed spray gun cleaning techniques; and (c) minimum training standards in the proper use of equipment and materials. | Yes.<br><br>The previous version of this section was revised in 2001 based on an OTC model rule to implement controls to mitigate Delaware's attainment shortfall under the 1-hour ozone NAAQS. The control levels were more stringent than the then-ACT requirements. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2010, this section was updated to adopt more stringent limits set forth in EPA's 2008 NESHAP rule and CTG. It also adopted some VOC limits from the California Air Resources Board (CARB) Suggested Control Measure (SCM) for Automotive Coatings, published October 2005, which are more stringent.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | Organic Compound Emissions from Automobile Refinishing, EPA-450/3-88-009, October 1988. | | | current technological and economic feasibility |
| Section 12.0 Surface Coating of Plastic Parts<br><br>10/11/2011 | CTG for Miscellaneous Metal and Plastic Parts Coatings (MMPPC). EPA-453/R-08-003, September 2008<br><br>ACT for Surface Coating of Automotive/Transportation and Business Machine Plastic Parts EPA-453/R-94-017, February 1994. | Final Rule<br>Federal Register Date: 09/25/2012<br>77 FR 58953 | This section applies to any plastic part or product coating unit.<br><br>It establishes VOC content limits of various coatings, sets up requirements for control devices, testing methods and compliance certification. | Yes.<br><br>This section was revised in 2001 to fully implement the 1994 ACT control requirements. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2010, it was updated to expand the applicability scope and to adopt more stringent requirements set forth in EPA's 2008 CTG.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 13.0 Automobile and Light-Duty Truck Coating Operations<br><br>03/11/2011 | CTG for Automobile and Light-Duty Truck Assembly Coatings. EPA 453/R-08-006, September 2008. | Final Rule<br>Federal Register Date: 04/13/2012<br>77 FR 22224 | This section applies to coating operations at automobile or light-duty truck assembly plants.<br><br>It establishes VOC content limits in adhesives, sealing materials, primer, coating materials used in | Yes.<br><br>This section was developed in 1993 to fully implement the 1977 CTG requirements in Delaware. It was approved by EPA as adequate under the 1997 ozone NAAQS. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Primer-Surfacer and Topcoat Operations. EPA 453/R-08-002, September 2008.<br><br>CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks. EPA-450/2-77-008, May 1977. (Group I) | | automobile and light-duty truck coating operations, and requirements for control device, test methods, and recordkeeping for such operations. | In 2011, it was updated to implement the new VOC limits and operational requirements specified in the 2008 CTG.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility<br><br>There are currently no automobile assembly plants in Delaware, at the time of this SIP submission. |
| Section 14.0 Can Coating<br><br>Section 15.0 Coil Coating<br><br>Section 17.0 Fabric Coating<br><br>Section 18.0 Vinyl Coating | CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks. | Final Rule<br>Federal Register Date: 05/03/1995<br>60 FR 21707 | These sections apply to coating operations at any can, coil, paper, fabric, or vinyl coating unit.<br><br>They establish various coating VOC content limits, depending on the particular coating and the substrate being coated, and operational requirements for relevant coating operations. | Yes.<br><br>These sections were developed in 1993 for fully implementing the 1977 CTG specified controls the targeted sources or source categories in Delaware.<br><br>They were approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| 01/11/1993<br>for all above sections. | EPA-450/2-77-008, May 1977. (Group I) | | | in RACT control technology for these sections.<br><br>The requirements are the lowest emission limitations that the covered sources are capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 16.0<br>Paper, Film, and Foil Coating<br><br>03/11/2011 | CTG for Paper, Film, and Foil Coatings. EPA 453/R-07-003, September 2007.<br><br>CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks. EPA-450/2-77-008, May 1977. (Group I) | Final Rule<br>Federal Register Date: 04/13/2012<br>77 FR 22224 | This section applies to paper, film, and foil surface coating operations.<br><br>It establishes VOC limits in coating materials used in paper, film, and foil surface coating operations, and requirements for control device, test methods, and recordkeeping for such operations. | Yes.<br><br>This section was developed in 1993 to fully implement the 1977 CTG specified VOC limits for paper coating materials in Delaware. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2011, it was updated (1) to add film and foil coating operations, and (2) to implement the new VOC limits specified in the 2007 CTG.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility |
| Section 19.0<br>Coating of Metal Furniture | CTG for Metal Furniture Coatings. | Final Rule<br>Federal Register Date: 09/25/2012 | This section applies to the coating operation of metal furniture. | Yes. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| 10/11/2011 | EPA 453/R-07-005, September 2007.<br><br>CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume III: Surface Coating of Metal Furniture. EPA-450/2-77-032, December 1977. (Group I) | 77 FR 58953 | It establishes VOC content limits in coating materials and other requirements such as control device, testing methods and recordkeeping, etc., for metal furniture coating operations. | This section was developed in 1993 to fully implement the 1977 CTG specified requirements for metal furniture coating operation in Delaware. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2011, it was updated to implement the new requirements specified in the 2007 CTG.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility |
| Section 20.0 Coating of Large Appliances<br><br>10/11/2011 | CTG for Large Appliance Coatings. EPA 453-07-004, September 2007.<br><br>CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume V: Surface Coating of Large Appliances. EPA-450/2-77-034, December 1977. (Group I) | Final Rule<br>Federal Register Date: 09/25/2012<br>77 FR 58953 | This section applies to the coating operation of large appliances.<br><br>It establishes VOC content limits in coating materials and other requirements such as control device, testing methods and recordkeeping, etc., for large appliance coating operations. | Yes.<br><br>This section was developed in 1993 to fully implement the 1977 CTG specified requirements for large appliance coating operation in Delaware. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2011, it was updated to implement the new requirements specified in the 2007 CTG.<br><br>The requirements are the lowest emission limitations that the covered |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | | | | source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 21.0 Coating of Magnet Wire<br><br>11/29/1994 | CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume IV: Surface Coating of Insulation of Magnet Wire, EPA-450/2-77-033, December 1977. (Group I) | Final Rule<br>Federal Register Date:<br>01/26/1996<br>61 FR 2419 | This section applies to the coating operation of magnet wire.<br><br>It requires use of compliant coatings with a VOC content of less than 1.7 lb/gal, and sets up requirements on control device, test methods, and recordkeeping for coating operation of magnet wire. | Yes.<br><br>This section was developed in 1994 to fully implement the 1977 CTG specified requirements in Delaware.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 22.0 Coating of Miscellaneous Metal Parts<br><br>10/11/2011 | CTG for Miscellaneous Metal and Plastic Parts Coatings (MMPPC). EPA-453/R-08-003, September 2008<br><br>CTG for Control of Volatile Organic | Final Rule<br>Federal Register Date:<br>09/25/2012<br>77 FR 58953 | This section applies to any miscellaneous metal parts coating unit.<br><br>It establishes VOC content limits in coating materials and other requirements such as control device, testing methods, compliance certification and recordkeeping, etc., | Yes.<br><br>This section was developed in 1993 to fully implement the 1978 CTG specified requirements for miscellaneous metal part coating operations in Delaware. It was approved by EPA as adequate under the 1997 ozone NAAQS. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | Emissions from Existing Stationary Sources, Volume VI: Surface Coating of Miscellaneous Metal Parts and Products. EPA-450/2-78-015, June 1978. (Group II) | | for miscellaneous metal part coating operations. | In 2011, it was updated to implement the new requirements specified in the 2008 CTG.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility |
| Section 23.0 Coating of Flat Wood Paneling<br><br>03/11/11 | CTG for Flat Wood Paneling Coatings. EPA 453/R-06-004, September 2006.<br><br>CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VII: Factory Surface Coating of Flat Wood Paneling. EPA-450/2-78-032, June 1978. (Group II) | Final Rule<br>Federal Register Date: 04/13/2012<br>77 FR 22224 | The section applies to coating operations of flat wood paneling.<br><br>It establishes VOC content limits in coatings, inks or adhesives used in coating operations for flat wood paneling, and sets up requirements of control device, test methods, and recordkeeping for such operations. | Yes.<br><br>This section was developed in 1993 to fully implements the 1978 CTG specified requirements for coating operation of flat wood paneling in Delaware, and approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2011, it was updated to implement the new requirements specified in the 2006 CTG.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 24.0 | | Final Rule | | Yes. |

| Column 1:<br>Regulation 1124<br>Section | Column 2:<br>Basis for RACT<br>Control | Column 3:<br>As SIP Revision<br>Approved by EPA | Column 4:<br>RACT Rule Applicability and<br>Requirements | Column 5:<br>Requirements at least as stringent as<br>RACT level for<br>the 2015 8-hour ozone NAAQS? |
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| Bulk Gasoline Plants<br><br>01/11/1993 | CTG for Control of Volatile Organic Emissions from Bulk Gasoline Plants. EPA-450/2-77-035, December 1977. (Group I) | Federal Register Date: 05/03/1995<br>60 FR 21707 | This section applies to all unloading, loading, and storage operations at bulk gasoline plants and to any gasoline tank truck delivering or receiving gasoline at a bulk gasoline plant.<br><br>It established requirements for the use of vapor balance, and set up various equipment and work practice standards for regulated operations. | This section was developed in 1993 to fully implement the 1977 CTG specified requirements in Delaware.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 25.0<br>Bulk Gasoline Terminals<br><br>11/29/1994 | CTG for Control of Volatile Organic Emissions from Bulk Gasoline Plants, EPA-450/2-77-035, December, 1977. (Group I) | Final Rule<br>Federal Register Date: 01/26/1996<br>61 FR 2419 | This section applies to the total of all the loading racks at any bulk gasoline terminal that deliver liquid product into gasoline tank trucks.<br><br>It sets up requirements for control using a vapor collection and control system designed to collect and destroy the organic compound liquids or vapors displaced from gasoline tank trucks during product loading, and various other equipment and operational requirements. | Yes.<br><br>This section was developed in 1994 to fully implement the 1977 CTG specified requirements in Delaware.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | | | | application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 26.0 Gasoline Dispensing Facility Stage I Vapor Recovery<br><br>01/11/2002 | CTG for Design Criteria for Stage I Vapor Control Systems - Gasoline Service Stations, EPA-450/R-75-102, November 1975. (Group I) | Final Rule Federal Register Date: 11/14/2003 68 FR 64540 | It applies to stationary gasoline storage tanks at gasoline dispensing facilities (GDFs).<br><br>It sets up requirements that include (1) loading gasoline with submerged fill method, and (2) installing vapor recovery system that returns the displaced vapors to the delivery vessels and then to the bulk plant or terminal. | Yes.<br><br>This section was updated in 2002 to provide for better control of emissions from GDFs than the 1975 CTG specified level.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>This section is expected to be amended by June 2020 alongside amendments to Section 36.0 to account for ORVR incompatibility with Stage II vapor recovery. Together, the proposed amendments will require (1) any new gasoline dispensing facility (GDF) to install a Stage I Enhanced Vapor Recovery (EVR) system, instead of a Stage II vapor recovery system, at construction, and (2) any existing GDF to decommission its Stage II vapor recovery system by December 31, 2021 and to install a Stage I EVR system by December 31, 2025. |

| Column 1:<br>Regulation 1124<br>Section | Column 2:<br>Basis for RACT<br>Control | Column 3:<br>As SIP Revision<br>Approved by EPA | Column 4:<br>RACT Rule Applicability and<br>Requirements | Column 5:<br>Requirements at least as stringent as<br>RACT level for<br>the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | | | | The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 27.0<br>Gasoline Tank Trucks<br><br>01/11/1993 | CTG for Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals. EPA-450/2-77-026, December 1977. (Group I)<br><br>CTG for Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems. EPA-450/2-78-051, December 1978. (Group II) | Final Rule<br>Federal Register Date:<br>05/03/1995<br>60 FR 21707 | This section applies to gasoline tank trucks equipped for gasoline vapor collection.<br><br>It requires that the covered gasoline tank trucks must be vapor-tight. It also sets up requirements of test methods and recordkeeping for the regulated tank trucks. | Yes.<br><br>This section was developed in 1993 to fully implement the 1977/1978 CTG specified control in Delaware.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 28.0<br>Petroleum Refinery Sources<br><br>01/11/1993 | CTG for Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds. | Final Rule<br>Federal Register Date:<br>05/03/1995<br>60 FR 21707 | This section applies to vacuum-producing systems, wastewater separators and process unit turnaround at petroleum refineries.<br><br>Its requirements include (1) no uncompressed VOC emission from | Yes.<br><br>This section was developed in 1993 to fully implement the 1977 CTG specified requirements in Delaware. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | EPA-450/2-77-025, October 1977. (Group I) | | vacuum-producing systems, (2) covers, lids or seals for wastewater separators, and (3) depressurization of process unit or vessel to reduce its internal pressure to 136 kPa or less and then venting to vapor recovery system, flare or firebox. | It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 29.0<br>Leaks from Petroleum Refinery Equipment<br><br>11/29/1994 | CTG for Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment. EPA-450/2-78-036, June 1978. (Group II) | Final Rule<br>Federal Register Date:<br>01/26/1996<br>61 FR 2419 | This section applies to equipment in VOC service in any process unit at petroleum refineries.<br><br>The rule establishes standards for proper valve operations under various scenarios to prevent VOC leak emissions. | Yes.<br><br>This section was developed in 1994 to fully implement the 1978 CTG specified requirements in Delaware.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| | | | | |

| Column 1:<br>Regulation 1124<br>Section | Column 2:<br>Basis for RACT<br>Control | Column 3:<br>As SIP Revision<br>Approved by EPA | Column 4:<br>RACT Rule Applicability and<br>Requirements | Column 5:<br>Requirements at least as stringent as<br>RACT level for<br>the 2015 8-hour ozone NAAQS? |
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| Section 30.0<br>Petroleum Liquid Storage in External Floating Roof Tanks<br><br>11/29/1994 | CTG for Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks. EPA-450-2/78-047, December 1978. (Group II). | Final Rule<br>Federal Register Date: 01/26/1996<br>61 FR 2419 | This section applies to petroleum liquid storage tanks with external floating roofs and with capacity of 150,000 L or greater.<br><br>It establishes sealing standards for a covered storage tank, including its openings, its connection structure between roof and tank wall, all seal closure devices, bleeder vents, rim vents, and emergency roof drains. | Yes.<br><br>This section was developed in 1994 for fully implementing the 1978 CTG specified controls.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 31.0<br>Petroleum Liquid Storage in Fixed Roof Tanks<br><br>11/29/1994 | CTG for Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed Roof Tanks. EPA-450/2-77-036, December 1977. (Group I) | Final Rule<br>Federal Register Date: 01/26/1996<br>61 FR 2419 | This section applies to petroleum liquid storage tanks with fixed roofs and with capacity of 150,000 L or greater.<br><br>It establishes sealing standards for a covered storage tank, including its openings, its connection structure between roof edge and tank wall, bleeder vents, and rim vents. | Yes.<br><br>This section was developed in 1994 for fully implementing the 1977 CTG specified controls.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered |

| **Column 1: Regulation 1124 Section** | **Column 2: Basis for RACT Control** | **Column 3: As SIP Revision Approved by EPA** | **Column 4: RACT Rule Applicability and Requirements** | **Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS?** |
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| | | | | source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 32.0<br>Leaks from Natural Gas/Gasoline Processing Equipment<br><br>11/29/1994 | CTG for Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants. EPA-450/2-83-007, December 1983. (Group III) | Final Federal Register Date: 01/26/1996<br>61 FR 2419 | This section applies to equipment in VOC service in any process unit at onshore natural gas/gasoline processing facilities.<br><br>It establishes standards for proper valve operations under various scenarios to prevent VOC leak emissions from the covered equipment. | Yes.<br><br>This section was developed in 1994 to fully implement the 1983 CTG specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 33.0<br>Solvent Cleaning and Drying<br><br>11/11/2001 | CTG for Industrial Cleaning Solvents: Final" EPA 453/R-06-001 September 2006<br><br>CTG for Control of Volatile Organic Emissions from | Final Rule<br>Federal Register Date: 11/22/2002<br>67 FR 70315 | This section applies to any solvent cleaning machine that contains more than 1 liter of solvent in which VOC is more than 5% by weight.<br><br>This rule establishes standards for (1) batch cold cleaning machines, (2) batch vapor cleaning machines, (3) in-line cleaning machines, (4) | Yes.<br><br>This section was updated in 2001 based on an OTC model to implement more stringent standards than the 1977 CTG and 1989ACT control levels. It was approved by EPA as adequate under the 1997 8-hour ozone NAAQS. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | Solvent Metal Cleaning. EPA-450/2-77-022, November 1977. (Group I)<br><br>ACT for Halogenated Solvent Cleaners. EPA-450/3-89-030, August 1989. | | and cleaning machines without a solvent-air interface. It also specifies an alternative standard for (2) and (3) above. | DAQ is currently amending Section 33.0 based upon a 2012 "Phase II" model rule for solvent cleaning, by the OTC. DAQ expects the amendments to be effective no later than 12/11/2020, with a compliance date of one year after the effective date of the regulation. |
| Section 34.0 Cutback and Emulsified Asphalt<br><br>01/11/1993 | CTG for Control of Volatile Organic Compounds from Use of Cutback Asphalt. EPA-450/2-77-037, December 1977. (Group I) | Final Federal Register Date: 05/03/1995 60 FR 21707 | This section applies to manufacture, mixing, storage, use, and application of cutback and emulsified asphalts in Delaware.<br><br>It prohibits all above activities for cutback asphalt during the ozone season without approval. It also prohibits all above activities during the ozone season for emulsified asphalt that contain any VOC. | Yes.<br><br>This section was developed in 1993 to fully implement the 1977 CTG specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 35.0 Manufacture of Synthesized | CTG for Control of Volatile Organic Emissions from | Final Federal Register Date: 01/26/1996 61 FR 2419 | This section applies to 10 VOC sources at synthesized pharmaceutical manufacturing | Yes. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| Pharmaceutical Products<br><br>11/29/1994 | Manufacture of Synthesized Pharmaceutical Products, EPA-450/2-78-029, December 1978. (Group II) | | facilities, including reactors, distillation operations, crystallizers, centrifuges, vacuum dryers, air dryers, production equipment exhaust systems, rotary vacuum filters and other filters, in-process tanks, and leaks.<br><br>It establishes standards for controlling and reducing VOC emissions from all covered sources. | This section was developed in 1994 to fully implement the 1978 CTG specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 36.0 Control of VOC Emissions- Stage II Vapor Recovery<br><br>01/11/2002<br><br>(04/2015) | Non-CTG RACT, CAA Section 182(b)(3). | Final Rule Federal Register Date: 11/14/2003 68 FR 64540 | This section applies to any gasoline dispensing facility (GDF) with a monthly throughput greater than 10,000 gallons.<br><br>It requires that all covered GDFs install approved Stage II vapor recovery system. It was updated in 2002 to (1) increase inspection frequency, and (2) provide for compliance tester certification. | Yes.<br><br>This section was updated in 2002 to fully implement the CAA required VOC emission control on GDFs in Delaware. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>Since 1998, the federally-enforced control (Onboard Refueling Vapor Recovery, i.e., ORVR) has been phased in that affects VOC emissions from this source. However, DAQ has determined that the Stage II requirements in Section 36.0 achieve significant emission reductions and |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | | | | remain the lowest emission limitations that the covered GDFs are capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility.<br><br>This section is expected to be amended by June 2020 alongside amendments to Section 26.0 to account for ORVR incompatibility with Stage II vapor recovery. Together, the proposed amendments will require (1) any new gasoline dispensing facility (GDF) to install a Stage I Enhanced Vapor Recovery (EVR) system, instead of a Stage II vapor recovery system, at construction, and (2) any existing GDF to decommission its Stage II vapor recovery system by December 31, 2021 and to install a Stage I EVR system by December 31, 2025. |
| Section 37.0<br>Graphic Arts Systems<br><br>03/11/2011 | CTG for Flexible Package Printing. EPA 453/R-06-003, September 2006.<br><br>CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VIII: Graphic Arts-Rotogravure and Flexography, EPA- | Final Rule<br>Federal Register Date: 04/13/2012<br>77 FR 22224 | This section allies to any packaging rotogravure, publication rotogravure, or flexographic printing process at a facility with potential uncontrolled VOC emission greater than 7.7 tons per year.<br><br>It establishes the limits of VOC contents in coatings and inks used in the covered facilities, specifies standards for control devices for various printing processes, and set | Yes.<br><br>This section was developed in 1994 to fully implement the 1978 CTG specified requirements for printing operations in graphic arts facilities. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2011, it was revised to implement the updated requirements specified in the 2006 CTG. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | 450/2-78-033, December 1978. (Group II) | | up requirements for testing and recordkeeping. | The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 38.0 Petroleum Solvent Dry Cleaners<br><br>01/11/1993 | CTG for Control of Volatile Organic Compound Emissions from Large Petroleum Dry Cleaners. EPA-450/3-82-009, September 1982. (Group III) | Final Federal Register Date: 05/03/1995<br>60 FR 21707 | This section applies to petroleum dry cleaning facilities that consume 123,000 L or more petroleum solvent per year.<br><br>It establishes emission limits or reduction requirements for fugitive emissions, leak repairs, dryers, and filtration systems at covered facilities. | Yes.<br><br>This section was developed in 1993 to fully implement the 1982 CTG specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility |
| Section 39.0 Reserved | | | | |
| Section 40.0 Leaks from Synthetic Organic Chemical, | CTG for Control of Volatile Organic Compound Emissions | Final Rule<br>Federal Register Date: 05/03/1995 | This section applies to all equipment in VOC service in any process unit at a synthetic organic | Yes. |

| Column 1:<br>Regulation 1124<br>Section | Column 2:<br>Basis for RACT<br>Control | Column 3:<br>As SIP Revision<br>Approved by EPA | Column 4:<br>RACT Rule Applicability and<br>Requirements | Column 5:<br>Requirements at least as stringent as<br>RACT level for<br>the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| Polymer, and Resin Manufacturing Equipment<br><br>01/11/1993 | from Reactor Processes and Distillation Operations in SOCMI. EPA-450/4-91-031, August 1993.<br><br>CTG for Control of Volatile Organic Compound Fugitive Emissions from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment. EPA-450/3-83-006, March 1984 (Group III). | 60 FR 21707 | chemical, polymer, and resin production facility with an annual design production capacity equal to or greater than 1,000 mega grams of product.<br><br>It establishes standards for proper valve operation, leak detection, repair, and reporting for synthetic organic chemical, polymer, and resin manufacturing equipment. | This section was developed in 1993 to fully implement the 1984/1993 CTG specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 41.0 Manufacture of High-Density Polyethylene, Polypropylene and Polystyrene Resins<br><br>01/11/1993 | CTG for Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins; EPA-450/3-83-008, November 1983. (Group III) | Final Rule<br>Federal Register Date: 05/03/1995<br>60 FR 21707 | This section applies to specific process sections (material recovery section, and production finishing section) at facilities engaged in manufacturing high-density polyethylene, polypropylene, and polystyrene.<br><br>It establishes requirements for VOC emission limits, reductions and combustions for the covered process sections. | Yes.<br><br>This section was developed in 1993 to fully implement the 1983 CTG specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | | | | is reasonably available considering current technological and economic feasibility. |
| Section 42.0<br>Air Oxidation Processes in the Synthetic Organic Chemical Manufacturing Industry<br><br>01/11/1993 | CTG for Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry. EPA-450/3-84-015, December 1984. (Group III) | Final Rule<br>Federal Register Date: 05/03/1995<br>60 FR 21707 | This section applies to 3 special air oxidation processes in synthetic organic chemical manufacturing industry.<br><br>The rule establishes requirements for VOC emission reduction and emission combustion for the covered processes. | Yes.<br><br>This section was developed in 1993 to fully implement the 1984 CTG specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility |
| Section 43.0<br>Bulk Gasoline Marine Tank Vessel Loading Facilities<br><br>08/08/1994 | Non-CTG RACT control, based on CAA Section 183(f). | Final Rule<br>Federal Register Date: 07/28/1995<br>60 FR 38710 | This section applies to all loading berths at a bulk marine tank loading facility that (1) delivers gasoline into marine tank vessels, and (2) has an annual throughput equal to or greater than 15,000 gallons.<br><br>It requires installation of a vapor collection system that is designed to collect all VOC vapors displaced from marine tank vessels during | Yes.<br><br>This section was developed in 1994 to implement the CAA Section 183(f) requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no new CTG or significant change in RACT control technology for this section. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | | | loading, ballasting, or housekeeping. | The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility |
| Section 44.0<br>Batch Processing Operations<br><br>11/29/1994 | ACT for Control of Volatile Organic Compound Emissions from Batch Processes. EPA-453/R-93-017, February 1994. | Final Rule<br>Federal Register Date:<br>01/26/1996<br>61 FR 2419 | This section applies to process vents associated with batch processing operations in manufacturing facilities with Standard Industrial Classification (SIC) Codes of 2821, 2833, 2861, 2869, 2869, and 2879.<br><br>It requires the affected sources to reduce VOC emissions by 90 percent by weight. | Yes.<br><br>This section was developed in 1994 to implement the 1994 ACT specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 45.0<br>Control of VOC Emissions- Industrial Cleaning Solvents<br><br>03/11/2011 | CTG for Industrial Cleaning Solvents. EPA 453/R-06-001, September 2006 | Final Rule<br>Federal Register Date:<br>04/13/2012<br>77 FR 22224 | This section applies to all sources that use organic solvents for the purpose of cleaning.<br><br>It establishes standards for the affected facilities to evaluate and | Yes.<br><br>This section was developed in 1994 to implement the 1994 ACT specified requirements for using industrial cleaning solvents. It was approved by |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | ACT for Industrial Cleaning Solvents. EPA-453/R-94-015, February 1994. | | test alternative cleaning solutions for the purpose of reducing VOC emissions. | EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2011, it was revised for necessary corrections for meeting the 2006 CTG requirements reflected in the updated Section 8.0 (See Columns 4 and 5 of Section 8.0).<br><br>Together, Section 45.0 and Section 8.0 require the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 46.0<br>Crude Oil Lightering Operations<br><br>05/11/2007 | Non-CTG RACT requirement, based on CAA Section 182(b)(2)(C). | Final Rule<br>Federal Register Date: 09/13/2007<br>72 FR 52285 | This section applies to the owner or operator of a lightering service that carries out crude oil lightering operations in the waters of the State. The owner of the crude oil being lightered is also affected by certain provisions in this section.<br><br>It establishes: (a) requirements for using submerged filling pipes, vapor-tight vessel, and vapor balancing between the marine vessels during the transfer of crude oil during lightering operations; (b) progressive schedule limits the annual volume of crude oil that can be lightered without vapor balancing; and (c) limitations on | Yes.<br><br>This section was not in Delaware's RACT SIP under the 1997 ozone NAAQS. It was developed in 2007 to implement effective VOC emission controls over lightering processes to meet the requirements of CAA Section 182(b)(2)(C).<br><br>It represents the current non-CTG RACT control levels and the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
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| | | | conducting uncontrolled lightering operations on Ozone Action Days. | |
| Section 47.0<br>Offset Lithographic Printing and Letterpress Printing<br><br>04/11/2011 | CTG for Offset Lithographic Printing and Letterpress Printing. EPA-453/R-06-002, September 2006.<br><br>ACT for Offset Lithographic Printing-Supplemental Information Based on Public Comment on CTG Draft EPA-453/D-95-001. EPA-453/R-94-054, June 1994.<br><br>CTG for Control of Volatile Organic Compound Emissions from Offset Lithographic Printing (CTG Draft). EPA-453/D-95-001, September 1993. | Final Rule<br>Federal Register Date: 11/25/2011<br>77 FR 72626 | This section applies to any offset lithographic printing facility and letterpress printing facility, including any heatset and non-heatset web, non-heatset sheet-fed, and newspaper facility.<br><br>It establishes VOC or alcohol content limits in fountain solutions, VOC limits in cleaning solutions, VOC control requirements for add-on control devices, and requirements for testing and recordkeeping, for the regulated facilities. | Yes.<br><br>This section was developed in 1994 to fully implement the 1993 CTG (Draft) and 1994 ACT specified requirements for lithographic printing facilities. It was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>In 2011, it was revised to implement the requirements specified in the 2006 CTG, by (1) adding letterpress printing facility, and (2) adopting more stringent control requirements.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 48.0<br>Reactor Processes and Distillation Operations in the Synthetic Organic Chemical | CTG for Control of Volatile Organic Compound Emissions from Reactor Processes and | Final Rule<br>Federal Register Date: 01/26/1996<br>61 FR 2419 | This section applies to any vent stream that originates from a process unit in which a reactor or distillation operation is located at a facility within the synthetic organic | Yes.<br><br>This section was developed in 1994 to fully implement the 1993 CTG specified requirements. |

| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| Manufacturing Industry<br><br>11/29/1994 | Distillation Operations in SOCMI.<br>EPA-450/4-91-031, November 1993. | | chemical manufacturing industry (SOCMI).<br><br>It requires the affected sources to reduce VOC emissions by 98 weight-present or to 20 ppmv on a dry basis corrected to 3% oxygen, via combustion device, flare, or process modification. | It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| Section 49.0<br>Control of VOC Emissions- Control of Volatile Organic Compound Emissions from Volatile Organic Liquid Storage Vessels<br><br>11/29/1994 | ACT for Volatile Organic Liquids Storage in Floating and Fixed Roof Tanks.<br>EPA-453/R-94-001, February 1994. | Final Rule<br>Federal Register Date: 01/26/1996<br>61 FR 2419 | This section applies to each storage vessel with a capacity equal to or greater than 40,000 gallons that is used to store volatile organic liquids (VOLs).<br><br>It establishes the venting and sealing standards for internal and external floating roofs, and specifies alternatives to installing internal or external floating roofs. | Yes.<br><br>This section was developed in 1994 to fully implement the 1994 ACT specified requirements.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
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| Column 1: Regulation 1124 Section | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Applicability and Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| Section 50.0<br>Control of VOC Emissions- Other Facilities that Emit Volatile Organic Compounds (VOCs)<br><br>11/29/1994 | Non-CTG RACT requirement, based on CAA Section 182(b)(2)(C). | Final Rule<br>Federal Register Date:<br>03/12/1997<br>62 FR 11329 | This section applies to any facility that is not covered by Section 10.0 through Section 49.0 of Regulation 1124.<br><br>In brief, it requires an affected source to achieve an overall VOC emission reduction of at least 81 percent by weight. Facilities may also comply with Section 50.0 by submitting an alternative control plan that is subject to approval. | Yes.<br><br>This section was developed in 1994 to require non-CTG major sources to implement RACT, thus implementing requirements of the CAA Section 182(b)(2)(C).<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no new CTG or significant change in RACT control technology for this section.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |

## 2.2. Implementation of Non-CTG Specified VOC Controls

As indicated in Table 1 above, Delaware has certified that Regulation 1124 contains adequate VOC RACT controls under the 2015 8-hour ozone NAAQS. In addition to Table 1, Delaware has implemented numerous non-CTG-ACT specified VOC controls to achieve further VOC emission reductions for attainment and maintenance of the ozone NAAQS. In general, those non-specified controls are developed for meeting requirements of the CAA Section 182(b)(2)(C)[11] and related federal regulations, or for fulfilling Delaware's commitments for model rules agreed upon by regional state affiliations such as the Ozone Transport Commission (OTC), in which Delaware is a member state. Although those controls are not included in the current CTG-ACT documents, they are based on recent technical information available in other forms. DAQ believes that those additional or more stringent controls will help Delaware attain the ozone NAAQS as expeditiously as practicable.[12] In its December 2017 final rule approving Delaware's 2008 SIP revision as adequate under the 2008 8-hour ozone NAAQS (82 FR 57849), the EPA determined that these rules are "beyond RACT." The non-CTG specified VOC rules are discussed below.

### 2.2.1. Regulation 1141 Section 1.0 "Architectural and Industrial Maintenance (AIM) Coatings" (as approved as a SIP revision by EPA on August 11, 2010, 75 FR 48566)

1) This rule became effective on 03/11/2002 to control VOC emission from AIM coating activities;
2) This rule was developed to fulfill Delaware's commitment for the OTC 2002 Model Rule-Architectural and Industrial Maintenance (AIM) Coatings;
3) It applies to any person who supplies, sells, offers for sale, blends, repackages for sale, or manufactures any architectural coating for use in Delaware;
4) It establishes VOC content limits in various coating materials;
5) It sets up requirements for container labeling, recordkeeping, reporting and testing;
6) This rule is currently under evaluation for more stringent requirements.

### 2.2.2. Regulation 1141 Section 2.0 "Consumer Products" (as approved as a SIP revision by EPA on October 20, 2010, 75 FR 64673)

1) This rule became effective on 04/11/2009 to control VOC emissions from using consumer products;
2) This rule was developed to fulfill commitments for the OTC 2006 Model Rule-Consumer Products;

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[11] Section 182(b)(2) states: "The State shall submit a revision to the applicable implementation plan to include provisions to require the implementation of reasonably available control technology under section 7502(c)(1) of this title with respect to each of the following: (A) Each category of VOC sources in the area covered by a CTG document issued by the Administrator between November 15, 1990, and the date of attainment. (B) All VOC sources in the area covered by any CTG issued before November 15, 1990. (C) All other major stationary sources of VOCs that are located in the area."

[12] In its proposed implementation rule for the 2008 8-hour ozone NAAQS (78 FR 34180, June 6, 2013), EPA indicates that states may require VOC and NOx reductions that are even ''beyond RACT'' levels if such reductions are needed in order to provide for timely attainment of the ozone NAAQS.

3) It applies to any person who sells, supplies, offers for sale, or manufactures consumer products in Delaware;
4) It establishes VOC content limits for all covered consumer products;
5) It sets up requirements for container/package labeling, recordkeeping, reporting and testing, as well as for surplus reductions and trading;
6) This rule is currently under evaluation for more stringent requirements.

### 2.2.3. Regulation 1141 Section 4.0 "Adhesives and Sealants" (as approved as a SIP revision by EPA on December 22, 2011, 76 FR 79537)

1) This rule became effective on 04/11/2009 to control VOC emissions when using adhesives and sealants;
2) This rule was developed to fulfill commitments for the OTC 2006 Model Rule-Adhesives and Sealants (Note that this model rule was the basis for EPA's 2008 updated CTG Miscellaneous Industrial Adhesives (EPA-453/R-08-005, September 2008));
3) It applies to any person who sells, supplies, offers for sale, or manufactures for sale adhesives, adhesive primers, sealants and sealant primers in Delaware;
4) It establishes VOC content limits in covered materials, and requirements for compliance and testing, as well as recordkeeping and reporting.

# 3. DETERMINATION OF COMPLIANCE OF NOX RACT REQUIREMENTS

## 3.1. Certification of $NO_X$ RACT Requirements

Delaware's NOx RACT controls are applicable to specific groups of sources in 7 **DE Admin. Code** 1112, "Control of Nitrogen Oxides Emissions" (hereafter in this document referred to as Regulation 1112), which forms the basic NOx RACT framework. Within this framework, other rules are developed and implemented for relevant subgroups, including:

- 7 **DE Admin. Code** 1144 "Control of Stationary Generator Emissions" (hereafter referred to as Regulation 1144);
- 7 **DE Admin. Code** 1146 "Electric Generating Units (EGUs) Multi-Pollutant Regulation" (hereafter referred to as Regulation 1146); and
- 7 **DE Admin. Code** 1148 "Control of Stationary Combustion Turbine Electric Generating Unit (EGU) Emissions" (hereafter referred to as Regulation 1148).

Sections in Regulation 1112 were first developed and implemented into Delaware SIP revisions under the 1-hour ozone NAAQS, and then included in Delaware's RACT SIP under the 1997 8-hour ozone NAAQS. All those sections were approved by EPA as adequate for meeting the RACT requirements under the 1997 8-hour ozone NAAQS (73 FR 42681, July 2008) and the 2008 8-hour ozone NAAQS (82 FR 57849, December 2017). Regulation 1144 was adopted in January 2006 to tighten the requirements covering internal combustion engines. Regulation 1146 was adopted in December 2006 to tighten the requirements covering EGUs. Regulation 1148 was adopted in July 2007 to tighten the requirements covering combustion turbines.

Certification of Delaware's NOx RACT controls for meeting the 2015 8-hour ozone NAAQS is provided in Table 2, which is laid out by following the framework of source groups in Regulation 1112. Explanations for the columns of Table 2 are as follows:

Column 1: Identifies $NO_X$ source groups being covered.

Regulation 1112, with an effective date of 11/24/1993, requires all major $NO_X$ emission sources to comply with the relevant provisions by May 31, 1995. Regulations 1144, 1146 and 1148, covering relevant subgroups, have subsequent compliance dates (See Section 3.2 of this document).

Column 2: Identifies the underlying basis for the NOx RACT control levels and compliance determination.

The fundamental basis of implementing $NO_X$ RACT controls is CAA Sections 182(b)(2) and 182(f) (Citation of those CAA sections is not repeated in Column 2).

Column 3: Identifies the date the rule was approved by EPA into the Delaware SIP, along with the Federal Register citation.

Regulation 1112 was first implemented in November 1993, conditionally approved by EPA in June 1999, and EPA granted the final approval of Regulation 1112 on June 14, 2001 (66 FR 32231). Section 1.0 of Regulation 1142 was approved by EPA on August 11, 2010 (75 FR 48566) and Section 2.0 of the regulation was approved by EPA on May 15, 2012 (77 FR 28489). Regulation 1144 was approved by EPA on August 11, 2010 (75 FR 48566). Regulation 1146 was approved by EAP on March 16, 2010 (75 FR 12449). Regulation 1148 was approved by EPA on August 11, 2010 (75 FR 48566).

Column 4: Explains RACT control requirements.

Column 5: Certifies that the rule represents the RACT control level under the 2015 8-hour ozone NAAQS.

Relevant subgroups being covered in Regulation 1144, Regulation 1146, and Regulation 1148 are briefly discussed in Column 5. More detailed discussions of Regulations 1144, 1146 and 1148 are presented in Section 3.2 of this document.

Delaware's minor source permitting program under Regulation 1102 "Permits" requires a detailed administrative and technical review of Delaware NOx sources that emit far below the "major" threshold" (i.e., permits are required for the emission of 10 pounds per day or more of "aggregate" air contaminants, and registrations for emissions between 0.2 and 10 lb/day of air contaminants). This permitting program gives confidence that all major NOx sources are currently controlled by RACT-level controls or more stringent controls.

Effective August 13, 2001, EPA finalized approval of three source-specific NOx RACT Determinations (66 FR 32231, 6/14/2001) in Delaware. The following three NOx RACT determinations were removed from Delaware's SIP as part of Delaware's RACT SIP revision for the 2008 8-hour ozone NAAQS: (1) a sulfuric acid ($H_2SO_4$) and inter-stage absorption system (ISA) process, (2) a metallic nitrite process, and (3) a Polyhydrate Alcohol Catalyst Regenerative (PACR) process. Processes (1) and (2) were both at the General Chemical Corporation facility, Claymont, New Castle, Delaware, and process (3) was at SPI Polyols, Incorporated, Atlas Point Site, New Castle, Delaware. The General Chemical facility at Claymont was permanently shutdown. The PACR process at SPI was permanently shutdown. Therefore, these three NOx RACT determinations were no longer required in Delaware's ozone SIP. The NOx RACT determination at the fourth facility was for the electric arc furnace at CitiSteel USA, Incorporated in Claymont, Delaware. The CitiSteel facility permanently shutdown, effective December 31, 2013. Therefore, these three source-specific NOX RACT determinations are no longer required in Delaware's ozone SIP.

**Table 2. Delaware NOx RACT Control List and Determination of Compliance under the 2015 8-hour ozone NAAQS**

| **Column 1:** NOx Emission Source Group | **Column 2:** Basis for RACT Control | **Column 3:** As SIP Revision Approved by EPA | **Column 4:** RACT Rule Requirements | **Column 5:** Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| 1. Fuel burning equipment with an input capacity of 100 mmBTU/hr or greater | Stationary Source Committee Recommendation on NOx RACT for Utility Boilers, NESCAUM, 8/12/1992.<br><br>Stationary Source Committee Recommendation on NOx RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992.<br><br>Controlling Emissions of Nitrogen Oxides from Existing Utility Boilers Under Title I of the Clean Air Act: Options and Recommendations, STAPPA/ALAPCO, 4/27/1992.<br><br>State Implementation Plans; Nitrogen Oxides Supplement to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, USEPA, 10/27/1995.<br><br>Summary of NOx Control Technologies and their Availability and Extent of Application, USEPA, February 1992.<br><br>Alternative Control Techniques Document: NOx Emissions from Process Heaters (Revised), USEPA, September 1993.<br><br>Alternative Control Techniques Document: NOx Emissions from | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32231 | Gas, oil and coal fired units are subject to 0.20, 0.25, or 0.38 lb/mmBTU emission limits, respectively;<br>Or their emissions must be controlled by low NOx burner technology or flue gas circulation with excess air.<br><br>And in general, equipment larger than 100 mmBTU is required to install $NO_X$ continuous emission monitoring system (CEMS). | Yes.<br><br>This provision fully implements the required $NO_X$ controls over the targeted sources.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source.<br><br>In addition, Delaware has adopted more stringent NOx limits in: (1) Regulation 1142, for two sub-groups of this source, i.e., industrial boilers greater than 100 mmBTU/hour and industrial boilers and heat processers greater than 200 mmBTU/hour at refineries; (2) Regulation 1146, for coal-fired and oil-fired electric generating units (EGUs) with capacity equal to or greater than 25 MW.<br>See Section 3.2 of this document for details.<br><br>Together, Regulations 1112, 1142, and 1146 require the lowest emission limitations that the covered sources are capable of meeting by the application of |

| **Column 1**: NOx Emission Source Group | **Column 2**: Basis for RACT Control | **Column 3**: As SIP Revision Approved by EPA | **Column 4**: RACT Rule Requirements | **Column 5**: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | Industrial/Commercial/Institutional (ICI) Boilers, USEPA, March 1994.<br><br>Alternative Control Techniques Document: NOx Emissions from Utility Boilers, USEPA, March 1994.<br><br>State's Report on Electric Utility Nitrogen Oxides Reduction Technology Options for Application by the Ozone Transport Assessment Group, prepared for the OTAG Control Technology & Options Workgroup by Ken Colburn, 4/11/1996.<br><br>Status Report on NOx Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000.<br><br>Summary of State/Local NOx Regulations for Stationary Sources, USEPA, 2004. | | | control technology that is reasonably available considering current technological and economic feasibility. |
| 2. Fuel burning equipment with an input capacity of 50 mmBTU/hr or greater and less than 100 mmBTU/hr | Stationary Source Committee Recommendation on NOx RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992.<br><br>Summary of NOx Control Technologies and their Availability and Extent of Application, USEPA, February 1992.<br><br>Alternative Control Techniques Document: NOx Emissions from Process | Final Rule Federal Register Date: 06/14/2001 66 FR 32231 | Emission rates of the targeted sources are limited to those to be achieved by low excess air and low $NO_X$ burners, or flue gas recirculation. | Yes.<br><br>This provision fully implements the required $NO_X$ controls over the targeted sources.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source. |

| Column 1: NOx Emission Source Group | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | Heaters (Revised), USEPA, September 1993.<br><br>Alternative Control Techniques Document: NOx Emissions from Industrial-Commercial/Institutional (ICI) Boilers, USEPA, March 1994.<br><br>Status Report on $NO_X$ Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000.<br><br>Summary of State/Local $NO_X$ Regulations for Stationary Sources, USEPA, 2004. | | | The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| 3. Fuel burning equipment with an input capacity of less than 50 mmBTU/hr | Stationary Source Committee Recommendation on $NO_X$ RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992.<br><br>Summary of $NO_X$ Control Technologies and their Availability and Extent of Application, USEPA, February 1992.<br><br>Alternative Control Techniques Document: NOx Emissions from Process Heaters (Revised), USEPA, September 1993.<br><br>Alternative Control Techniques Document: NOx Emissions from Industrial/Commercial/Institutional (ICI) Boilers, USEPA, March 1994. | Final Rule Federal Register Date: 06/14/2001 66 FR 32231 | The rule requires the targeted sources to conduct annual tune-ups. | Yes.<br><br>This provision fully implements the required $NO_X$ controls over the targeted sources.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is |

| **Column 1:** NOx Emission Source Group | **Column 2:** Basis for RACT Control | **Column 3:** As SIP Revision Approved by EPA | **Column 4:** RACT Rule Requirements | **Column 5:** Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | Summary of State/Local $NO_X$ Regulations for Stationary Sources, USEPA, 2004. | | | reasonably available considering current technological and economic feasibility. |
| 4. Alternative requirement for fuel burning equipment - Seasonal fuel switching (April 1 through October 31) to a low $NO_X$ emitting fuel. | Memorandum, Fuel Switching to Meet the Reasonably Available Control Technology (RACT) Requirements for Nitrogen Oxides ($NO_X$), Michael H. Shapiro, Air and Radiation, US EPA, 7/30/1993.<br><br>Summary of $NO_X$ Control Technologies and their Availability and Extent of Application, USEPA, February 1992.<br><br>Memorandum, Nitrogen Oxides ($NO_X$) Questions from Ohio EPA, Tom Helms, Chief Ozone/Carbon Monoxide Programs Branch, US EPA (no date, referring to 11/30/1993 questions).<br><br>Summary of State/Local $NO_X$ Regulations for Stationary Sources, USEPA, 2004.<br><br>Alternative Control Techniques Document: $NO_X$ Emissions from Industrial-Commercial/Institutional (ICI) Boilers, USEPA, March 1994.<br><br>State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, USEPA. | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32234 | For the covered sources, fuel switching is limited to the use of natural gas, liquid petroleum gas (LPG) or distillate oil. A 90% availability of the new fuel is required. | Yes.<br><br>This provision fully implements the required $NO_X$ controls over the targeted sources.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source.<br><br>The requirements are the lowest emission limitations that the covered source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| | | | | |

| **Column 1:**<br>**NOx Emission Source Group** | **Column 2:**<br>**Basis for RACT Control** | **Column 3:**<br>**As SIP Revision Approved by EPA** | **Column 4:**<br>**RACT Rule Requirements** | **Column 5:**<br>**Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS?** |
|---|---|---|---|---|
| 5. Gas turbines | Alternative Control Techniques Document: $NO_X$ Emissions from Stationary Gas Turbines, USEPA, January 1993.<br><br>Stationary Source Committee Recommendation on $NO_X$ RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992.<br><br>Status Report on $NO_X$ Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000.<br><br>Summary of $NO_X$ Control Technologies and their Availability and Extent of Application, USEPA, February 1992.<br><br>Summary of State/Local $NO_X$ Regulations for Stationary Sources, USEPA, 2004. | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32231 | The rule requires the covered gas turbines to meet 42ppm and 88 ppm $NO_X$ limits for gas and oil fired units, respectively | Yes.<br><br>This provision fully implements the required $NO_X$ controls over the targeted sources.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source group, except as explained below.<br><br>In 2007, Delaware adopted Regulation 1148, setting forth additional requirements for a subgroup of combustion turbine electric generating units (EGUs), in particular to control NOx emissions from the covered EGUs in high-electric-demand-days (HEDDs). See Section 3.2 of this document for details.<br><br>Together, Regulations 1112 and 1148 require the lowest emission limitations that the covered source groups and subgroup are capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| | | | | |

| **Column 1**: NOx Emission Source Group | **Column 2**: Basis for RACT Control | **Column 3**: As SIP Revision Approved by EPA | **Column 4**: RACT Rule Requirements | **Column 5**: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| 6. Stationary internal combustion engines | Summary of $NO_X$ Control Technologies and their Availability and Extent of Application, USEPA, February 1992.<br><br>Stationary Source Committee Recommendation on $NO_X$ RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992.<br><br>Alternative Control Techniques Document: $NO_X$ Emissions from Stationary Reciprocating Internal Combustion Engines, USEPA, 1993.<br><br>$NO_X$ Emissions from Stationary Internal Combustion Engines, USEPA, October 2003<br><br>Stationary Reciprocating Internal Combustion Engines – Updated Information on $NO_X$ Emissions and Control Techniques – Revised Final Report, USEPA, 9/1/2000.<br><br>Sourcebook: $NO_X$ Control Technology Data, USEPA, July 1991.<br><br>Status Report on $NO_X$ Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000.<br><br>Summary of State/Local $NO_X$ Regulations for Stationary Sources, USEPA, 2004 | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32231 | The rule establishes emission limits for the targeted engines to those achieved using pre-ignition chamber combustion or clean burn technology for gas fired units and those achieved using lean burn technology for diesel fired units. | Yes.<br><br>This provision fully implements the required $NO_X$ controls over the targeted sources.<br><br>It was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source group, except as explained below.<br><br>In 2006, Delaware adopted Regulation 1144, setting forth NOx emission requirements for a subgroup of stationary generators that were generally exempted from Regulation 1112. See Section 3.2 of this document for details.<br><br>Together, Regulations 1112 and 1144 require the lowest emission limitations that the covered source groups and subgroup are capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |

| Column 1: NOx Emission Source Group | Column 2: Basis for RACT Control | Column 3: As SIP Revision Approved by EPA | Column 4: RACT Rule Requirements | Column 5: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| 7. Fuel burning equipment used exclusively for providing residential comfort heating and hot water | Summary of $NO_X$ Control Technologies and their Availability and Extent of Application, USEPA, February 1992.<br><br>State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, USEPA. | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32231 | Regulation 1112 specifies no emissions limits or control requirements for the targeted source group. | Yes.<br><br>For this source group, DAQ determined that no cost effective RACT controls existed under the 1-hour ozone NAAQS and under the 1997 ozone NAAQS.<br><br>The determination was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source group. |
| 8. Incinerator or thermal/catalytic oxidizer constructed before November 15, 1992, and used primarily for the control of air pollution. | Summary of $NO_X$ Control Technologies and their Availability and Extent of Application, USEPA, February 1992, | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32231 | Regulation 1112 specifies no emissions limits or control requirements for the targeted source group. | Yes.<br><br>For this source group, DAQ determined that no cost effective RACT controls existed under the 1-hour ozone NAAQS and under the 1997 ozone NAAQS.<br><br>The determination was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source. |

| **Column 1**: NOx Emission Source Group | **Column 2**: Basis for RACT Control | **Column 3**: As SIP Revision Approved by EPA | **Column 4**: RACT Rule Requirements | **Column 5**: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| 9. Fuel burning equipment with a rated heat input capacity of less than 15 MMBTU/hour. | Memorandum: De Minimis Values for $NO_X$ RACT, from G.T. Helms, Ozone Policy and Strategies Group, USEAP, 1/1/1995.<br><br>Alternative Control Techniques Document: $NO_X$ Emissions from Industrial-Commercial/Institutional (ICI) Boilers, USEPA, March 1994 | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32231 | Regulation 1112 specifies no emissions limits or control requirements for the targeted source group. | Yes.<br><br>For this source group, DAQ determined that no cost effective RACT controls existed under the 1-hour ozone NAAQS and under the 1997 ozone NAAQS.<br><br>The determination was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source. |
| 10. Stationary internal combustion engine with a rated capacity of or less than 450 hp of output power. | Memorandum: De Minimis Values for $NO_X$ RACT, from G.T. Helms, Ozone Policy and Strategies Group, USEPA, 1/1/1995.<br><br>$NO_X$ Emissions from Stationary Internal Combustion Engines, USEPA, October 2003.<br><br>Stationary Reciprocating Internal Combustion Engines – Updated Information on NOx Emissions and Control Techniques – Revised Final Report, USEPA, 9/1/2000.<br><br>Alternative Control Techniques Document: NOx Emissions from | Final Rule<br>Federal Register<br>Date: 06/14/2001<br>66 FR 32231 | Regulation 1112 specifies no emissions limits or control requirements for the targeted source group. | Yes.<br><br>For this source group, DAQ determined that no cost effective RACT controls existed under the 1-hour ozone NAAQS and under the 1997 ozone NAAQS.<br><br>The determination was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source group, except as explained below. |

| **Column 1:** NOx Emission Source Group | **Column 2:** Basis for RACT Control | **Column 3:** As SIP Revision Approved by EPA | **Column 4:** RACT Rule Requirements | **Column 5:** Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | Stationary Reciprocating Internal Combustion Engines, USEPA, 1993. | | | In 2006, Delaware adopted Regulation 1144, setting forth NOx emission requirements for a subgroup of stationary generators that were generally exempted from Regulation 1112. See Section 3.2 of this document for details.<br><br>Together, Regulations 1112 and 1144 require the lowest emission limitations that the covered source groups and subgroup are capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| 11. Any source operating during the month of November to the end of March and operating with a capacity factor of 5% or less from April 1 to October 31. | Memorandum, Nitrogen Oxides ($NO_X$) Questions from Ohio EPA, Tom Helms, Chief Ozone/Carbon Monoxide Programs Branch, US EPA (no date, referring to 11/30/1993 questions).<br><br>Memorandum Subject: De Minimis Values for NOx RACT, from G.T. Helms, Ozone Policy and Strategies Group, 1/1/1995 | Final Rule Federal Register Date: 06/14/2001 66 FR 32231 | Regulation 1112 specifies no emissions limits or control requirements for the targeted source group, based on EPA's Helms Memo.[13]<br><br>Delaware, however, determines that some units in this source group have high short | Yes.<br><br>For this source group, DAQ determined that no cost effective RACT controls existed under the 1-hour ozone NAAQS and under the 1997 ozone NAAQS.<br><br>The determination was approved by EPA as adequate under the 1997 ozone NAAQS. After EPA's approval, there has been no updated |

[13] The DAQ believes that the exemptions for this source group based on the 1995 Helms Memo should not continue because short term emissions from the source group impact adversely the ozone air quality in summer time. Delaware has adopted RACT controls in Regulation 1144 and Regulation 1148 to address the short term NOx emissions. The DAQ suggests that EPA revoke the 1995 memo to avoid continuous exemption for the related sources.

| **Column 1**: NOx Emission Source Group | **Column 2**: Basis for RACT Control | **Column 3**: As SIP Revision Approved by EPA | **Column 4**: RACT Rule Requirements | **Column 5**: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | | | term or daily NOx emissions that impact ozone air quality in the ozone season. Delaware has set forth RACT-level requirements outside Regulation 1112 (i.e., in Regulations 1144 and 1148). See Column 5, and Section 3.2 of this document. | CTG and no significant change in RACT control technology for the covered source, except as explained below.<br><br>In 2006, Delaware adopted: (1) Regulation 1144, setting forth NOx emission requirements for a subgroup of stationary generators that were generally exempted from Regulation 1112; and (2) Regulation 1148 in 2007, setting forth additional requirements for a subgroup of combustion turbine electric generating units (EGUs), in particular to control NOx emissions from the covered EGUs in high-electric-demand-days (HEDDs). See Section 3.2 of this document for details.<br><br>Together, Regulations 1112, 1144 and 1148 require the lowest emission limitations that the covered source groups and subgroup are capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility. |
| 12. Any fuel burning equipment, gas turbine, or internal combustion engine with an annual | Memorandum Subject: De Minimis Values for $NO_X$ RACT, from G.T. Helms, Ozone Policy and Strategies Group, USEPA, 1/1/1995. | Final Rule Federal Register Date: 06/14/2001 66 FR 32231 | Regulation 1112 specifies no emissions limits or control requirements for the | Yes.<br><br>For this source group, DAQ determined that no cost effective |

| **Column 1**: NOx Emission Source Group | **Column 2**: Basis for RACT Control | **Column 3**: As SIP Revision Approved by EPA | **Column 4**: RACT Rule Requirements | **Column 5**: Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| capacity factor of less than 5 percent. | Alternative Control Techniques Document: $NO_X$ Emissions from Industrial-Commercial-Institutional (ICI) Boilers, USEPA, March 1994.<br><br>Alternative Control Techniques Document: NOx Emissions from Stationary Reciprocating Internal Combustion Engines, USEPA, 1993.<br><br>Alternative Control Techniques Document: $NO_X$ Emissions from Stationary Gas Turbines, USEPA, January 1993.<br><br>Alternative Control Techniques Document: $NO_X$ Emissions from Process Heaters (Revised), USEPA, September 1993. | | targeted source group, based on EPA's Helms Memo.[7]<br><br>Delaware, however, determines that some units in this source group have high short term or daily NOx emissions that impact ozone air quality in the ozone season. Delaware has set forth RACT-level requirements outside Regulation 1112 (i.e., in Regulations 1144 and 1148). See Column 5, and Section 3.2 of this document. | RACT controls existed under the 1-hour ozone NAAQS and under the 1997 ozone NAAQS. The determination was approved by EPA as adequate under the 1997 ozone NAAQS.<br><br>After EPA's approval, there has been no updated CTG and no significant change in RACT control technology for the covered source group, except as explained below.<br><br>In 2006, Delaware adopted: (1) Regulation 1144, setting forth NOx emission requirements for a subgroup of stationary generators that were generally exempted from Regulation 1112; and (2) Regulation 1148 in 2007, setting forth additional requirements for a subgroup of combustion turbine electric generating units (EGUs), in particular to control NOx emissions from the covered EGUs in high-electric-demand-days (HEDDs). See Section 3.2 of this document for details.<br><br>Together, Regulations 1112, 1144 and 1148 require the lowest emission limitations that the covered source groups and subgroup are capable of meeting by the application of control technology that is reasonably |

| **Column 1:** NOx Emission Source Group | **Column 2:** Basis for RACT Control | **Column 3:** As SIP Revision Approved by EPA | **Column 4:** RACT Rule Requirements | **Column 5:** Requirements at least as stringent as RACT level for the 2015 8-hour ozone NAAQS? |
|---|---|---|---|---|
| | | | | available considering current technological and economic feasibility. |

## 3.2. Implementation of Non-CTG Specified NOx Controls

As indicated in Table 2 above, Delaware has certified that the framework of Regulation 1112, including Regulations 1112, 1142, 1144, 1146 and 1148 contains adequate $NO_X$ RACT controls under the 2015 8-hour ozone NAAQS. As aforementioned, Regulation 1112 was developed following CTG-ACT guidelines under the 1-hour ozone NAAQS and maintained valid under the 1997 8-hour ozone NAAQS. Delaware has also developed Regulations 1142, 1144, 1146, 1148 and other controls to implement additional RACT-level rules and requirements to aid in maintenance of the 1-hour NAAQS and attainment of the NAAQS. In general, those non-CTG specified rules are developed for meeting requirements of the CAA Section 182(b)(2) and related federal regulations, or for fulfilling Delaware's commitments for model rules agreed upon by regional state affiliations such as the OTC, in which Delaware is a member state.

As aforementioned, EPA has defined RACT as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility (44 FR 53762). EPA's definition indicates that the RACT requirements must include compliance with the lowest emission levels that were achieved in the past, are achieved at present, or will be achieved in the future under facility's operational limitations (such as operational permits) and equipment standards that were previously applicable, are presently applicable, or will become applicable in the future, respectively. The DAQ believes that the development of its non-CTG specified NOx rules reflects exactly the EPA's RACT definition, as they were approved by the EPA as adequate under the 2008 8-hour ozone NAAQS. Further, the OTC document "White Paper on Control Technologies and OTC State Regulations for Nitrogen Oxides (NOx) Emissions from Eight Source Categories"[14] identifies emissions limits and regulations for NOx emissions identified by OTC states as RACT. The NOx emissions comparisons for boilers, stationary generators, and combustion turbines of this document provide justification for DAQ's assertion that the following rules reflect RACT.

The non-CTG NOx rules are discussed in details below.

### 3.2.1. Regulation 1142 Section 1.0 "Control of $NO_X$ Emissions from Industrial Boilers"

1) This rule became effective on 12/12/2001 to control NOx emissions from large industrial boilers;[15]
2) It imposes controls on certain industrial boilers with heat input greater than 100 mmBTU/hour, by setting up a NOx emission rate limit of 0.10 lb/mmBTU for the ozone season, and 0.25 lb/mmBTU for the non-ozone season months.
3) It also establishes the requirements of monitoring, recordkeeping and reporting for the covered boilers.

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[14] This document can be obtained on the OTC website at https://otcair.org/upload/Documents/Reports/WhitePaper_NOx_Control_04052017.pdf, and is listed in in 5.7 of the Documentation section of this document.

[15] Three boilers at Sunoco refining facility (Claymont, Delaware) used to be subject to Regulation 1142 Section 1.0. The boilers were shutdown in 2002. At present, no source in Delaware is subject to this rule.

### 3.2.2. Regulation 1142 Section 2.0 "Control of $NO_X$ Emissions from Industrial Boilers and Heat Processers at Petroleum Refineries"

1) This rule became effective on 04/11/2011 to control NOx emission from large industrial boilers and heat processor at petroleum refineries;
2) It was originally developed to fulfill requirements to attain the 1997 8-hour ozone NAAQS and was revised following a consent agreement of May 2010 between the Department and the covered refinery;
3) It imposes stringent NOx emission rate limits, and corresponding compliance schedule, for 8 industrial boilers and heat processors with heat input greater than 200 mmBTU/hour at Delaware City refinery, operated by Delaware City Refinery Company (DCRC) (the only petroleum refinery in Delaware);
4) The emission rate limits include: 0.015 lb/mmBTU on a 24-hour rolling average basis for three boilers, 20 ppmvd@0% $O_2$ on a 365-day rolling average basis for a CO boiler, and 0.04 lb/mmBTU on a 24-hour rolling average basis process heaters;
5) It establishes an alternative facility-wide NOx emission cap for the covered facility:
   a) 2,525 tons in 2013;
   b) 2,225 tons in 2014;
   c) 1,650 tons in 2015;
6) It also establishes the requirements of compliance, recordkeeping and reporting for the covered refineries.

### 3.2.3. Regulation 1144 "Control of Stationary Generator Emissions"

1) This regulation became effective on 01/11/2006 to control NOx emissions, as well as other pollutant emissions, from stationary generators;
2) It was developed from Delaware governor's initiative for clean energy and clean air, and later became the template of the OTC Model Rule for Stationary Generator Control Measures (2009);
3) It addresses short term NOx emissions from the covered sources and reduces their daily impacts on ozone air quality during the ozone season;
4) It sets up stringent NOx emission rates for stationary distributed generators, with standby power ratings greater than 10kW, when used at times other than emergency times;
5) The NOx emission rate limits include:
   a) For existing distributed generators: 4.0 lb/MWh;
   b) For new distributed generators:
      i) Installed on or after 01/11/2006, 2.2lb/MWh;
      ii) Installed on or after 01/01/2008, 1.0 lb/MWh;
      iii) Installed on or after 01/01/2012, 0.6 lb/MWh;
6) For new distributed generators using waste/landfill/digester gases and installed on or after 01/11/2006: 2.2 lb/MWh;

7) It establishes requirements for recordkeeping and reporting, emission certification, compliance and enforcement, and emission credit calculations for the covered generators.
8) The stationary generators covered by Regulation 1144 are in general exempted from Regulation 1112 because of their small capacities. Delaware, however, determines that these units had high daily NOx emissions and therefore should be controlled to aid in attainment and maintenance of the ozone NAAQS during the ozone season.

### 3.2.4. Regulation 1146 "Electric Generating Units (EGU) Multi-Pollutant Regulation"

1) This regulation became effective on 12/11/2006 to limit NOx emission rates and to establish unit-specific annual NOx mass emissions caps, as well as SO2 and mercury emission rates and mass emissions caps, from coal and residual oil fired EGUs with a nameplate rating of 25 MW or greater;
2) It was developed to fulfill Delaware's obligations under former EPA cap and trade programs and Clean Air Act (CAA) Section 110 transport restrictions.;
3) It set~~s~~ up stringent NOx emission rate limit of 0.15 lb/mmBTU for coal-fired and residual oil-fired EGUs with nameplate capacity ratings of greater than 25 MW during the period of May 1, 2009 through December 31, 2009, and a NOx emissions rate limit of 0.125 lb/MMBTU for the period beginning January 1, 2010 and beyond;
4) It establishes standards for recordkeeping and reporting, compliance, and penalties for the covered EGUs.

### 3.2.5. Regulation 1148 "Control of Stationary Combustion Turbine Electric Generating Unit (EGU) Emissions"

1) This regulation became effective on 07/11/2007 to control NOx emissions from stationary combustion turbine EGUs with base-load nameplate capacities of 1 MW or greater;
2) It was developed to fulfill requirements for controlling NOx emissions in high-electric-demand-days (HEDDs) during the ozone season, as required in the OTC Model Rule for HEDD Turbines (2009);
3) It addresses short term NOx emissions from the covered sources and reduces their daily impacts on ozone air quality during the ozone season;
4) It sets up RACT-level NOx emission limits, 42 ppmv (parts per million by volume) for gaseous fuel and 88 ppmv for liquid fuel, for the covered EGUs;
5) It also implements NOx emission requirements for covered combustion turbine EGUs in HEDDs during the ozone season;
6) It establishes standards for monitoring and reporting, recordkeeping for the covered EGUs;
7) The stationary combustion turbines covered by Regulation 1148 are in general exempted from Regulation 1112 because of their small capacities. Delaware, however, determines that these units had high daily NOx emissions and therefore should be controlled to aid in attainment and maintenance of the ozone NAAQS in the ozone season.

## 3.3. Optimized Operation Limits as RACT Controls for Refinery Units

The DAQ has reviewed the 2017 Delaware emission inventory[16] and has determined that the requirements of Regulation 1112, Section 2.0 of 1142, 1144, 1146, and 1148 continue to provide adequate NOx RACT emissions controls under the 2015 8-hour ozone NAAQS for all NOx emission units except for two units located at the Delaware City Refinery. These two units are the fluid-coking unit (FCU) and the fluid-catalytic-cracking unit (FCCU).

The Delaware City refinery currently complies with Section 2.0 of Regulation 1142 by compliance with a facility-wide NOx emission cap.[17] In addition, $NO_x$ short-term and long-term emission limits from the FCU and the FCCU are covered under an EPA consent decree finalized in letters from EPA to the refinery dated May 21, 2014. In its 2008 RACT SIP Revision, Delaware established the consent decree limits as RACT limits for these two units as follows:

1) The FCU and FCCU each generate NOx and carbon monoxide (CO), the latter being combusted in a downstream CO Boiler;
2) The FCU and FCCU NOx limits are established as follows:
   a) FCU: 152.0 ppmvd (parts per million by volume dry) @ 0% $O_2$ on a 7-day rolling average basis and 115.2 ppmvd @ 0% $O_2$ on a 365-day rolling average basis;
   b) FCCU: 137.0 ppmvd @ 0% $O_2$ on a 7-day rolling average basis and 100.7 ppmvd @ 0% $O_2$ on a 365-day rolling average basis;
3) For days in which the units are not operating, no $NO_x$ value shall be used in the average, and those periods shall be skipped in determining the 7-day and 365-day averages;
4) The DAQ finds the optimized limits described above to be the lowest emission limitation that the units are capable of meeting by the application of control technology that is reasonably available for the two units considering technological and economic feasibility;
5) The following were incorporated into Delaware's 2008 RACT SIP revision and approved by the EPA as adequate under the 2008 ozone NAAQS. The DAQ contends that these requirements for the FCU and FCCU meet the RACT requirements under the 2015 8-hour ozone NAAQS:
   a) The optimized limits as described in (4) above;
   b) The compliance requirements as specified in Section 2.4.1 of Regulation 1142.
   c) The recordkeeping and reporting requirements as specified in Section 2.5 of Regulation 1142.

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[16] Delaware's 2017 emissions inventory has been prepared internally by DAQ. The emissions will be publicly available on the EPA's website for the 2017 National Emissions Inventory (NEI) https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data.

[17] A facility-wide emissions cap incorporates an overall emissions limit for a pollutant on a plant-wide basis. The cap is designed to maintain compliance with all applicable emission limits, but provides the facility with some flexibility in the operation of individual emissions units.

# 4. NEGATIVE DECLARATIONS

Some RACT controls have not been adopted in Delaware because there are no targeted emission sources in Delaware. The DAQ makes the negative declarations for the following RACT controls:

1) Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires, EPA-450/2-78-030, December 1978. (Group II).
2) Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations, EPA-453/R-96-007, April 1996.
3) Control Techniques Guidelines for Shipbuilding and Ship Repair Operations (Surface Coating) - August 1996 (61 FR 44050), August 27, 1996.
4) Control Techniques Guidelines for Fiberglass Boat Manufacturing Materials. EPA-453/R-08-004, September 2008.
5) Control Techniques Guidelines for the Oil and Natural Gas Industry. EPA-453/B-16-001, October 2016.

In addition, in its implementation rule for the 1997 8-hour ozone NAAQS (70 FR 71612, November 29, 2005), EPA identified that cement kilns and stationary internal combustion engines were two source categories for which additional $NO_X$ control information was available since the RACT determinations under the 1-hour ozone NAAQS were made. However, Delaware declares that (1) it does not have cement kilns within its boundary and (2) the stationary internal combustion engines in Delaware are regulated by the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and New Source Performance Standards (NSPS) for reciprocating internal combustion engines (RICE) (Note that the subgroup of stationary generators is now covered by Regulation 1144).

Furthermore, Delaware declares that it does not have any new major stationary VOC and $NO_X$ emission sources that fall outside the scope of the implemented RACT VOC rules (i.e., sections in Regulation 1124), RACT NOx rules (i.e., source groups of Regulation 1112), and other VOC rules and NOx rules discussed in 2.2 and 3.2 of this document, respectively.

# 5. DOCUMENTATION

## 5.1. List of EPA's Control Techniques Guidelines (CTG) documents, Alternative Control Techniques (ACT) documents, and Additional Reference Documents, cited in this RACT SIP revision.


1) Control Technology Guidance (CTG) document: Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations, EPA-453/R-97-004, December 1997.
2) Alternative Control Techniques (ACT) document: Reduction of Volatile Organic Compound Emissions from Automobile Refinishing, EPA-450/3-88-009, October 1988.
3) ACT: Automobile Refinishing, EPA-453/R-94-031, April 1994.
4) ACT: Surface Coating of Automotive/Transportation and Business Machine Plastic Parts, EPA-453/R-94-017, February 1994.
5) CTG: Control of Volatile Organic Emissions from Existing Stationary Sources, Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks, EPA-450/2-77-008, May 1977 (Group I).
6) CTG: Control of Volatile Organic Emissions from Existing Stationary Sources, Volume III: Surface Coating of Metal Furniture, EPA-450/2-77-032, December 1977.
7) CTG: Control of Volatile Organic Emissions from Existing Stationary Sources, Volume V: Surface Coating of Large Appliances, EPA-450/2-77-034, December 1977 (Group I).
8) CTG: Control of Volatile Organic Emissions from Existing Stationary Sources, Volume IV: Surface Coating of Insulation of Magnet Wire, EPA-450/2-77-033, December 1977 (Group I).
9) CTG: Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VI: Surface Coating of Miscellaneous Metal Parts and Products, EPA-450/2-78-015, June 1978 (Group II).
10) CTG: Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VII: Factory Surface Coating of Flat Wood Paneling, EPA-450/2-78-032, June 1978 (Group II).
11) CTG: Control of Volatile Organic Emissions from Bulk Gasoline Plants, EPA-450/2-77-035, December, 1977 (Group I).
12) CTG: Control of Volatile Organic Emissions from Bulk Gasoline Plants, EPA-450/2-77-035, December, 1977 (Group I).
13) CTG: Design Criteria for Stage I Vapor Control Systems - Gasoline Service Stations, November 1975 (Group I).
14) CTG: Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals, EPA-450/2-77-026, December 1977 (Group I).
15) CTG: Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems, EPA-450/2-78-051, December 1978 (Group II).
16) CTG: Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds, EPA-450/2-77-025, October 1977 (Group I).
17) CTG: Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment, EPA-450/2-78-036, June 1978 (Group II).
18) CTG: Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks, EPA-450-2/78-047, December 1978 (Group II).

19) CTG: Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed Roof Tanks, EPA-450/2-77-036, December 1977 (Group I).
20) CTG: Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants, EPA-450/2-83-007, December 1983 (Group III).
21) CTG: Control of Volatile Organic Emissions from Solvent Metal Cleaning, EPA-450/2-77-022 November 1977 (Group I).
22) ACT: Halogenated Solvent Cleaners, EPA-450/3-89-030, August 1989.
23) CTG: Control of Volatile Organic Compounds from Use of Cutback Asphalt, EPA-450/2-77-037, December 1977 (Group I).
24) CTG: Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products, EPA-450/2-78-029, December 1978 (Group II).
25) CAA Section 182(b)(3).
26) CTG: Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VIII: Graphic Arts-Rotogravure and Flexography, EPA-450/2-78-033, December 1978 (Group II).
27) CTG: Control of Volatile Organic Compound Emissions from Large Petroleum Dry Cleaners, EPA-450/3-82-009, September 1982 (Group III).
28) CTG: Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations in SOCMI, November 15, 1993, EPA-450/4-91-031.
29) CTG: Control of Volatile Organic Compound Fugitive Emissions from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment, EPA-450/3-83-006, March 1984 (Group III).
30) CTG: Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins, EPA-450/3-83-008, November 1983 (Group III).
31) CTG: Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry, EPA-450/3-84-015, December 1984 (Group III).
32) CAA Section 183(f).
33) ACT: Control of Volatile Organic Compound Emissions from Batch Processes, EPA-453/R-93-017, February 1994.
34) ACT Document: Industrial Cleaning Solvents, EPA-453/R-94-015, February 1994.
35) CTG: Control of Volatile Organic Compound Emissions from Offset Lithographic Printing (CTG Draft), EPA-453/D-95-001, September 1993.
36) ACT: Offset Lithographic Printing, EPA-453/R-94-054, June 1994.
37) CTG: Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations in SOCMI, November 15, 1993, EPA-450/4-91-031.
38) ACT: Volatile Organic Liquids Storage in Floating and Fixed Roof Tanks, EPA-453/R-94-001, February 1994.
39) CAA Section 182(b)(2)(C).
40) Stationary Source Committee Recommendation on NOx RACT for Utility Boilers, North-East States for Coordinated Air Use Management (NESCAUM), 8/12/1992.
41) Stationary Source Committee Recommendation on NOx RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, North-East States for Coordinated Air Use Management (NESCAUM), 9/18/1992.

42) Controlling Emissions of Nitrogen Oxides from Existing Utility Boilers Under Title I of the Clean Air Act: Options and Recommendations, State and Territorial Air Pollution Program Administrators and Association of Local Air Pollutions Officials (STAPPA/ALAPCO), 4/27/1992.
43) State Implementation Plans; Nitrogen Oxides Supplement to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, USEPA, 10/27/1995.
44) Summary of NOx Control Technologies and their Availability and Extent of Application, USEPA, February 1992.
45) Alternative Control Techniques Document: NOx Emissions from Process Heaters (Revised), USEPA, September 1993.
46) Alternative Control Techniques Document: NOx Emissions from Industrial/Commercial/Institutional (ICI) Boilers, USEPA, March 1994.
47) Alternative Control Techniques Document: NOx Emissions from Utility Boilers, USEPA, March 1994.
48) State's Report on Electric Utility Nitrogen Oxides Reduction Technology Options for Application by the Ozone Transport Assessment Group (OTAG), prepared for the OTAG Control Technology & Options Workgroup by Ken Colburn, 4/11/1996.
49) Status Report on NOx Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000.
50) Summary of State/Local NOx Regulations for Stationary Sources, USEPA, 2004.
51) Summary of NOx Control Technologies and their Availability and Extent of Application, USEPA, February 1992.
52) Summary of NOx Control Technologies and their Availability and Extent of Application, USEPA February 1992.
53) Memorandum subject, Fuel Switching to Meet the Reasonably Available Control Technology (RACT) Requirements for Nitrogen Oxides (NOx), Michael H. Shapiro, Air and Radiation, 7/30/1993.
54) Memorandum subject, Nitrogen Oxides (NOx) Questions from Ohio EPA, Tom Helms, Chief Ozone/Carbon Monoxide Programs Branch, (no date cited, references 11/30/1993 questions).
55) State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, USEPA.
56) Alternative Control Techniques Document: NOx Emissions from Stationary Gas Turbines, USEPA, January 1993.
57) Alternative Control Techniques Document: NOx Emissions from Stationary Reciprocating Internal Combustion Engines, USEPA 1993.
58) NOx Emissions from Stationary Internal Combustion Engines, USEPA, October 2003.
59) Stationary Reciprocating Internal Combustion Engines – Updated Information on NOx Emissions and Control Techniques – Revised Final Report, USEPA, 9/1/2000.
60) Sourcebook: NOx Control Technology Data, USEPA, July 1991.
61) Memorandum Subject: De Minims Values for NOx RACT, from G.T. Helms, Ozone Policy and Strategies Group, dated 1/1/1995.
62) Alternative Control Techniques Document: NOx Emissions from Iron and Steel Mills, USEPA, September 1994.

63) The “Blue Book,” i.e., “ISSUES RELATED TO VOC REGULATION CUTPOINTS, DEFICIENCIES AND DEVIATIONS, Clarification to Appendix D of November 24, 1987 FEDERAL REGISTER,” May 25, 1988. https://www.epa.gov/sites/production/files/2016-08/documents/voc_bluebook_25may1988.pdf
64) Control Techniques Guidelines for Flat Wood Paneling Coatings. EPA 453/R-06-004, September 2006.
65) Control Techniques Guidelines for Industrial Cleaning Solvents. EPA 453/R-06-001, September 2006.
66) Control Techniques Guidelines for Flexible Package Printing. EPA 453/R-06-003, September 2006.
67) Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing. EPA-453/R-06-002, September 2006.
68) Control Techniques Guidelines for Paper Film and Foil Coatings. EPA 453/R-07-003, September 2007.
69) Control Techniques Guidelines for Metal Furniture Coatings. EPA 453/R-07-005, September 2007.
70) Control Techniques Guidelines for Large Appliance Surface Coating. EPA 453-07-004, September 2007.
71) Control Techniques Guidelines for Auto and Light-duty Truck Assembly Coatings. EPA 453/R-08-006, September 2008.
72) Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Primer-Surfacer and Topcoat Operations. EPA 453/R-08-002, September 2008.
73) Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings. EPA-453/R-08-003, September 2008.
74) Control Techniques Guidelines for Fiberglass Boat Manufacturing Materials. EPA-453/R-08-004, September 2008.
75) Control Techniques Guidelines for Miscellaneous Industrial Adhesives. EPA-453/R-08-005, September 2008.
76) Model Rule for Architectural, Industrial and Maintenance Coatings (AIM), Ozone Transport Commission (OTC), 2002.
77) Model Rule for Consumer Products, Ozone Transport Commission (OTC), 2006.
78) Model Rule for Adhesives and Sealants, Ozone Transport Commission (OTC), 2006.
79) Model Rule for Large Above-Ground VOC Storage Tanks, Ozone Transport Commission (OTC), 2010.
80) Model Rule for Solvent Degreasing, Ozone Transport Commission (OTC), 2012.
81) Letter from U.S. EPA (Philip Brooks, Director of Air Enforcement Division) to the Delaware City Refining Company (John Deemer, HSE Manager) dated May 21, 2014, establishing $NO_x$ limits for the fluid coking unit (FCU) under the consent decree.
82) Letter from U.S. EPA (Philip Brooks, Director of Air Enforcement Division) to the Delaware City Refining Company (John Deemer, HSE Manager) dated May 21, 2014, establishing $NO_x$ limits for the fluidized catalytic cracking unit (FCCU) under the consent decree.

**5.2. Delaware Reasonably Available Control Technology (RACT) State Implementation Plan (SIP) under the 8-Hour Ozone National Ambient Air Quality Standard (NAAQS), September 2006. Approved by EPA in July 2008 (73 FR 42681).**

**5.3. Delaware Reasonably Available Control Technology (RACT) State Implementation Plan (SIP) Under the 2008 Ozone National Ambient Air Quality Standard (NAAQS), August 2014. Approved by EPA in December 2018 (82 FR 57849).**

**5.4. Delaware VOC RACT Regulation**
**7 DE Admin. Code 1124 Control of Volatile Organic Compound Emissions**
**http://regulations.delaware.gov/AdminCode/title7/1000/1100/Split1124/index.shtml#TopOfPage**
**(Note: Hard copy of this regulation is available upon request.)**

**5.5. Delaware NOx RACT Regulation**
**7 DE Admin. Code 1112 Control of Nitrogen Oxides Emissions**
**http://regulations.delaware.gov/AdminCode/title7/1000/1100/1112.shtml#TopOfPage**
**(Note: Hard copy of this regulation is available upon request.)**

**5.6. Other Delaware Regulations Included in This RACT SIP Document**
**Regulations are available at:**
**http://regulations.delaware.gov/AdminCode/title7/1000/1100/index.shtml#TopOfPage**
**(Note: Hard copies of the regulations are available upon request.)**

**5.7. White Paper on Control Technologies and OTC State Regulations for Nitrogen Oxides (NOx) Emissions from Eight Source Categories (2/10/2017), available at: https://otcair.org/upload/Documents/Reports/WhitePaper_NOx_Control_04052017.pdf**

# Appendix K

# Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2016 Based Modeling Platform Support Document

## Ozone Transport Commission

## 1st Version

## January 31, 2023

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# Table of Contents

# Executive Summary

The purpose of this Technical Support Document (TSD) is to detail committee work completed by the Ozone Transport Commission (OTC) to develop and operate a photochemical modeling platform needed by member states for their State Implementation Plan (SIP) attainment demonstrations for the 2008 and 2015 Ozone National Ambient Air Quality Standard (NAAQS). The OTC modeling platform is based on the year 2016 with future year emission inventory projections to 2023 and 2028 for platform V1. Modeling results and model performance are presented and analyzed for the base year, 2016. Results and analyses of air quality model projections for 2023 are included in this report while results for 2028 will be included in a later document.

The modeling exercises documented in this TSD demonstrate acceptable performance of the platform as required for federally approvable SIPs. These exercises are committee products primarily related to development and testing of the 2016 modeling platform for the 2016 base and 2023 projected emissions inventories. Specialty screening exercises, such as tagged emissions modeling and episodic modeling, were performed at the request of OTC Air Directors and are also presented in the TSD. OTC's 2016 modeling platform relies on generally accepted conservative assumptions regarding emissions inventories and ozone photochemistry.

Specific committee products described in the TSD include the following:

- The evaluation of modeled meteorological and biogenic emissions inputs.
- A comparison of performance between the Community Multi-scale Air Quality model (CMAQ) and the Comprehensive Air Quality Model with Extensions (CAMx).
- The evaluation of a 4 km subdomain in the highest-ozone portion of the Ozone Transport Region (OTR).
- The evaluation of data handling techniques for near-water monitoring locations.
- Tagged emission modeling for the 2023 projected year.
- The development of an episodic modeling platform that focuses on analyzing approximately one-third of the full ozone season and its application toward high energy demand day screening modeling for electricity generating/peaking units.
- Detailed modeling results for base cases and specialty model runs.

A summary of emissions inventory inputs is provided in the OTC's TSD, but greater detail can be found in the Environmental Protection Agency's (EPA) TSD for their 2016 emissions modeling platform.

This TSD does not contain every modeling exercise performed by individual OTC modeling centers with the 2016 based modeling platform. For example, additional exploratory screening analyses, modeling performed outside of committee efforts, and work performed using a "best science" platform are not presented in this TSD. OTC member states performing additional SIP relevant modeling intend to document those efforts in the supporting documentation for their individual SIPs.

# 1 Introduction

## *1.1 Purpose*

The purpose of this report is to document the results and technical details of State Implementation Plan (SIP) quality modeling efforts undertaken by the Ozone Transport Commission (OTC)/Mid-Atlantic Northeast Visibility Union (MANE-VU) to support member state SIP submittals for the 2008 and 2015 ozone standards. The OTC platform described here is currently not needed for regional haze modeling purposes. For previous regional haze modeling, please see the OTC/MANE-VU *2011-Based Modeling Platform Support Document.*[1]

## *1.2 Document Outline*

Environmental Protection Agency (EPA) guidance on modeling for ozone ($O_3$) includes recommendations for documentation of the modeling platform that should be included in SIP submissions.[2] This document addresses EPA recommendations as follows:

- Section 1 (current section) presents:
  - an overview of the air quality issue being considered including historical background,
  - a list of participants in the analysis and their roles,
  - a schedule of key dates relevant to ozone modeling, and
  - a description of the conceptual model of ozone formation in the region.
- Section 2 presents:
  - a description of periods to be modeled, how they comport with the conceptual model, and why they are sufficient,
  - the selected models and emissions inventories, how they are setup and why they are appropriate, and
  - a description and justification of the domain to be modeled (expanse and resolution).
- Sections 3, 4, and 5 discuss:
  - a description of model inputs and their expected sources (e.g., emissions, meteorology, etc.),
  - the methods used in processing emissions for use in the SIP quality modeling platform for the base year,
  - an assessment of the meteorological model used in the platform, and
  - consideration of a more recent biogenic emissions model.

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[1] Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018 Update, 2nd version (Oct. 18, 2018), *available at* *https://otcair.org/upload/Documents/Reports/OTC%20MANE-VU%202011%20Based%20Modeling%20Platform%20Support%20Document%20October%202018%20-%20Final.pdf*.

[2] https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

- Sections 6, 7, and 11 cover:
    - the process for evaluating base year model performance (meteorology, emissions, and air quality) and demonstrating that the model is an appropriate tool for the intended use,
    - a methodology for improving model performance using nested gridding and analyzed the results from implementing the methodology, and
    - a methodology for conducting screening analysis using only ozone episodes, evidence for its performance, and its application on high electric demand days.
- Sections 8 and 9 describe:
    - the future years to be modeled,
    - a description of the National Ambient Air Quality Standard (NAAQS) attainment test procedures,
    - methods for calculating future projected ozone design values in instances where the default method may not be warranted, and
    - the projected future year ozone design values.
- Section 10 presents:
    - an overview of the tagged modeling source apportionment project,
    - methodology used to determine tagged sources, and
    - results on the ozone contributions from sources at key monitor locations.
- Section 12 presents:
    - an overview of peak electricity generating units, and goal of analysis,
    - methodology used to develop emissions for screening modeling, and
    - results of targeted unit impacts on daily ozone and ozone design values.
- Section 13 presents:
    - a summary of OTC-produced data visualization work products.

Thus, this document examines all necessary elements recommended for SIP approvable ozone modeling following guidance outlined in EPA 454/R 009 dated November 2018.

## *1.3 History*

The Clean Air Act (CAA) requires EPA to establish, and periodically review, primary and secondary National Ambient Air Quality Standards (NAAQS) for the protection of public health and welfare, respectively. To date, criteria for NAAQS have been established for six pollutants, including ground-level (tropospheric) ozone.

The CAA delegates to states the authority to implement plans (i.e., the SIPs) to attain and maintain air quality that is within the NAAQS. These plans will include rules designed to limit the emissions or ambient concentrations of pollutants that may deteriorate air quality within the state. States evaluate these plans, together with other federally enforceable rules, to determine their effect on air quality. Because ozone is a reaction product of other pollutants, mainly nitrogen oxides (NOx) and volatile organic compounds (VOC), and can be transported long distances, states use national inventories of these pollutants and complex regional scale ozone models to demonstrate the efficacy of their SIPs in attaining and maintaining compliance with the ozone NAAQS. These “attainment demonstrations” are required under the CAA for certain designated nonattainment areas and the modeling included in this report may be used to support those demonstrations.

The following is an overview of the current ozone NAAQS for which the modeling documented in this report is applicable.

## 1.4 2015 8-hour Ozone NAAQS

In 2015 the primary and secondary ozone NAAQS were set to 0.070 ppm (equivalent to 70 ppb) for the three-year average of the 4th highest 8-hour average ozone concentration (US EPA 2015b). Areas were designated for the 2015 NAAQS as seen in **Table 1-1** (US EPA 2018a). Reclassifications for certain nonattainment areas were published in the Federal Register [87 FR 60897, 07OCT22] with an effective date of November 7,2022. These most recent classifications are also listed in the table.

Areas classified as marginal are not required to include modeling demonstrations with their SIPs. However, areas classified, or re-classified, as moderate or higher are required to submit modeling demonstrations and may rely on this TSD to support their SIP submittals.

***Table 1-1*** *Nonattainment areas and original/current classifications in the OTR for 2015 Ozone NAAQS.*

| 2015 NAAQS | | | | |
|---|---|---|---|---|
| **Area Name** | **State** | **No. Counties** | **Original Classification** | **Current Classification** |
| Baltimore, MD | MD | 6 | Marginal | Moderate* |
| Greater Connecticut, CT | CT | 5 | Marginal | Moderate* |
| NYC-N. NJ-Long Island, NY-NJ-CT | CT | 3 | Moderate | Moderate |
| | NJ | 12 | | |
| | NY | 9 | | |
| Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE | NJ | 9 | Marginal | Moderate* |
| | DE | 1 | | |
| | MD | 1 | | |
| | PA | 5 | | |
| Washington, DC-MD-VA | DC | 1 | Marginal | Moderate*QCD |
| | MD | 5 | | |
| | VA | 9 | | |

** - Failed to attain by the original attainment date*
*QCD- Currently Qualifies for Clean Data*

## 1.5 2008 8-hour Ozone NAAQS

In 2008 the primary and secondary ozone NAAQS were set to 0.075 ppm (equivalent to 75 ppb) for the three-year average of the 4th highest 8-hour average ozone concentration (US EPA, 2008). After some delays in timeframes outlined in the CAA, areas were designated for the 2008 NAAQS as shown in **Table 1-2** (US EPA, 2012). Reclassifications for certain nonattainment areas, effective November 7, 2022 [87 FR 60926], are also listed in this table.

***Table 1-2*** *Nonattainment areas and original/current classifications in the OTR for 2008 Ozone NAAQS.*

| 2008 NAAQS | | | | |
|---|---|---|---|---|
| **Area Name** | **State** | **No. Counties** | **Original Classification** | **Current Classification** |
| Baltimore, MD | MD | 6 | Moderate | Moderate[CD] |
| Greater Connecticut, CT | CT | 5 | Marginal | Attainment |
| NYC-N. NJ-Long Island, NY-NJ-CT | CT | 3 | Marginal | Severe* |
| | NJ | 12 | | |
| | NY | 9 | | |
| Allentown-Bethlehem-Easton, PA | PA | 3 | Marginal | Marginal[CD] |
| Dukes County, MA | MA | 1 | Marginal | Marginal[CD] |
| Jamestown, NY | NY | 1 | Marginal | Marginal[CD] |
| Lancaster, PA | PA | 1 | Marginal | Marginal[CD] |
| Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE | NJ | 9 | Marginal | Marginal[CD] |
| | DE | 1 | | Marginal[CD] |
| | MD | 1 | | Marginal[CD] |
| | PA | 5 | | Marginal[CD] |
| Pittsburgh-Beaver Valley, PA | PA | 7 | Marginal | Marginal[CD] |
| Reading, PA | PA | 1 | Marginal | Marginal[CD] |
| Seaford, DE | DE | 1 | Marginal | Marginal[CD] |
| Washington, DC-MD-VA | DC | 1 | Marginal | Maintenance |
| | MD | 5 | | Maintenance |
| | VA | 9 | | Maintenance |

** - Failed to attain by the original attainment date*

*CD- Clean Data*

## *1.6 Geographic Definitions*

Throughout this document, several geographic definitions will be used that are based on the boundaries of Regional Planning Organizations (RPOs). **Table 1-3** lists the member states (including DC) of the OTC, MANE-VU, Southeastern Air Pollution Control Agencies (SESARM), Lake Michigan Air Directors Consortium (LADCO), and Central States Air Resource Agencies (CenSARA) RPOs.

***Table 1-3*** *List of states in geographic areas based on RPOs*

| OTC | MANE-VU | SESARM | LADCO | CenSARA |
|---|---|---|---|---|
| Connecticut | Connecticut | Alabama | Illinois | Arkansas |
| District of Columbia | District of Columbia | Florida | Indiana | Iowa |
| Delaware | Delaware | Georgia | Michigan | Kansas |
| Massachusetts | Massachusetts | Kentucky | Minnesota | Louisiana |
| Maryland | Maryland | Mississippi | Ohio | Missouri |
| Maine | Maine | North Carolina | Wisconsin | Nebraska |
| New Hampshire | New Hampshire | South Carolina | | Oklahoma |
| New Jersey | New Jersey | Tennessee | | Texas |
| New York | New York | Virginia | | |
| Pennsylvania | Pennsylvania | West Virginia | | |
| Rhode Island | Rhode Island | | | |
| Virginia – DC Area | Vermont | | | |
| Vermont | | | | |

## 1.7 Participants

*OTC Air Directors*

OTC Air Directors serve as overseers of the work products developed by the OTC Modeling Committee. The OTC Air Directors coordinate the design of control strategies for the Ozone Transport Region (OTR) and make recommendations on policies and strategies which may be implemented to reduce ozone throughout the region. Members of the OTC Modeling Committee keep Air Directors informed of progress in development of the OTC SIP quality modeling platform and Air Directors review all OTC SIP quality modeling platform documentation before it is finalized.

*OTC Modeling Committee*

The OTC Modeling Committee members serve as first tier reviewers of the work products developed for the SIP quality modeling platform. The OTC Modeling Committee approves technical approaches used in the modeling platform, reviews results, and approves products for review by the Air Directors. Since members of three EPA regions are members of the OTC Modeling Committee, they help provide insights into any issues that may occur involving SIP acceptability of the OTC modeling platform.

*OTC Modeling Planning Group*

The OTC Modeling Planning Group is made up of members of the modeling centers and the OTC Modeling Committee leadership. The workgroup reviews technical decisions to bring recommendations on approaches to the OTC Modeling Committee.

*OTC Technical Support Document Workgroup*

The OTC Technical Support Document (TSD) Workgroup, a subgroup of the Modeling Committee, is responsible for compiling drafts of the technical documentation for review by the OTC Modeling Planning Group.

*OTC Modeling Centers*

The OTC Modeling Centers are the state staff and academics that perform modeling and conduct analyses of modeling results. They include New York State Department of Environmental Conservation (NYSDEC), New Jersey Department of Environmental Protection (NJDEP), Virginia Department of Environmental Quality (VADEQ), University of Maryland College Park (UMCP) via the Maryland Department of the Environment (MDE), and Office of Research Commercialization (ORC) at Rutgers University via New Jersey Department of Environmental Protection (NJDEP).

*MANE-VU*

MANE-VU's primary focus areas is regional haze for the northeastern and mid-Atlantic states. Regional haze SIPs are due every ten years. The next round of regional haze SIP submittals requiring modeling will not be due until 2028. Therefore, regional haze is not discussed further in this TSD.

*MARAMA Emission Inventory Leads Committee*

The Mid-Atlantic Regional Air Management Association (MARAMA) coordinated the emission inventory for the states of the OTR through the Emission Inventory Leads Committee, which is made up of state staff who make technical recommendations involving the multi-pollutant emissions inventory, as well as provide quality assurance (QA) of the inventories.

## 1.8 Schedule

**Table 1-4** provides an overview of important dates which guided scheduling modeling referred to in this document. Although the V2 emissions platform had been released, this document reflects modeling conducted using the latest updates of the V1 emissions inventory only.

***Table 1-4*** *Multi-pollutant modeling dates relevant to the 2016 platform.*

| PROCESS POINT | 2008 NAAQS TIMEFRAME | 2015 NAAQS TIMEFRAME |
|---|---|---|
| 2016 V1 Inventory for $O_3$ | October 2019 | |
| 2016 V2 Inventory for $O_3$ | July 2022 | |
| 2016 V2 Base Case Modeling for $O_3$ | August 2022 | |
| 2023/2026 V2 Future Case Emissions/Modeling for $O_3$ | September 2022 | |
| NYC NY-NJ-CT Moderate 2015 NAAQS Attainment Deadline | -- | August 2024[a] |

| | | |
|---|---|---|
| PA-NJ-MD-DE and Greater CT Moderate 2015 NAAQS Attainment Deadline | -- | August 2024[a] |
| NYC NY-NJ-CT Severe-15 2008 NAAQS Attainment Deadline | July 2027[a] | -- |

[a] *Attainment based on prior year ozone data.*

## 1.9 Ozone Conceptual Model

The interaction of meteorology, chemistry, and topography lead to a complex process of ozone formation and transport. Ozone episodes in the OTR often begin with an area of high pressure setting up over the southeast United States. These summertime high-pressure systems can stay in place for days or weeks. This scenario allows for stagnant surface conditions to form in the OTR, and, in turn, the transported pollution mixes with local pollution in the late morning hours as the nocturnal inversion breaks down. With a high-pressure system in place, the air mass, which is characterized by generally sunny and warm conditions, exacerbates ozone concentrations. This meteorological setup promotes ozone formation, as sunlight, warm temperatures, and ozone precursors (nitrogen oxides (NOx) and volatile organic compounds (VOCs)) interact chemically to form ozone. In addition, ozone precursors and ozone are transported into the OTR during the late night and/or early morning hours from the areas to the southwest of the OTR by way of the nocturnal low-level jet (NLLJ), a fast-moving river of air that resides approximately 1,000 meters above the surface. All this local and transported polluted air can, in some instances, accumulate along the coastal OTR areas as the air is kept in place due to onshore bay and sea breezes.

Some ozone is natural, or transported internationally, leading to ozone that is not considered relatable to US human activity. This US background ozone in the eastern United States is estimated to be in the range of 30 to 35 ppb though it can be as high as 50 ppb in the Intermountain West (US EPA 2014).

Another complexity involves the nonlinear relationship between $NO_X$ and VOC concentrations and ozone formation. Areas that have extensive forests that produce high levels of isoprene and other VOCs during the summer months more readily control ozone through reductions in regional $NO_X$ emissions. This is the case in the majority of the landscape in the OTR. Conversely, dense urban areas such as New York City, that have low natural VOC production, may more readily benefit locally from VOC emission reductions. In other cases, excess $NO_X$ is available to destroy already formed ozone. The phenomenon is known as titration and in areas where this occurs, such as New Haven harbor, reductions of $NO_X$ can increase ozone levels.

To address the complexity of ozone formation and transport that occurs in the OTR, the 2016-based modeling year was selected as representative of the conceptual model as described in “The Nature of the Ozone Air Quality Problem in the Ozone Transport Region: A Conceptual Description” (Downs et al. October 2010).

## 1.10 Model Year Selection

### 1.10.1 Base Year

The Base Year Selection Workgroup of the 2016 Inventory Collaborative examined several candidate base years, including 2014, 2015, and 2016. In practical terms, 2014 would have been a top choice since it aligns with the triennial National Emissions Inventory (NEI) cycle and the 2014 NEI could have readily served as the basis for the modeling inventories. However, the meteorological conditions during the summer of 2014 were least conducive to ozone formation, making the year 2014 a poor choice as the basis of a modeling platform for ozone formation. Ultimately, the Base Year Selection Workgroup recommended that both 2015 and 2016 be used as base years, but that 2016 should be the focus if time and resource constraints allow for only one. This was decided for simplicity and to keep all portions of the country working with the same period of data. Therefore, 2016 was ultimately selected as the base year due to these restraints. More details can be found in the document "Base Year Selection Workgroup Final Report"[3] produced by the Inventory Collaborative Base Year Selection Workgroup, December 12, 2017.

### 1.10.2 Future Year

The New York Metropolitan Moderate Nonattainment Area for the 2015 ozone NAAQS, which includes Long Island and parts of Connecticut and New Jersey, has a deadline of August 2024 to attain the 2015 ozone NAAQS. Because attainment is based on the most recent complete ozone season, attainment is based on 2023 design values. It was plausible that marginal nonattainment areas in Connecticut, Delaware, Maryland, New Jersey, Pennsylvania, and perhaps the District of Columbia, would be reclassified to moderate nonattainment and therefore face the same August 2024 deadline for attaining the 2015 $O_3$ NAAQS. Therefore, a future analysis year of 2023 was selected to best meet the attainment planning needs of these jurisdictions.

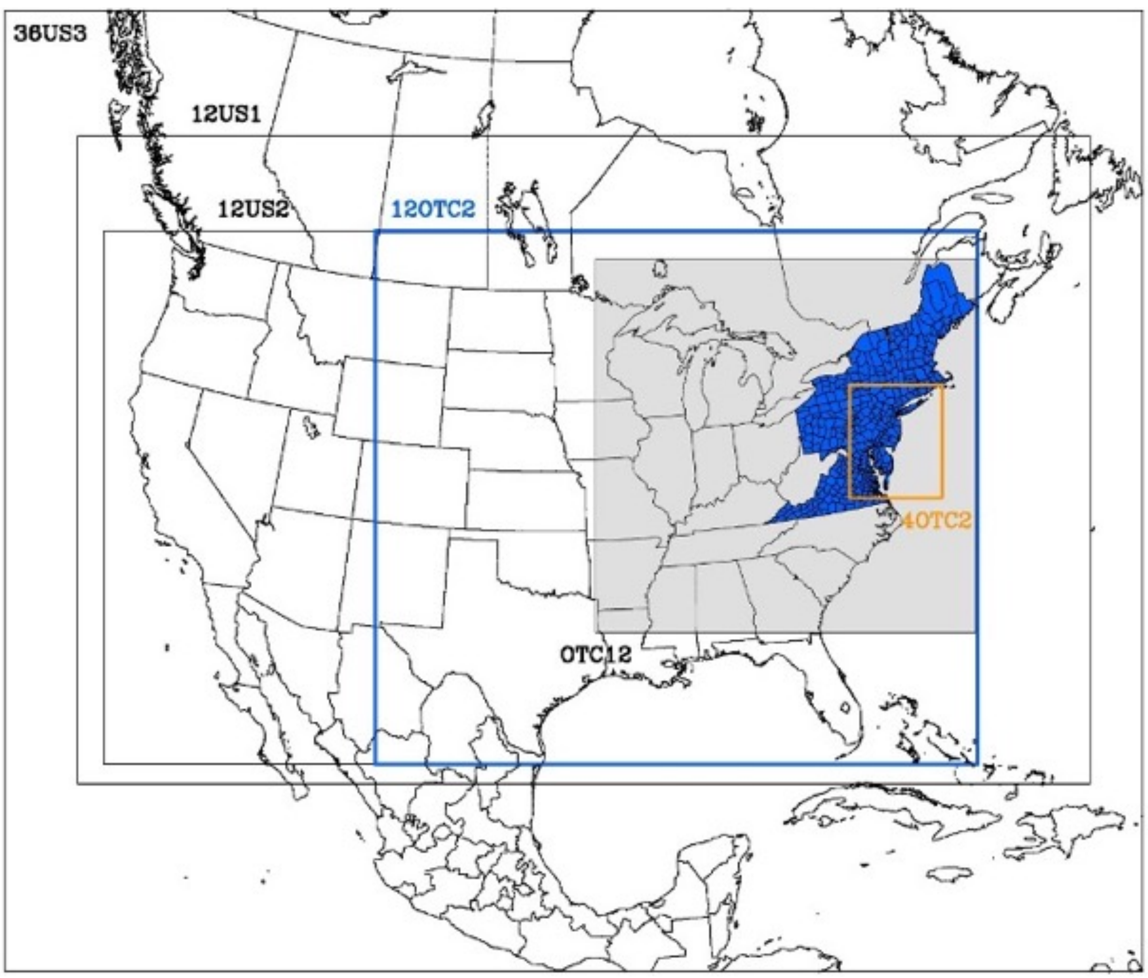
[3] Base Year Selection Workgroup Final Report, www.wrapair2.org/pdf/2017-12-12_Base_Year_Selection_Report_V1.1.pdf

# 2 8-Hour Ozone Modeling Using the CMAQ and CAMx Modeling Platforms

## 2.1 Air Quality Modeling Domain

The modeling domain used in this platform represents a subset of the larger EPA continental-modeling domains (“12US1” and “12US2”) that cover the contiguous U.S. The OTC modeling domain at 12 km horizontal grid resolution (“12OTC2”), outlined in blue, is displayed in **Figure 2-1**. The 12 km by 12 km domain used in this analysis includes 38 full states (including DC) and four partial states (MT, WY, CO, and NM) from 110.17°W to 65.0931°W and 23.0019°N to 51.8794°N, which includes some portions of southern Canada and northern Mexico. The domain is 273 columns by 246 rows in the horizontal and 35 vertical layers—the same as the Weather Research Forecast (WRF) model—from the surface to 50 mb.

***Figure 2-1*** *The OTC modeling domains. The outermost 36 km domain (“36US3”) from EPA was used to develop boundary conditions for the 12 km OTC V1 platform (“12OTC2”). The 12OTC2 domain is a subset of the EPA 12 km platforms (“12US1” and “12US2”). The smaller 12 km domain (“OTC12”) used in the Beta modeling and the innermost 4 km domain (“4OTC2”) are also shown.*



The modeling system uses a Lambert conformal projection centered at (97°W, 40°N) and true latitudes 33°N and 45°N. Note that the 12OTC2 domain for the V1 modeling is roughly 2.5 times larger than the domain used for the Beta modeling ("OTC12"; 172 columns by 172 rows). The same domain is used for CMAQ and CAMx modeling. Boundary conditions for the 12OTC2 domain are generated from the larger 36 km by 36 km "36US3" also developed by the EPA. A high-resolution 4 km by 4 km nested grid ("4OTC2"; 126 columns by 156 rows) with the same vertical structure as the 12 km domain was used as further described in **Section 7**.

## 2.2 Vertical Layers

**Table 3-1** shows the values defining the vertical layers used in the photochemical modeling platform and the WRF model. This layer configuration was used in all modeling runs discussed.

## 2.3 Boundary and Initial Conditions.

### 2.3.1 Modeling with Beta Emissions

The 3-D boundary and initial conditions for the OTC12 km grid were extracted from National Oceanic and Atmospheric Administration's (NOAA's) 2016 national air quality forecast model at 12 km grid resolution. The CMAQ simulations used a 15-day ramp-up period to wash out the effect of the initial fields. The 12 km boundary and initial conditions for the CMAQ model were then converted into CAMx format.

### 2.3.2 Modeling with V1 Emissions

For V1 modeling a new set of boundary and initial conditions were created by NYSDEC running CMAQv5.3.1 at the 36US3 domain with "fh" emissions. Boundary and initial conditions for the 36US3 domain were obtained from the EPA's hemispheric 108 km CMAQ (H-CMAQ) platform downloaded from the Intermountain West Data Warehouse.[4] The 3-D fields from the 36US3 simulation provided boundary and intial conditions for the 12OTC2 CMAQ simulation and were also converted to CAMx format. The 12 km CMAQ and CAMx 3-D fields also provided boundary and initial conditions for the corresponding nested 4 km simulations.

## 2.4 Photochemical Modeling Configurations

### 2.4.1 CMAQ and CAMx Modeling with Beta Emissions

CMAQ v5.2.1 and CAMx v6.50 were used for the Beta modeling over the OTC12 domain. The CMAQ modeling software was obtained from the Community Modeling and Analysis System (CMAS) modeling center[5] and the CAMx software was obtained from Ramboll[6]. Key model options are listed in **Table 2-1**.

[4] http://views.cira.colostate.edu/iwdw/
[5] httsp://www.cmascenter.org
[6] https://www.camx.com

***Table 2-1*** *Key model options for the Beta modeling.*

| | CMAQ | CAMx |
|---|---|---|
| **Emissions** | 2016 Beta (ff) emissions inventory | 2016 Beta (ff) emissions inventory |
| **EGU point** | IPM | IPM |
| **Meteorology** | WRF v3.8, MCIP v4.3 (provided by EPA and NYSDEC cut to OTC12 km domain) | WRF v3.8, wrfcamx v4.6 (provided by EPA and NYSDEC cut to OTC12 km domain) |
| **Boundary conditions** | extracted from NOAA's 2016 national air quality forecast modeling (2016) | Converted CMAQ format to CAMx format |
| **Domain** | OTC12 domain, 172x172 | OTC12 domain, 172x172 |
| **Modeling period** | May to August, 2016 | May to August, 2016 |
| **Model layers** | 35 | 35 |
| **Model version** | CMAQ v5.2.1, cb6r3/AERO6 | CAMx v6.50, cb6r4 |
| **Resolution** | 12 km | 12 km |
| **Biogenic emissions** | BEIS v3.61 | BEIS v3.61 |
| **Science option** | Offline BEIS, no Wind Blown Dust model, no lightning NOx, M3dry, NH3 bidi | Chemistry Parameters: CAMx6.5.chemparam.CB6r4_CF_SOAP_ISORROPIA |

### 2.4.2 V1 CMAQ and CAMx Modeling

CMAQ v5.3.1 and CAMx v7.10 were used in the V1 modeling over the 12OTC2 and 4OTC2 domains. The modeling software was obtained from the CMAS modeling center[5] and the CAMx software was obtained from Ramboll.[6] Key model options are listed in **Table 2-2**.

***Table 2-2*** *Key model options for the V1 modeling.*

| | CMAQ | CAMx |
|---|---|---|
| **Emissions** | 2016 V1 (fi) emissions inventory | 2016 V1 (fi) emissions inventory |
| **EGU point** | ERTAC | ERTAC |
| **Meteorology** | WRF v3.8 (provided by EPA), MCIP v5.0 (processed by NYSDEC) | WRF v3.8, wrfcamx v4.6 (provided by EPA and NYSDEC cut to 12OTC2 domain) |

| | | |
|---|---|---|
| **Boundary conditions** | Extracted from 36 km (36US3) CMAQ v5.3.1 model runs using V1(fh) for 2016, 2023 and 2028 (CMV update, no airport update, IPM) | Converted CMAQ format to CAMx format |
| **Domain** | 12OTC2 domain, 273x246; 4OTC2 domain, 126x156 | 12OTC2 domain, 273x246; 4OTC2 domain, 126x156 |
| **Modeling period** | April to October, 2016 | April to October, 2016 |
| **Model layers** | 35 | 35 |
| **Model version** | CMAQ v5.3.1, cb6r3/AERO7 | CAMx v7.10, cb6r5 |
| **Resolution** | 12 km and 4 km | 12 km and 4 km |
| **Biogenic emissions** | BEIS v3.61 | BEIS v3.61 |
| **Science option** | Offline BEIS, no Wind Blown Dust model, no lightning NOx, M3dry, NH3 bidi (12 km), no NH3 bidi (4 km) | No NH3 bidi<br>Chemistry Parameters: CAMx7.1.chemparam.CB6r5_CF2E |

## *2.5 Source Apportionment Modeling*

Source apportionment modeling for the future year 2023 used CAMx v7.10. Details and results of the source apportionment modeling are shown in **Section 10** and **Appendix F**. The CAMx modeling software was obtained from Ramboll. For consistency with the modeling conducted by the EPA, the Anthropogenic Precursor Culpability Assessment (APCA) option was applied instead of Ozone Source Apportionment Technology (OSAT).

# 3 Evaluation of Meteorological Modeling Using WRF

OTC modeling is conducted using 2016 meteorology for baseline and all projected years. Climatologically, 2016 was a warmer than average year across much of the U.S. including in the OTR. Large regions of the Northeast experienced record warm temperatures during August 2016. Overall, the 2016 $O_3$ season was drier than average in the OTR states, in spite of higher rainfall than average in upstate New York, western Pennsylvania, northern Vermont, New Hampshire, and Maine in August 2016.

The OTC Modeling Committee used meteorology originally output from the Weather Research and Forecasting (WRF) v3.8 model simulations conducted by EPA members of the 2016 National Emissions Inventory Collaborative. Simulations were performed on the 36 km by 36 km North American domain and the 12 km by 12 km continental U.S. (CONUS) domain (see **Figure 2-1)**. WRF meteorology output was processed to be CMAQ- or CAMx-ready on the 12 km by 12 km OTC domain (12OTC2) using the Meteorology-Chemistry Interface Processor v4.5 (MCIP; Otte and Pleim, 2010). The OTC retained the same 12 km by 12 km horizontal resolution and 35-layer column depth as was used by EPA (WRF model layers described in **Table 3-1**). All OTC modeling centers used the same meteorology inputs.

Modeling physics options used include the Pleim-Xiu land surface model, Asymmetric Convective Model version 2 planetary boundary layer scheme, Kain-Fritsch cumulus parameterization utilizing the moisture-advection trigger (Ma and Tan, 2009), Morrison double moment microphysics, and RRTMG longwave and shortwave radiation schemes (Gilliam and Pleim, 2010). The 12 km by 12 km CONUS WRF simulation was initialized with the 12 km North American Model (12NAM) product from the National Climatic Data Center (NCDC) and the 40 km Eta Data Assimilation System (EDAS) analysis (ds609.2) when the former is not available. Boundary layer nudging was included for temperature, wind, and moisture. Lightning data assimilation into WRF to improve the precipitation estimate was included following Heath et al., (2016). Additional model parameter information can be referenced in the 2016 Collaborative report.[7] This is known as the “16j” version of meteorology.

## *3.1 Model performance analyzed by EPA/Collaborative*

In-depth model evaluation of WRF was performed by the 2016 collaborative and documented in the collaborative report.[5] Meteorological parameters from the model were evaluated against observations and include 2-meter temperature and mixing ratio, 10-meter wind speed and direction, shortwave radiation, and precipitation. Observations at airports for surface temperature, mixing ratio, and wind speed and direction, were obtained from the National Weather Service (NWS) in the U.S. and Environment Canada in Canada. Other observations were obtained from locations in the National Center for Atmospheric Research (NCAR) ds472 network (see Figure 3.1 of the 2016

[7] http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016beta_0311/MET_TSD_2016.pdf

Collaborative Meteorological TSD[7] for observation locations). Shortwave downward radiation observations were taken from the seven sites in SURFRAD[8] and the nine sites in SOLRAD.[9] Precipitation is estimated using the Parameter-elevation Relationships on Independent Slopes Model (PRISM) at a 2 km to 4 km resolution and re-projected to the WRF domain.

***Table 3-1** WRF layers and approximate height above ground level.*

| CMAQ/CAMx/WRF Layers | Approximate Height (m AGL) | Pressure (mb) | Sigma Level |
|---|---|---|---|
| 35 | 17,556 | 50 | 0.000 |
| 34 | 14,780 | 97.5 | 0.050 |
| 33 | 12,822 | 145 | 0.100 |
| 32 | 11,282 | 192.5 | 0.150 |
| 31 | 10,002 | 240 | 0.200 |
| 30 | 8,901 | 287.5 | 0.250 |
| 29 | 7,932 | 335 | 0.300 |
| 28 | 7,064 | 382.5 | 0.350 |
| 27 | 6,275 | 430 | 0.400 |
| 26 | 5,553 | 477.5 | 0.450 |
| 25 | 4,885 | 525 | 0.500 |
| 24 | 4,264 | 572.5 | 0.550 |
| 23 | 3,683 | 620 | 0.600 |
| 22 | 3,136 | 667.5 | 0.650 |
| 21 | 2,619 | 715 | 0.700 |
| 20 | 2,226 | 753 | 0.740 |
| 19 | 1,941 | 781.5 | 0.770 |
| 18 | 1,665 | 810 | 0.800 |
| 17 | 1,485 | 829 | 0.820 |
| 16 | 1,308 | 848 | 0.840 |
| 15 | 1,134 | 867 | 0.860 |
| 14 | 964 | 886 | 0.880 |
| 13 | 797 | 905 | 0.900 |
| 12 | 714 | 914.5 | 0.910 |
| 11 | 632 | 924 | 0.920 |
| 10 | 551 | 933.5 | 0.930 |
| 9 | 470 | 943 | 0.940 |
| 8 | 390 | 952.5 | 0.950 |
| 7 | 311 | 962 | 0.960 |
| 6 | 232 | 971.5 | 0.970 |
| 5 | 154 | 981 | 0.980 |
| 4 | 115 | 985.75 | 0.985 |
| 3 | 77 | 990.5 | 0.990 |
| 2 | 38 | 995.25 | 0.995 |
| 1 | 19 | 997.63 | 0.9975 |

[8] https://gml.noaa.gov/grad/surfrad/sitepage.html
[9] https://gml.noaa.gov/grad/solrad/solradsites.html

Model performance metrics include mean bias, mean error, fractional bias, and fractional error (Boylan and Russell, 2006) for temperature, wind speed and mixing ratio. Rainfall performance is assessed using monthly total rainfall values.

Performance statistics indicate that modeled wind speeds tend to overpredict in the morning and afternoon and underpredict in the evening and overnight. Across the OTR, monthly average biases remain low during the summer months, with daytime biases trending between -0.5 m/s and +1 m/s in the late spring and early summer and shifting to -1.5 m/s to +0.5 m/s on average. Daily average wind speeds are biased low in springtime by up to -2 m/s, with a shift towards high biases of up to +1 m/s at some locations by late summer. Coastal locations like Long Island and southeastern Massachusetts consistently exhibit modeled high biases of up to +2 m/s (Figures 3.1.8 and 3.1.9 of the 2016 Collaborative Meteorological TSD[7]).

***Table 3-2*** *Mean observed, mean modeled, mean bias (MB), mean absolute error (MAE), normalized mean bias (NMB), normalized mean error (NME), and root mean square error for wind speed (m/s) from the 2016 Collaborative meteorology TSD.*

| Season | Mean Obs (m/s) | Mean Mod (m/s) | MB (m/s) | MAE (m/s) | NMB (%) | NME (%) | RMSE (m/s) |
|---|---|---|---|---|---|---|---|
| **Spring** | 5.09 | 5.69 | 0.6 | 0.82 | 11.79 | 16.12 | 1.09 |
| **Summer** | 11.95 | 12.12 | 0.17 | 1.05 | 1.42 | 8.79 | 1.45 |
| **Fall** | 7.35 | 7.54 | 0.19 | 0.7 | 2.57 | 9.47 | 0.96 |
| **Winter** | 2.74 | 3.14 | 0.4 | 0.51 | 14.55 | 18.50 | 0.71 |

***Table 3-3*** *Mean observed, mean modeled, mean bias (MB), mean absolute error (MAE), normalized mean bias (NMB), normalized mean error (NME), and root mean square error (RMSE) for temperature (K) for the 12US simulation for the northeastern U.S. More data available in* ***Table 3.2.1*** *of the 2016 Collaborative Meteorology TSD[7].*

| Season | Mean Obs (K) | Mean Mod (K) | MB (K) | MAE (K) | NMB (%) | NME (%) | RMSE (K) |
|---|---|---|---|---|---|---|---|
| **Spring** | 282.51 | 282.26 | -0.25 | 1.59 | -0.09 | 0.56 | 2.13 |
| **Summer** | 295.16 | 295.46 | 0.30 | 1.35 | 0.19 | 0.46 | 1.85 |
| **Fall** | 285.68 | 285.95 | 0.27 | 1.52 | 0.09 | 0.53 | 2.05 |
| **Winter** | 272.41 | 272.20 | -0.21 | 1.74 | -0.08 | 0.64 | 2.33 |

Modeled two-meter temperatures vary in bias compared to observations during the ozone season. In March, April, and May, modeled temperatures are biased low, within -1 K. In June, July, August, and September, modeled temperature biases in the OTR are largely between -0.5 and +0.5 K. Coastal sites in New England exhibit the greatest temperature biases of +/- 1 K or greater. Modeled two-meter daytime temperature biases are low throughout the ozone season, up to -3 K at coastal sites. See figures 3.2.8-9 and 3.2.16-17 in the 2016 Collaborative Meteorology TSD[7] for more detailed information.

***Figure 3-1*** *Panels from Figure 3.1.19 of the 2016 Collaborative WRF TSD showing diurnal wind speeds on average seasonally for A) spring, B) summer, C) fall, and D) winter in the northeastern U.S. Yellow bars are modeled WRF wind speeds and gray bars are observations from METAR. Other regions can be found in the 2016 Collaborative Meteorological TSD[7].*

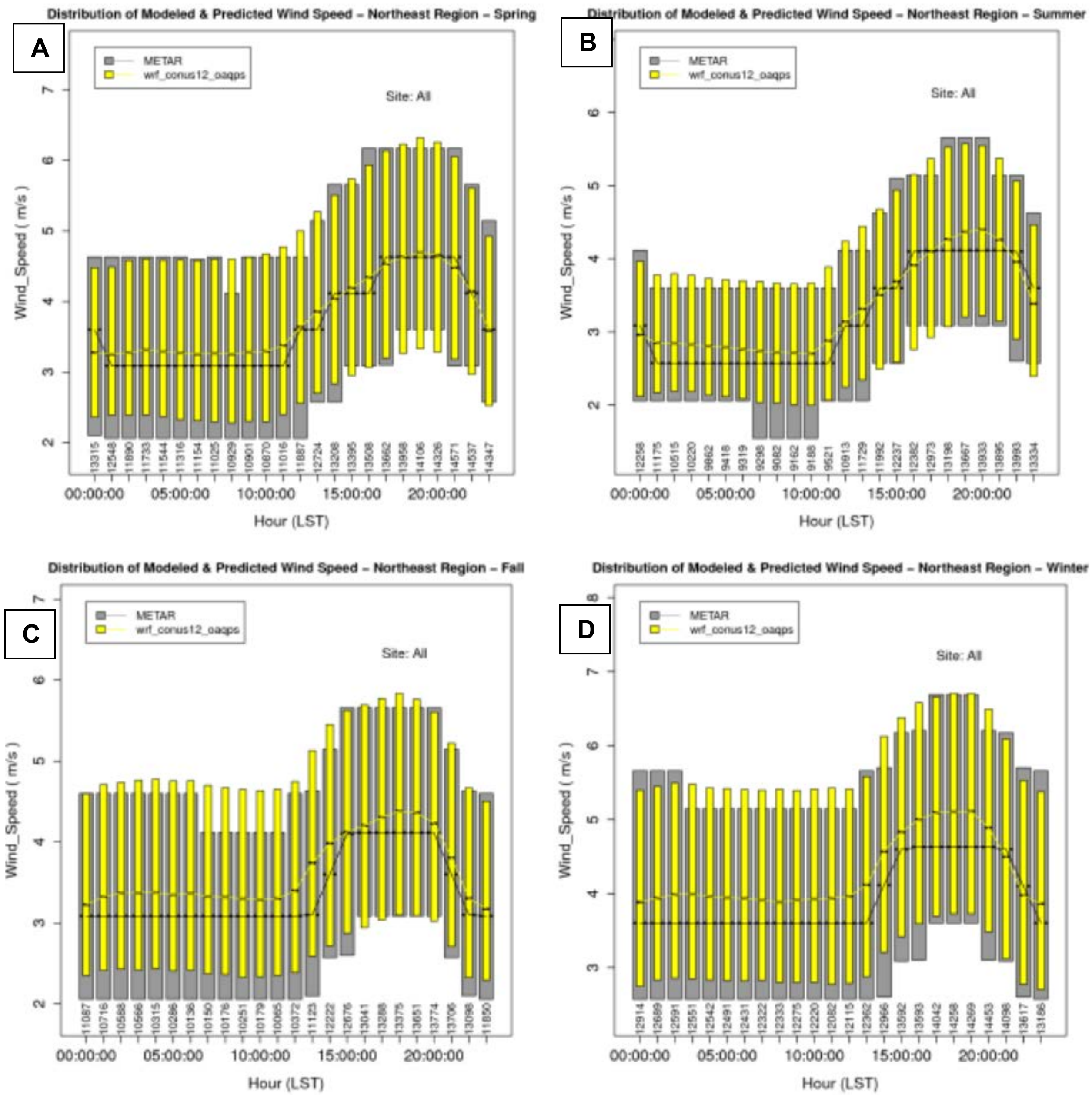


***Figure 3-2*** *Panels from 2016 Collaborative Meteorology TSD Figure 3.2.19 showing the distribution of modeled and predicted temperatures for A) spring, B) summer, C) fall, and D) winter in the Northeastern U.S.. Additional regions can be found in the 2016 Collaborative Meteorology TSD[7].*

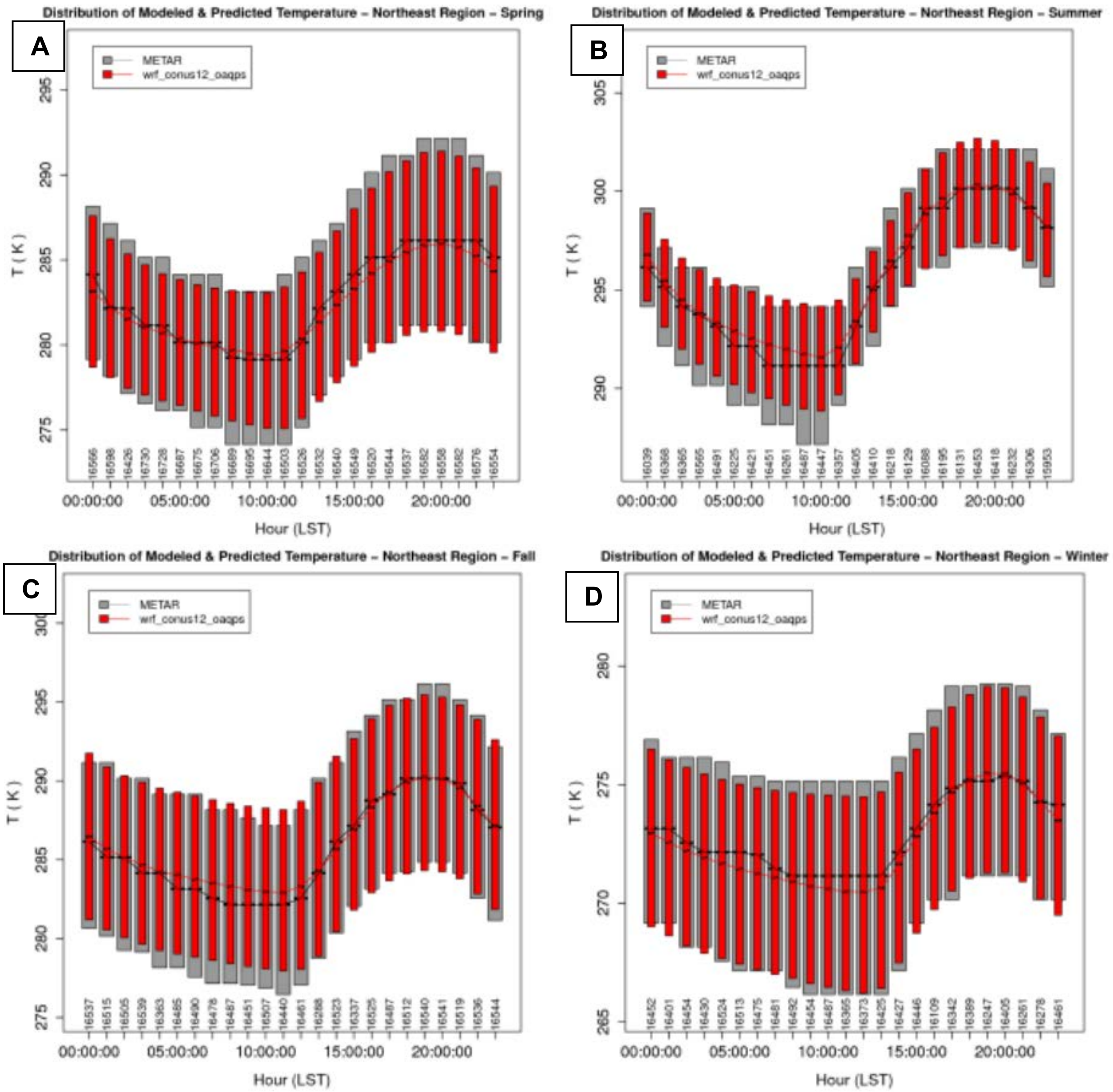


***Figure 3-3***. *Panel plot of hourly average distributions of observed and modeled water vapor mixing ratio for the northeastern U.S. from Figure 3.3.19 of the 2016 Collaborative Meteorology TSD for A) spring, B) summer, C) fall, and D) winter.*

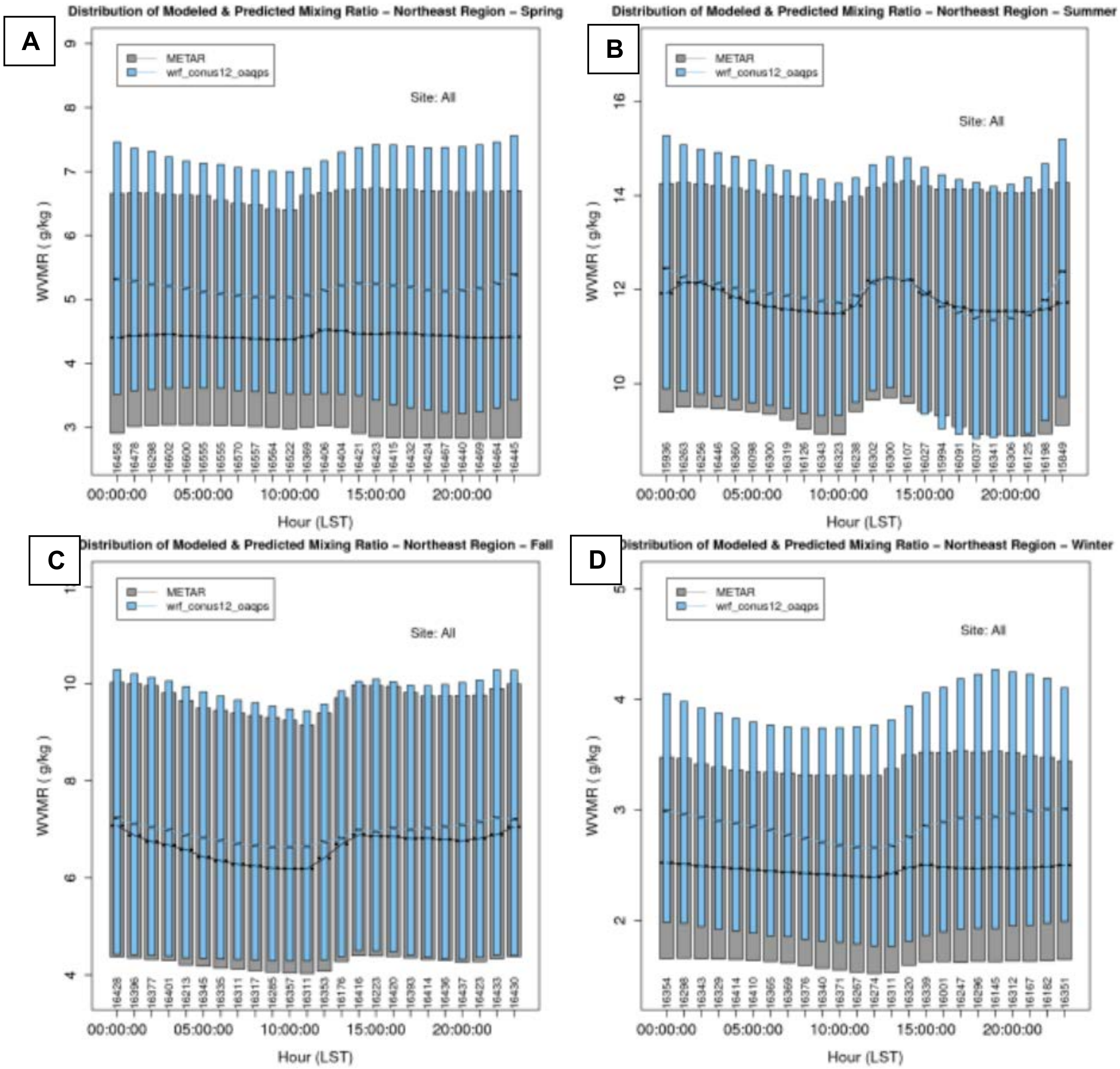


***Table 3-4**. Performance metrics for modeled water vapor mixing ratio in the Northeast from Table 3.3.1 from the 2016 Collaborative Meteorology TSD.*

| Season | Mean Obs (g/kg) | Mean Mod (g/kg) | MB (g/kg) | MAE (g/kg) | NMB (%) | NME (%) | RMSE (g/kg) |
|---|---|---|---|---|---|---|---|
| **Spring** | 4.13 | 4.10 | -0.03 | 1.26 | -0.74 | 30.43 | 1.81 |
| **Summer** | 3.57 | 3.57 | 0.00 | 1.11 | 0.12 | 31.21 | 1.63 |
| **Fall** | 3.87 | 4.00 | 0.14 | 1.22 | 3.56 | 31.55 | 1.78 |
| **Winter** | 4.46 | 4.59 | 0.13 | 1.40 | 2.89 | 31.42 | 2.01 |

Daily average modeled water vapor mixing ratios exhibit slight positive biases in the OTR states of up to +1 g/kg early in the ozone season. In June, July, and August biases across the region remain mixed between -1 g/kg and +1 g/kg, with lower biases along the Atlantic coast. Biases tend to be consistent diurnally as compared to temperature, since water vapor mixing ratio has less temporal variability. Therefore, there is little difference between daytime biases and daily average biases. See Figures 3.3.8-9 and 3.3.16-17 in the 2016 Collaborative Meteorology TSD[7] for more detail.

Modeled precipitation in the Northeast performs adequately in terms of spatial pattern and rainfall magnitudes. Yet model performance underpredicts precipitation June to October during periods of high convective activity and overpredicts during spring and fall. Modeled biases remain within plus or minus a few inches of rainfall. Figures 3.4.13 to 3.4.24 in the 2016 Collaborative Meteorology TSD[7] show spatial biases in rainfall amounts for each month for the 12US2 simulation.

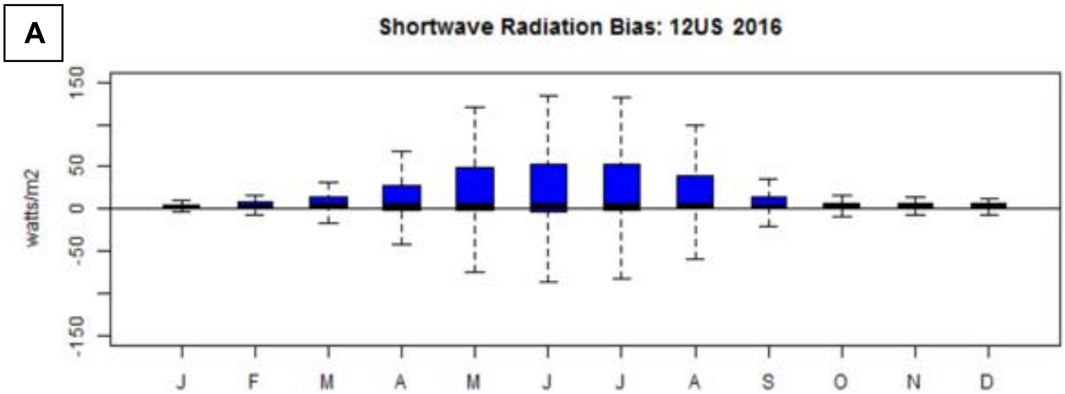
Modeled solar radiation biases high against observations (**Figure 3-4**) at the SURFRAD and SOLRAD network monitors with tendency to overpredict in the summer, however overpredictions are less than 100 $W/m^2$. At the time of greatest incoming solar radiation, the model bias approaches 50 $W/m^2$. Hourly biases change from underpredictions most of the day to overpredictions during periods of peak solar insolation. Averages are across all observation locations.

## *3.2 Summary*

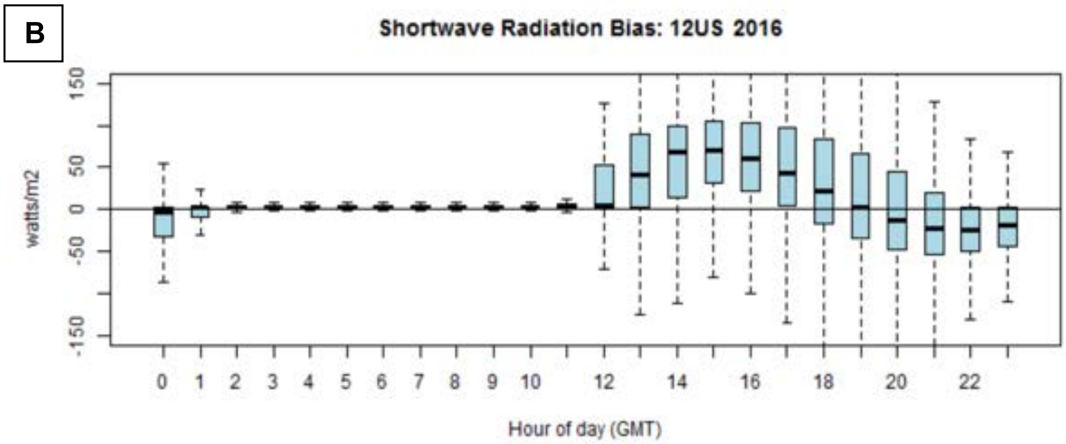
The 2016 Collaborative performed extensive evaluation of the modeled meteorology used in the 2016v1 modeling. Conditions in the northeastern U.S. during the 2016 ozone season were a bit warmer and drier than average. Modeled meteorology biases exist across the OTR states; however, they are generally small in comparison to observations. Model biases will be consistent in sensitivity simulations and projections and will not impact comparisons of these against the base case. However, meteorology model biases may impact base year 2016 modeled ozone concentrations. Evaluation of modeled ozone concentrations is conducted by members of the OTC Modeling Committee (see **Section 6**).

***Figure 3-4.*** *Hourly bias distribution for shortwave radiation by A) month and B) hour of the day from the 2016 Collaborative Meteorology TSD[7].*

**A**




**B**



# 4 Evaluation of Biogenic Model Versions

The modeling platform made available by EPA for 2016 Beta and 2016 V1 relied on the Biogenic Emissions Inventory System (BEIS) v3.61 for biogenic emissions (US EPA, 2021a), and used the "16j" version of the 2016 meteorology as described in **Section 3**. More information about BEIS v3.61 is available in the EPA Technical Support Document for the 2016 emissions platform (US EPA, 2021a). Briefly, BEIS v3.61 outputs gridded hourly emissions of CO, VOCs, and NO from vegetation and soils for the contiguous U.S. and portions of Mexico and Canada. Biogenic emissions are processed within the Sparse Matrix Operator Kernel Emissions (SMOKE) system and are model-ready to be input to CMAQ.

Biogenic emissions were processed in conjunction with a modified v4.1 of the Biogenic Emissions Landuse Database (BELD4). More details about the two-layer canopy model and imported meteorology variables are described in Pouliot and Bash (2015) and US EPA (2021). The BELD4 is based upon the USDA-USFS Forest Inventory and Analysis (FIA) vegetation speciation data for 2001 to 2014 (FIA v5.1), National Land Cover Database product from the Landsat satellite for canopy coverage, NASA's Shuttle Radar Topography Mission for elevation data, and the USDA Cropland Data Layer.

## *4.1 Comparison Testing*

### 4.1.1 Modeled Isoprene Concentrations

Additional evaluations and comparisons were performed by NYSDEC to understand model performance biases across two chemical transport models (CMAQ and CAMx) and comparing BEIS v3.61 with another biogenic emissions model, the Model for Emissions of Gases and Aerosols from Nature (MEGAN) v3.0. Much of the difference in modeled ozone concentrations when comparing the use of MEGAN versus BEIS comes from the difference in isoprene concentrations simulated by each of the two biogenic models.

Both CMAQ and CAMx air quality models using either biogenic inventory underpredict ozone in May and June and overpredict in July and August. On average, ozone predictions using BEIS are higher than when using MEGAN and this is even more prominent on high ozone days above a 60 ppb threshold. However, site to site and day to day results can be highly variable. For instance, on average during July 2016, isoprene emissions from BEIS are greater than those from MEGAN across much of Appalachia and Canada, while emissions from MEGAN are greater than BEIS for the rest of the northeastern U.S. (**Figure 4-1**). For some areas, like the Great Lakes, the differences in BEIS versus MEGAN emissions are small and may impact predicted ozone minimally.

Simulated isoprene concentrations can be compared with observations to understand model performance. Diurnal patterns in observations (black line), CMAQ modeled with BEIS (red line) and with MEGAN (orange line), and CAMx modeled with BEIS (dark blue line) and with MEGAN (light blue line) are shown in **Figure 4-2** for the Pfizer Laboratory site (New York Botanical Gardens, Bronx, NY). Generally, BEIS performs better with both CAMx and CMAQ at replicating the June to August average diurnal profiles than does MEGAN. With BEIS, isoprene concentrations peak during midday, as observed concentrations do, while with MEGAN, there is a dip in the middle of the day which is replicated at monitors in the southeastern U.S. (not shown).

***Figure 4-1.*** *(BEIS v3.61 - MEGAN v3.0), BEIS > MEGAN warm colors and BEIS < MEGAN cool colors.*

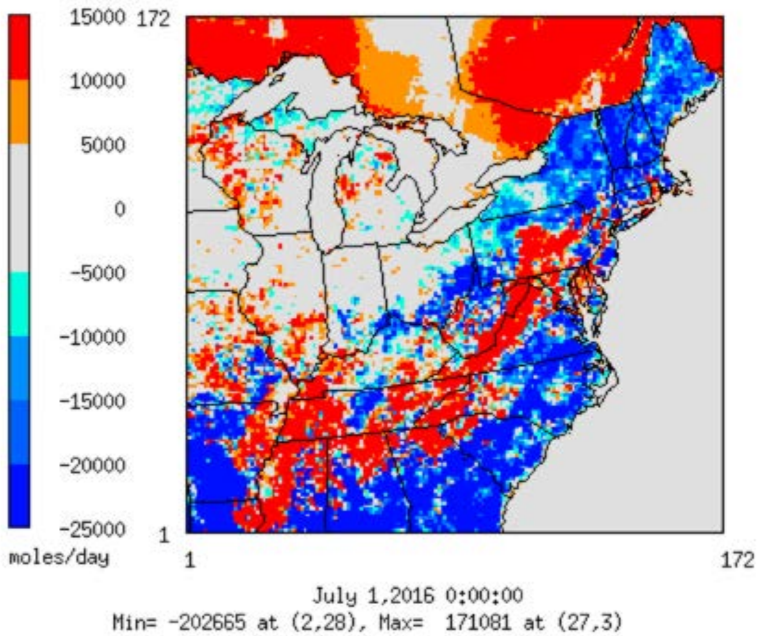
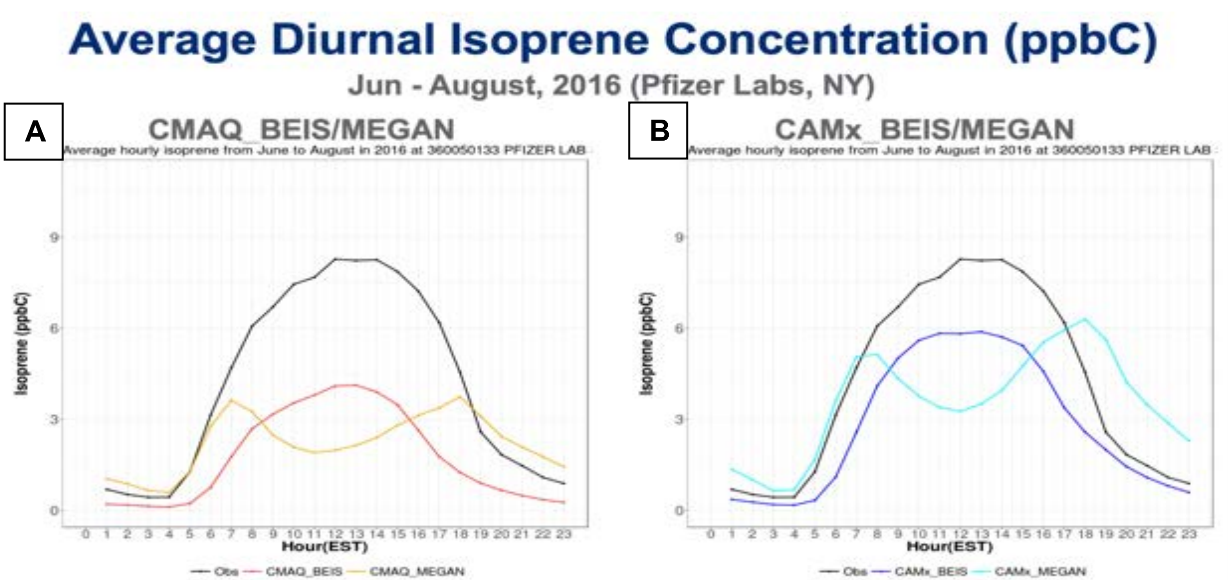


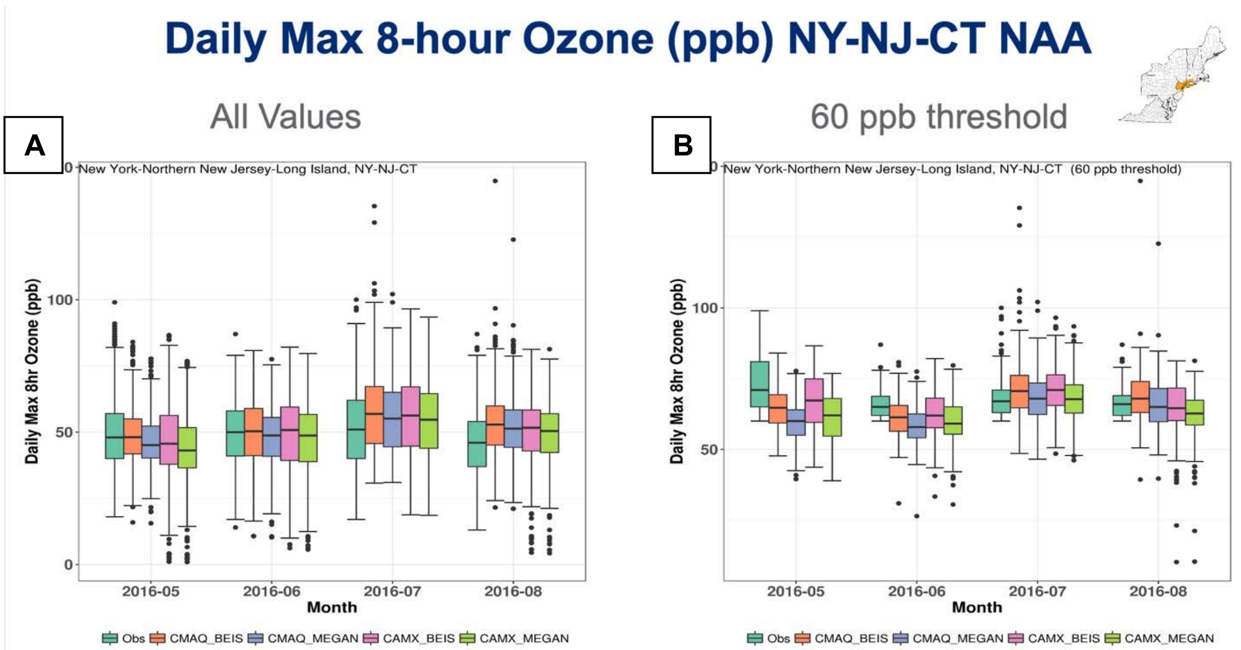

***Figure 4-2.*** *June to August 2016 average diurnal concentrations of isoprene as observed (black) and modeled in CMAQ (left) and CAMx (right) for BEIS (darker lines) and MEGAN (lighter lines).*



### 4.1.2 Ozone Concentrations

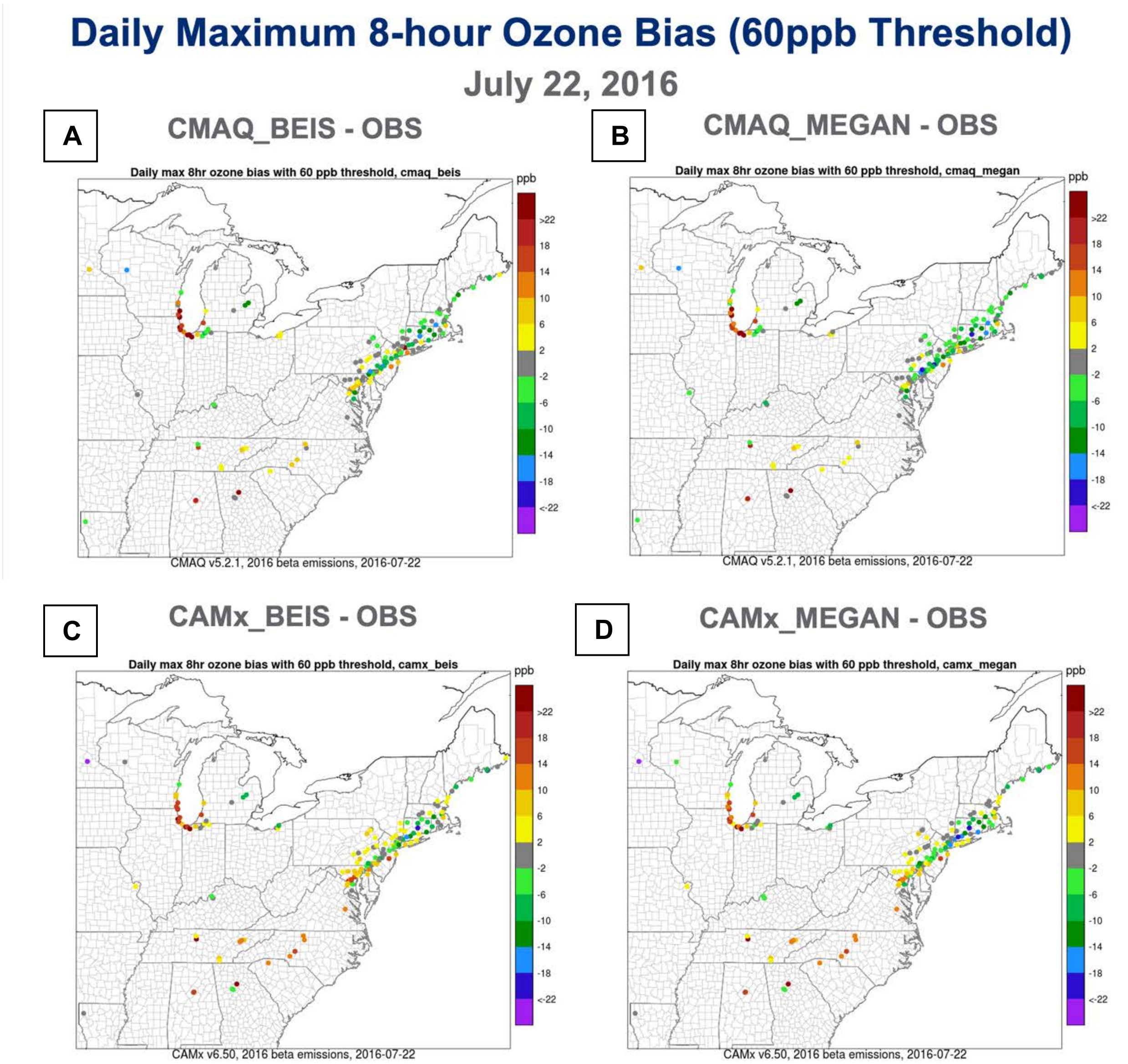
Monthly average daily maximum 8-hour observations and modeled concentrations in the NY-NJ-CT nonattainment area show on average, CMAQ with BEIS, CMAQ with MEGAN, CAMx with BEIS, and CAMx with MEGAN are generally similar to one another (**Figure 4-3**). Additionally, all model combinations perform generally well on average in May and June compared to observations. However, all model iterations overestimate ozone concentrations in July and August, and CMAQ tends to overestimate lower concentrations. At high ozone concentrations above a 60 ppb threshold, results are more mixed. Generally, both CMAQ and CAMx with MEGAN estimate lower concentrations of ozone than do CMAQ and CAMx with BEIS. Modeled concentrations tend to be low in May and June and slightly high in July and August but with larger concentration spread than observed.

**Figure 4-3** (A-B). Monthly distributions of Daily Max 8-hour O3 concentrations for observations and each of the four simulations.




To illustrate spatial patterns in model performance, daily maximum 8-hour ozone biases for concentrations above the 60 ppb threshold are shown in **Figure 4-4** on a single day – July 22, 2016. Across all model configurations, model biases fall within +/- 6 ppb of the observed values. CMAQ tends to have more underpredictions through the urban corridor with some notable exceptions in coastal CT and Long Island (LI), which tend to be higher with BEIS than with MEGAN. Contrastingly, CAMx exhibits more overpredictions through the corridor, especially with BEIS.

***Figure 4-4.*** *For July 22, 2016, modeled biases using an observed daily maximum 8-hour 60 ppb threshold for A) CMAQ with BEIS, (top left), B) CMAQ with MEGAN (top right), C) CAMx with BEIS (bottom left), and D) CAMx with MEGAN (bottom right).*

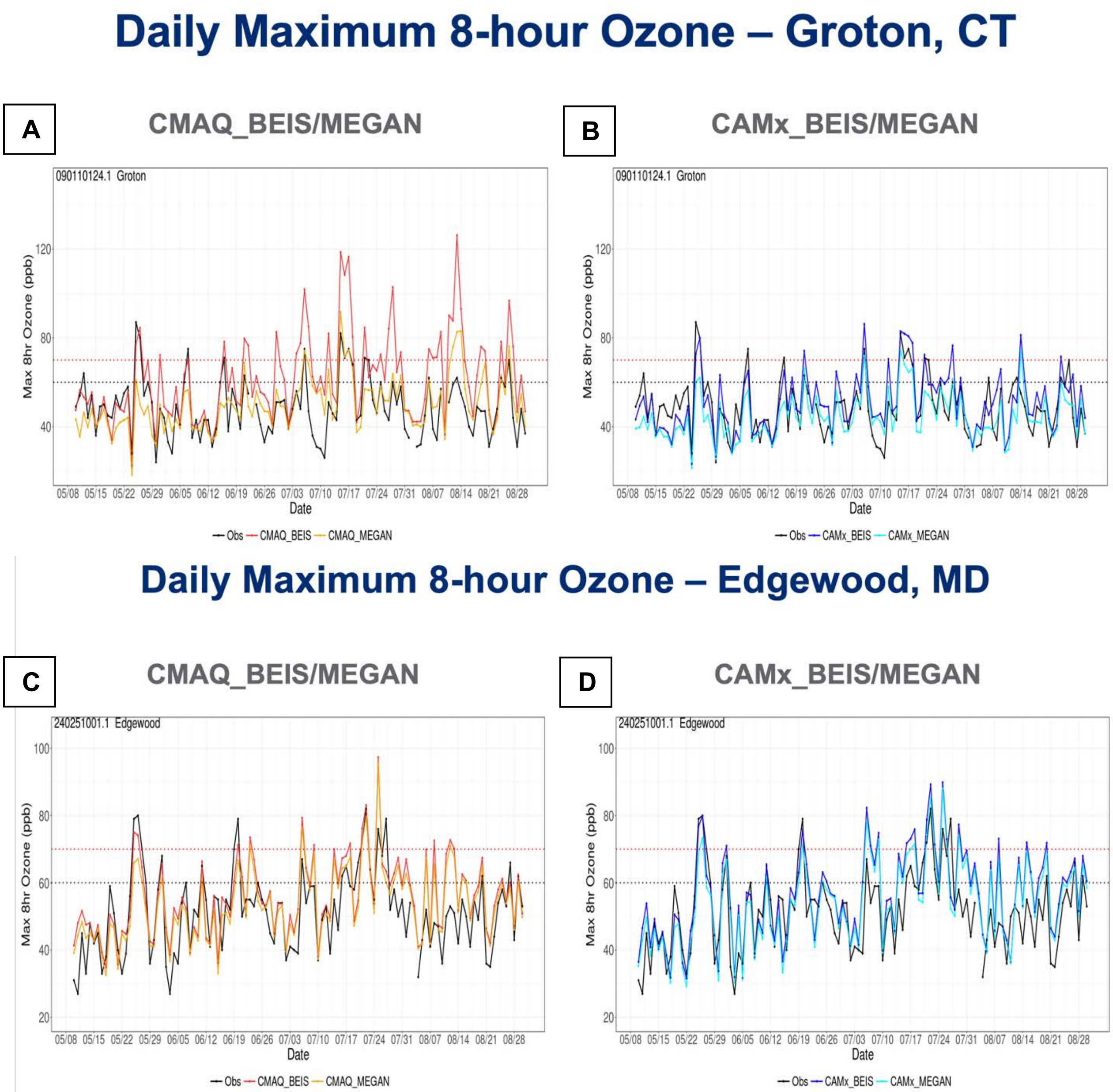



Observed and modeled daily maximum 8-hour ozone (MDA8) concentrations are compared for each model iteration from May through August at two monitor locations, Groton, CT and Edgewood, MD (**Figure 4-5**).[10] Generally, models perform similarly compared to observations (black line) with a few notable exceptions. At Groton, CT, CMAQ with BEIS overpredicts MDA8 ozone for much of the summer, including overestimating ozone by more than 40 ppb in mid-July and mid-August. Observed ozone concentrations are also overestimated in July and August. Comparisons between

[10] Groton, CT and Edgewood, MD are two near-water sites in different NAAs of the OTR and were chosen for this analysis because CMAQ does not always agree with observed values at these locations.

model results and observations tend to be more in-line with each other at the Edgewood, MD site except in August, when CMAQ overestimates MDA8 ozone concentrations. The CAMx performance is more consistent across all model iterations with observations at Groton, CT, but the model overestimated ozone during mid-July and most of August at Edgewood, MD.

**Figure 4-5** (A-D): Daily maximum 8-hour O3 at Groton, CT (top A-B) and Edgewood, MD (bottom C-D) for CMAQ and CAMx with BEIS or MEGAN.



## 4.2 Assessment/Recommendations

Model biases and performance are not consistent spatially or temporally. The models with BEIS or with MEGAN perform better some days than others or predict ozone concentrations better at certain monitors than others. The OTC Modeling Committee chooses to use BEIS because this is more consistent with the EPA's modeling approach.

# 5 Emissions Inventories and Processing for 2016 12 km Base Year Simulation

The emissions data used in all air quality modeling were developed by the National Emission Inventory Collaborative. The Inventory Collaborative is a partnership between state emissions inventory staff, multi-jurisdictional organizations (MJOs), federal land managers (FLMs), EPA, and others to develop an emissions modeling platform for use in air quality planning and is structured around workgroups organized by emissions inventory sectors. Work began on the 2016 inventory in late 2017 and continues with platform updates and improvements. As of the date of this document, the Collaborative had released three versions of the 2016 modeling platform: Alpha, Beta, and version 1 (V1). In addition, EPA has released V2 and portions of V3. The EPA uses a two-character naming convention in their emissions modeling platforms. The first character represents the base year "f" in the case of the 2016 platform. The second character indicates a version number e.g., "f" for Beta, "h" for version 1. Documentation for the 2016 modeling platform can be found on EPA's website for beta[11] and for version 1.[12]

*2016 Beta (ff)*
The Beta inventory is largely based on the 2014 National Emissions Inventory (NEI) developed by the EPA (US EPA, 2019). This initial version of the platform only included the 2016 base year inventory and was released on March 2019 via the Intermountain West Data Warehouse (IWDW) website.[13]

*2016 V1 (fh)*
An approved inventory, 2016 V1, was released in October 2019.[12] It included updates to Commercial Marine Vessels (CMV) sectors as well as complete future year inventories for 2023 and 2028.

*Post 2016 v1 Updates (fi)*
Several months after the initial release of the V1 inventory, updates and corrections were made to several emission sectors (US EPA, 2021b):

- Commercial Marine Vessels (CMV): December 2019 it was discovered that emissions from hoteling ships were being allocated to a single hour instead of the entire duration of the hoteling period. Additionally, a day of week error was discovered in the emissions for some areas. Because the 2016 emissions were based on 2017 NEI activity data, a remapping of 2016 days to 2017 days to ensure emissions were on the same day of the week was implemented. This affected both the small- and medium-size CMV engines in

[11] US EPA 2016v7.2 (beta and Regional Haze) Platform. https://www.epa.gov/air-emissions-modeling/2016v72-beta-and-regional-haze-platform.
[12] US EPA 2016v1 Platform. https://www.epa.gov/air-emissions-modeling/2016v1-platform.
[13] Intermountain West Data Warehouse. https://views.cira.colostate.edu/iwdw/

Categories 1 and 2 (cmv_c1c2) and large-size CMV engines in Category 3 cmv_c3 sectors.

- Airports: June 2020, it was discovered that airport emissions were overestimated in the 2017 NEI. The 2016 airport emissions were based on the 2017 NEI hence they had to be adjusted.
- EPA EGU point sources: in July 2020, an issue was identified with how SMOKE treated cases when multiple emissions units were mapped to the same CEM unit in the base year. Some CEMS data were dropped in this situation. This affected the 2016 base year. In addition, a new Integrated Planning Model (IPM) run was completed in January 2020, which resulted in updates to the 2023 and 2028 future year EGU inventories.

## *5.1 Emission Inventory Platforms used in OTC modeling*

**Table 5.1** summarizes the air quality modeling runs performed by OTC. The "inventory platform" column indicates what version of the emissions inventory was used for each modeling run. The EGU and biogenic emission sectors both have inventory options i.e., IPM/ERTAC for EGU and BEIS/MEGAN for biogenic. OTC is using the ERTAC and BEIS options and this is noted in the inventory platform nomenclature. For example, the inventory platform name fh_ERTAC_BEIS, indicates the V1 (before updates) platform with the ERTAC EGU and BEIS biogenic options were used.

**fd_IPM_BEIS**

The "fd" indicator is for the 2016 Alpha platform and the"BEIS" indicator refers to using biogenic emissions model. This inventory summary is accessible online.[14] Briefly, the 2016 Alpha platform was based on the 2014 NEI V2. The NEI was compiled using the Emissions Inventory System with quality assurance checks conducted by state, local, and tribal air agencies, and the EPA. There are five data categories of emissions: point, non-point, non-road mobile, on-road mobile, and fire events. Additional emissions are included in the 2016 platform for biogenic sources, Canadian and Mexican inventories, and some other non-NEI sectors. This inventory mostly consists of 2014 NEI V2 components but includes updates for 2016 include point sources, agricultural and wildland fire emissions, CMV updated to reflect a 2015 sulfur rule, fertilizer, oil and gas, and on-road and non-road processed using the MOtor Vehicle Emissions Simulator (MOVES). More detail on each individual sector used in 2016 and as it relates to 2014 NEI V2 can be found in the 2016 alpha platform Technical Support Document.[11]

**ff_IPM_BEIS**

The "ff" indicator is for the 2016 Beta platform. This platform was developed by the 2016 Inventory Collaborative and released for use in March 2019. A detailed description on the individual emission sectors is available under Documentation on the 2016 Collaborative Wiki page for the 2016 Beta platform.[15] Briefly, the Beta platform includes year-specific updates to electricity generating units

[14] US EPA 2016v7.1 Alpha Platform. https://www.epa.gov/air-emissions-modeling/2016v71-alpha-platform.
[15] Beta IWDW Documentation. http://views.cira.colostate.edu/wiki/wiki/10197#Documentation.

(EGUs), onroad mobile, nonroad mobile, fires, and biogenics. The Beta platform also includes the first set of 2023 and 2028 projected emissions.

**ff_IPM_MEGAN**
The "MEGAN" indicator refers to using biogenic emissions from the Model for Emissions of Gases and Aerosols from Nature (MEGAN) as opposed to using biogenic emissions from BEIS. This inventory is identical to ff_IPM_BEIS except MEGAN emissions replace those from BEIS.

**fh_IPM_BEIS**
The "fh" indicator is for the 2016 V1 platform. This platform was developed by the 2016 Inventory Collaborative and released for use in October 2019. A detailed description on the individual emission sectors is available under Documentation on the 2016 Collaborative Wiki page for the 2016 V1 platform[16].

**fh_ERTAC_BEIS**
The "ERTAC" indicator is for EGU emissions from the Eastern Regional Technical Advisory Committee (ERTAC). This version replaces IPM with ERTAC EGU emissions while all other emission sectors remain the same. fh_ERTAC_BEIS is the standard version employed by the OTC Modeling Centers.

**fi_ERTAC_BEIS**
This platform is identical to the fh_ERTAC_BEIS except it includes the post V1 updates to the airport and CMV sectors. This inventory is used for the modeling presented throughout the TSD.

### *5.2 Emission Inventory Sectors*

Emission inventories for each model year were developed by sector and are listed below with a brief description. In addition, links to specification sheets that detail the methodologies of how emissions for each sector were calculated are listed. Specific emissions files are listed in **Appendix A**.

1. **Agricultural (ag):** The ag sector includes ammonia ($NH_3$) emissions from fertilizer and emissions of all pollutants other than $PM_{2.5}$ from livestock in the nonpoint (county-level) data category of the 2017 NEI. The sector now includes VOC and HAP VOC in addition to $NH_3$.[17]
2. **Airports (airports):** Emissions of all pollutants from aircraft and ground support equipment.[18]
3. **Biogenic**

[16]2016 V1 IWDW Documentation: http://views.cira.colostate.edu/wiki/wiki/10202#Documentation
[17]National Emissions Inventory Collaborative (2020). Specification Sheet - Agriculture http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_nonpoint-ag_25Feb2020.pdf
[18]National Emissions Inventory Collaborative (2019). Specification Sheet - Airports http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_airports_16Dec2019.pdf

a. **(BEIS):** Non-anthropogenic emissions, including emissions from Canada and Mexico, generated with BEIS v3.61 using BELD v4.1 land use data.[19]

b. **(MEGAN):** Non-anthropogenic emissions, including emissions from Canada and Mexico, generated with MEGAN v3.0.[20]

4. **Fugitive Dust (afdust):** Fugitive dust particulate matter (PM) emissions from the 2014 National Emissions Inventory (NEI) V2 nonpoint source category. Categories included in this sector are paved roads, unpaved roads and airstrips, construction (residential, industrial/commercial/institutional, road and total), agriculture production, and mining and quarrying.[21]
5. **Area Source (nonpt):** Area source emissions not included in other sectors.[22]
6. **Category 1 & 2 Marine Vessels (cmv_c1c2):** Category 1 and category 2 commercial marine vehicle emissions treated as point sources at grid cell resolution.[23]
7. **Category 3 Marine Vessels (cmv_c3):** Category 3 commercial marine vehicle emissions, generally in international waters in the Alpha inventory distributed throughout the Atlantic Ocean, and in the Alpha 2 and Beta inventories distributed to shipping lanes. Sulfur dioxide emissions are reduced by 90% compared to 2014 NEI V2 due to a 2015 rule. Emissions from C3 vessels operating in U.S. and Mexican inland and federal waters are included in this category. C3 vessels operating in Canadian inland waters are not included in this category.[24]
8. **Nonroad (nonroad):** Nonroad equipment emissions, at the county and monthly resolution. Nonroad in Beta was processed using MOVES2014a using NONROAD 2008 version NR08a for all states except California, which submitted their own emissions and included new HAP emissions factor superseding those used in the 2011 NEI and 2014 NEI V2.[25] Nonroad in the V1 platform was processed with MOVES2014b.[26] Nonroad in the 2016 V2 platform was processed with MOVES3 (US EPA, 2022).

[19]National Emissions Inventory Collaborative (2019). Specification Sheet - BEIS http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_biogenic-beis_18Dec2019.pdf

[20]National Emissions Inventory Collaborative (2019). Specification Sheet – MEGAN http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/MEGAN3_Specification_Sheet_v2.pdf

[21]National Emissions Inventory Collaborative (2019). Specification Sheet – Fugitive Dust http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_nonpoint-afdust_16Dec2019.pdf

[22]National Emissions Inventory Collaborative (2020). Specification Sheet – Non-point http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_nonpoint_24Feb2020.pdf

[23]National Emissions Inventory Collaborative (2020). Specification Sheet - CMV C1 & C2 http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_mobile-nonroad-cmv-c1c2_20Feb2020.pdf

[24]National Emissions Inventory Collaborative (2020). Specification Sheet - CMV C3 http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_mobile-nonroad-cmv-c3_04Mar2020.pdf

[25] National Emissions Inventory Collaborative (2019). Specification Sheet – Non-road http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016beta_0919/National-Emissions-Collaborative_2016beta_mobile-nonroad_06Mar2019.pdf

[26]National Emissions Inventory Collaborative (2019). Specification Sheet – Non-road http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_mobile-nonroad_24Feb2020.pdf

9. **Non-point oil and gas (np_oilgas):** Onshore and offshore nonpoint emissions from the oil and gas sector at the county and annual resolution. Projected to 2016 from the 2014 NEI V2 inventory using the same methodology as used for projecting emissions from the point oil and gas sector.[27]
10. **Mobile Source (onroad):** Emissions from gasoline and diesel vehicles while moving, idled or parked including evaporative losses and vehicle refueling, at the grid cell and hourly resolution, from on-road vehicles in all states except California processed using MOVES and SMOKE-MOVES. California submitted their on-road emissions separately. Transportation modes included exhaust, extended idle, auxiliary power units, evaporative, permeation, refueling, and brake and tire wear. Emissions were calculated using winter and summer MOVES emissions tables and processed with MOVES2014a for the Beta platform.[28] Onroad in the V1 platform was processed with MOVES2014b[29], and onroad in the 2016 V2 platform was processed with MOVES3 (US EPA, 2022).
11. **Mobile Source Canada (onroad_can):** Onroad mobile source emissions from Canada.[30]
12. **Mobile Source Mexico (onroad_mex):** Onroad mobile source emissions from Mexico.[31] Emissions are processed using MOVES-Mexico emissions for the inventory.
13. **Area Source Fugitive Dust Canada (othafdust):** Particulate emissions from fugitive dust sources in Canada obtained from Environment and Climate Change Canada (ECCC).[32]
14. **Point Source Fugitive Dust Canada (othptdust):** Point source particulate emissions from fugitive dust sources in Canada.[33]
15. **Area Source Canada & Mexico (othar):** Area source emissions from Canada and Mexico, including mobile nonroad.[34]

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[27] National Emissions Inventory Collaborative (2019). Specification Sheet - Non-point Oil & Gas http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_nonpoint-oilgas_18Dec2019.pdf

[28] National Emissions Inventory Collaborative (2019). Specification Sheet – Onroad http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016beta_0919/National-Emissions-Collaborative_2016beta_mobile-onroad_15Sep2019.pdf

[29] National Emissions Inventory Collaborative (2020). Specification Sheet – Onroad http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_mobile-onroad_24Feb2020.pdf

[30] National Emissions Inventory Collaborative (2019). Specification Sheet – On-road Canada http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/National-Emissions-Collaborative_2016v1_canada-onroad-mobile_15Oct2019.pdf

[31] National Emissions Inventory Collaborative (2019). Specification Sheet - Onroad Mexico http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/National-Emissions-Collaborative_2016v1_mexico-onroad-mobile_15Oct2019.pdf

[32] National Emissions Inventory Collaborative (2019). Specification Sheet – Nonpoint- fugitive dust Canada http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/National-Emissions-Collaborative_2016v1_canada-nonpoint-afdust_15Oct2019.pdf

[33] National Emissions Inventory Collaborative (2019). Specification Sheet – Point fugitive dust Canada http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/National-Emissions-Collaborative_2016v1_canada-point-dust_15Oct2019.pdf

[34] National Emissions Inventory Collaborative (2019). Specification Sheet – Nonpoint area, Canada & Mexico http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/National-Emissions-Collaborative_2016v1_canada-mexico-nonpoint_15Oct2019.pdf

16. **Point Source Canada & Mexico (othpt):** Point source emissions from Canada and Mexico. [35]

17. **Point Oil & Gas (pt_oilgas):** Point source emissions from oil and gas production and related processes at an annual resolution. Includes offshore oil and gas platforms in the Gulf of Mexico. Emissions are a combination of updated emissions for 2016 and emissions projected from the 2014 NEI V2 without updates.[36]

18. **Agricultural Burning (ptagfire):** Point source agricultural burning emissions.[37]

19. **Prescribed Burning & Wildfires (ptfire):** Point source emissions from year specific controlled burning and wildfires.[38]

20. **Electric Generating Units**
    a. **EPA IPM (ptegu):** Electricity generating unit source emissions for simulating 2016 and future year U.S. air quality with the Integrated Planning Model.[39]
    b. **ERTAC (ptertac):** Electricity generating unit source emissions for simulating 2016 and future year U.S. air quality with the Eastern Regional Technical Advisory Committee (ERTAC) EGU tool.[40]

21. **Industrial and Commercial Point Sources**
    a. **EPA IPM (ptnonipm):** Emissions from industrial and commercial point sources.[41]
    b. **ERTAC (ptnonertac):** Emissions from industrial and commercial point sources.[40]

22. **Rail Emissions (rail):** Area source emissions from railways.[42]

23. **Residential Wood Combustion (rwc):** Area source emissions from residential wood combustion.[43]

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[35] National Emissions Inventory Collaborative (2019). Specification Sheet - Othpt Canada & Mexico, http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/National-Emissions-Collaborative_2016v1_canada-mexico-point_15Oct2019.pdf

[36] National Emissions Inventory Collaborative (2019). Specification Sheet – Point Oil & Gas http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_point-oilgas_18Dec2019.pdf

[37] National Emissions Inventory Collaborative (2019). Specification Sheet – Agricultural Fires http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_point-agfire_20Dec2019.pdf

[38] National Emissions Inventory Collaborative (2019). Specification Sheet – Prescribed Burning & Wildfies http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_point-fire_20Dec2019.pdf

[39] National Emissions Inventory Collaborative (2019). Specification Sheet – IPM EGUs http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/National-Emissions-Collaborative_2016v1_point-egu-ipm_15Oct2019.pdf

[40] National Emissions Inventory Collaborative (2023). Specification Sheet – ERTAC EGUs http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_ERTAC-EGU_20jan2023.pdf

[41] National Emissions Inventory Collaborative (2020). Specification Sheet – Point non-IPM EGUs http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_point-nonipm_25Feb2020.pdf

[42] National Emissions Inventory Collaborative (2020). Specification Sheet - Rail http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_mobile-nonroad-rail_06May2020.pdf

[43] National Emissions Inventory Collaborative (2020). Specification Sheet – Residential Wood Combustion http://views.cira.colostate.edu/wiki/Attachments/Inventory%20Collaborative/Documentation/2016v1/after_comments/National-Emissions-Collaborative_2016v1_nonpoint-rwc_24Feb2020.pdf

## 5.3 Speciation

Gaseous chemical speciation of emissions is accomplished through the SMOKE preprocessor based on the selected chemical mechanism. In this case, speciation occurs according to the CB6 mechanism (Yarwood et al., 2010). Specific pollutant species can be found in Table 3.3 of the Collaborative 2016v1 TSD. The chemical speciation approach for total organic gases and $PM_{2.5}$ are based on the SPECIATE 4.5 database[44], which provides a repository of speciation profiles from air pollution sources. More detail on speciation can be found in the Collaborative 2016v1 TSD.[11]

## 5.4 Spatial Allocation

The spatial surrogates for the 12OTC2 domain for the United States were extracted from the 12US1 U.S. grid surrogates. Spatial factors were applied by county and source classification codes with surrogates from 2014 data when possible. Most U.S. surrogates were generated with the Spatial Allocator and Surrogate Tool.[45]

## 5.5 Temporal Allocation

Temporal allocation of the annual or monthly emissions found in the inventory to hourly emissions required by the air quality models is performed during SMOKE processing by the application of temporal profiles. Temporal profiles are applied to the emissions at the SCC level for each sector.

Exceptions to this procedure are the EGU sectors (ptegu/ptertac) which make use of hourly Continuous Emission Monitoring Systems (CEM) data. More details on temporal allocation for individual sectors are in the 2016 V1 TSD.[12]

In the case of ERTAC EGU (ptertac), the ERTAC code produces hourly EGU emissions that are grounded in the base year CEM data. v2.1.1 of the ERTAC EGU code was used in all inventories. The input files were from ERTAC EGU v16.0 for the Beta inventories, and from ERTAC EGU v16.1 for the 2016 V1 inventory. In all cases they were post-processed using v1.02 of the ERTAC to SMOKE conversion tool. Given the fine level of detail that ERTAC EGU produces, the hourly ERTAC EGU results are used to temporalize EGUs in the modeling platform. In order to include the temporalization during SMOKE processing, hourly ff10 files were produced by the ERTAC to SMOKE post processor in addition to the annual ff10 files.

[44] US EPA SPECIATE. https://www.epa.gov/air-emissions-modeling/speciate
[45] CMAS Spatial Allocator and Surrogate Tool. https://www.cmascenter.org/sa-tools/documentation/4.2/SurrogateToolUserGuide_4_2.pdf

***Table 5-1.*** *Modeling ledger of runs and emissions inventory used. Description of Inventory platform included below.*

| Run ID | Run Name | Year | Domain[a] | Inventory Platform[b] | Modeling Period | AQ Model | Pre-merged Emission Source | Modeling Center | Complete |
|---|---|---|---|---|---|---|---|---|---|
| A | 2016 Base | 2016 | 12OTC1 | fd_IPM_BEIS | May-Aug | CMAQ5.2.1 | EPA | NY | Yes |
| B1 | 2016 Base - IPM/BEIS | 2016 | 12OTC1 | ff_IPM_BEIS | May-Aug | CMAQ5.2.1 | NY | NY | Yes |
| B2 | 2016 Base - IPM/MEGAN | 2016 | 12OTC1 | ff_IPM_MEGAN | May-Aug | CMAQ5.2.1 | NY | NY | Yes |
| B3 | 2016 Base - IPM/BEIS | 2016 | 12OTC1 | ff_IPM_BEIS | May-Aug | CAMx6.50 | NY | NY | Yes |
| B4 | 2016 Base - IPM/MEGAN | 2016 | 12OTC1 | ff_IPM_MEGAN | May-Aug | CAMx6.50 | NY | NY | Yes |
| | | | | | | | | | |
| C1 | 2016 Base - IPM/BEIS | 2016 | 12OTC2 | fh_IPM_BEIS | Apr-Oct | CMAQ5.3.1 | EPA | NY | Yes |
| C2 | 2023 FY - IPM/BEIS | 2023 | 12OTC2 | fh_IPM_BEIS | Apr-Oct | CMAQ5.3.1 | EPA | NY | Yes |
| C3 | 2028 FY - IPM/BEIS | 2028 | 12OTC2 | fh_IPM_BEIS | Apr-Oct | CMAQ5.3.1 | EPA | NY | Yes |
| C4 | 2016 Base – ERTAC/BEIS | 2016 | 12OTC2 | fh_ERTAC_BEIS | Apr-Oct | CMAQ5.3.1 | EPA/NY | NY | Yes |
| C5 | 2023 FY – ERTAC/BEIS | 2023 | 12OTC2 | fh_ERTAC_BEIS | Apr-Oct | CMAQ5.3.1 | EPA/NY | NY | Yes |
| C6 | 2028 FY – ERTAC/BEIS | 2028 | 12OTC2 | fh_ERTAC_BEIS | Apr-Oct | CMAQ5.3.1 | EPA/NY | NY | Yes |
| | | | | | | | | | |
| C7 | 2016 Base – ERTAC/BEIS | 2016 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Oct | CMAQ5.3.1 | EPA/NY | NY | Yes |
| C8 | 2023 FY - ERTAC/BEIS | 2023 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Oct | CMAQ5.3.1 | EPA/NY | NY | Yes |
| C9 | 2016 Base – ERTAC/BEIS | 2016 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Oct | CAMx7.00 | NY | NY | Yes |
| C10 | 2023 FY - ERTAC/BEIS | 2023 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Oct | CAMx7.00 | NY | NY | Yes |
| C11 | 2028 FY – ERTAC/BEIS | 2028 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Oct | CAMx7.00 | NY | NY | Yes |
| C12 | 2016 Base – ERTAC/BEIS | 2016 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Oct | CAMx7.10 | NY | NY | Yes |
| C13 | 2023 FY - ERTAC/BEIS | 2023 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Oct | CAMx7.10 | NY | NY | Yes |

| Run ID | Run Name | Year | Domain[a] | Inventory Platform[b] | Modeling Period | AQ Model | Pre-merged Emission Source | Modeling Center | Complete |
|---|---|---|---|---|---|---|---|---|---|
| D1 | 2016 Base Nest Grid ERTAC/BEIS | 2016 | 4OTC2 | fi_ERTAC_BEIS | Apr-Oct | CMAQ5.3.1 | NY | NY | Yes |
| D2 | 2023 Base Nest Grid ERTAC/BEIS | 2023 | 4OTC2 | fi_ERTAC_BEIS | Apr-Oct | CMAQ5.3.1 | NY | NY | Yes |
| D3 | 2016 Base Nest Grid ERTAC/BEIS | 2016 | 4OTC2 (two-way) | fi_ERTAC_BEIS | Apr-Oct | CAMx7.10 | NY | NY | Yes |
| D4 | 2023 Base Nest Grid ERTAC/BEIS | 2023 | 4OTC2 (two-way) | fi_ERTAC_BEIS | Apr-Oct | CAMx7.10 | NY | NY | Yes |
| | | | | | | | | | |
| E1 | Peak Energy Day 2016 Base | 2016 | 12-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NH/DC/NY | NESCAUM | Yes |
| E2 | Peak Energy Day 2018/19 ReBase | 2018/19 | 12-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NH/DC/NY | NESCAUM | Yes |
| E3 | Peak Energy Day 2018/19 Zero Part-75 P Emissions | 2018/19 | 12-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NH/DC/NY | NESCAUM | Yes |
| E6 | Peak Energy Day 2018/19 Dirtiest Units Dispatched First | 2018/19 | 12-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NH/DC/NY | NESCAUM | Yes |
| E7 | Peak Energy Day 2018/19 Cleanest Units Dispatched First | 2018/19 | 12-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NH/DC/NY | NESCAUM | Yes |
| E8 | Peak Energy Day 2018/19 Most-used Units Dispatched First Base | 2018/19 | 12-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NH/DC/NY | NESCAUM | Yes |
| | | | | | | | | | |
| H1 | VOC Sensitivity All VOC NYC Nonattainment | 2018/19 | 4-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NY | NJ | No |
| H2 | VOC Sensitivity All VOC 4km Portion of CT, NJ, NY | 2018/19 | 4-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NY | NJ | No |
| H3 | VOC Sensitivity All VOC Full 4 km Domain | 2018/19 | 4-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NY | NJ | No |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| H4 | VOC Sensitivity Consumer Products | 2018/19 | 4-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NY | NJ | No |
| H5 | VOC Sensitivity Paints & Solvents | 2018/19 | 4-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NY | NJ | No |
| H6 | VOC Sensitivity Mobile Sources, Fuels, and fueling | 2018/19 | 4-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NY | NJ | No |
| H7 | VOC Sensitivity Others | 2018/19 | 4-OTC2 | fi_ERTAC_BEIS | Jul-Aug | CMAQ5.3.1 | NY | NJ | No |
| | | | | | | | | | |
| | Contributions (source apportionment CAMx modeling) | | | | | | | | |
| K1 | 2023 FY - ERTAC/BEIS | 2023 | 12OTC2 | fi_ ERTAC_BEIS | Apr-Sep | CAMx7.10 | NY/NJ | UMD | Yes |
| K2 | 2023 FY - ERTAC/BEIS Corrected | 2023 | 12OTC2 | fj_ ERTAC_BEIS | Apr-Sep | TBD | NY/NJ | UMD | Yes |

*a.* *12OTC1 - Old OTC modeling Domain 12 km, 172 x 172 x 35*
*12OTC2 - Expanded OTC modeling Domain 12 km, 273 x 246 x 35*
*4OTC2 – OTC modeling Domain 4 km, 126 x 156 x 35*

*b.* *2016 Emission Modeling Platform with EPA IPM or ERTAC EGU options and BEIS or MEGAN biogenic options*
*fd – Alpha; fg – Beta; fh - v1; fi – v1 (fh) update*

In the case of non-ERTAC point sources (ptnonertac), some of the units were confirmed to be EGUs <25 MW (Small EGUs) through a research project conducted by the Maryland Department of the Environment (MDE) as outlined in Appendix A of the temporalization documentation (Ozone Transport Commission, 2016). The units were expected to be EGUs based on their Source Classification Code (SCC) and North American Industry Classification System (NAICS) codes, and further refinement to the list of EGUs occurred through a multi-state collaborative effort. These units still function as EGUs but produce too small an amount of power and emissions to be required to report hourly emissions to the EPA Clean Air Markets Division (CAMD) and thus are not temporalized through the ERTAC EGU process. MDE has developed a temporalization profile using hourly data from units that burn the same primary fuel and do report to CAMD. The Emission Modeling Framework (EMF) tool was used to create hourly profiles for these units so that they operate during times when electricity demand is highest rather than at a steady rate throughout the year. In order to develop the hourly ff10 files for the Small EGUs to process in SMOKE a multistep process was implemented. First, default temporal profiles were developed using SMOKE (Temporal Cross Reference [TREF] and Temporal Profile [TPRO]) and then imported into EMF. Next, hourly ff10 files were produced in EMF using the imported profiles. MDE in conjunction with University of Maryland researchers completed this work.

## *5.6 SMOKE Processed Emission Results*

In order to quality assure that the outputs from SMOKE were properly distributed geographically and to develop a better understanding of the geographical and temporalization of emissions, we looked at daily emissions on July 12, 2016. $NO_X$ and VOC emissions were examined with and without including biogenic emissions. Urban areas, interstates in rural areas, and shipping lanes are clearly distinguishable in the maps of $NO_X$ emissions (**Figure 5-1**). Total anthropogenic VOC emissions similarly show high emissions in densely populated areas and lower emissions in between **(Figure 5-2**).

Additionally, summary tables of emissions by RPO, sector, and pollutant were output from SMOKE processing. Portions of RPOs which lie outside the domain are not accounted for in this table. These results are aggregated for the 2016V1 inventory in **Table 5-2**.

***Figure 5-2.*** *2016 total NOx emissions (tons/day) for a typical summer weekday.*

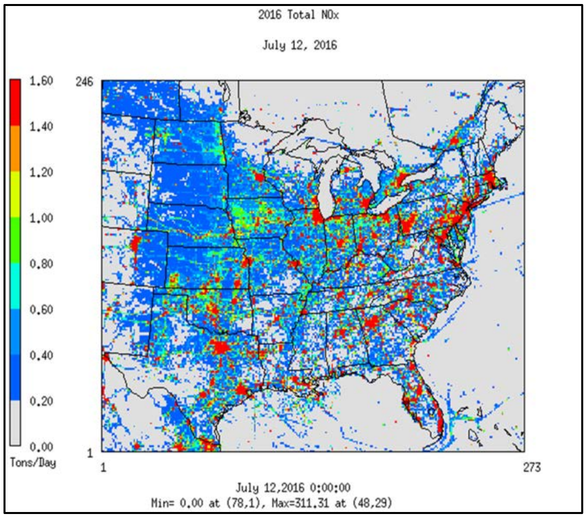



***Figure 5-1****. 2016 anthropogenic VOC emissions (tons/day) for a typical summer weekday.*

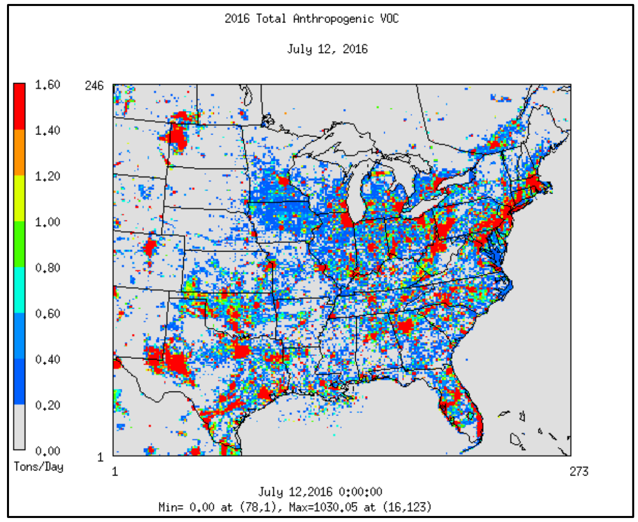



***Table 5-2.*** *2016 V1 base case emissions in tons of each pollutant by RPO and sector from SMOKE processed emission reports (tons/day).*

| **CO** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 4,001 | | | 5,975,688 | | | 5,979,689 |
| CENSARA | 2,008,649 | 668,167 | 1,866,096 | 520,250 | 3,813,691 | 4,341,805 | 242,650 | 273,311 | 13,734,618 |
| LADCO | 498,011 | 1,159,393 | 2,128,339 | 55,198 | 3,697,370 | 549,425 | 70,716 | 511,726 | 8,670,178 |
| MANE-VU | 333,097 | 964,382 | 2,216,067 | 51,199 | 2,727,861 | 164,462 | 81,687 | 111,452 | 6,650,207 |
| Mexico | | | | | | 1,200,350 | | | 1,200,350 |
| SESARM | 1,482,299 | 1,152,885 | 2,990,345 | 110,527 | 6,046,451 | 3,048,919 | 128,717 | 383,544 | 15,343,686 |
| US EEZ* | | | 39,229 | | | | | | 39,229 |
| WRAP | 995,842 | 126,049 | 524,350 | 166,102 | 960,551 | 1,735,325 | 46,828 | 52,356 | 4,607,403 |
| CO Total | 5,317,898 | 4,070,876 | 9,768,427 | 903,275 | 17,245,925 | 17,015,975 | 570,597 | 1,332,388 | 56,225,361 |

*EEZ Exclusive Economic Zone, largely coastal waterways

| **$NH_3$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 12 | | | 388,852 | | | 388,864 |
| CENSARA | | 11,325 | 530 | 74 | 17,884 | 1,420,784 | 8,435 | 23,271 | 1,482,303 |
| LADCO | | 24,675 | 434 | 74 | 16,622 | 546,157 | 5,489 | 7,169 | 600,620 |
| MANE-VU | | 14,042 | 312 | 44 | 15,029 | 123,681 | 4,148 | 4,105 | 161,360 |
| Mexico | | | | | | 87,041 | | | 87,041 |
| SESARM | | 10,854 | 454 | 2 | 27,534 | 571,878 | 9,035 | 17,821 | 637,579 |
| US EEZ | | | | | | | | | |
| WRAP | | 3,151 | 163 | 4,046 | 4,111 | 415,469 | 1,254 | 1,121 | 429,316 |
| $NH_3$ Total | | 64,048 | 1,906 | 4,240 | 81,181 | 3,553,862 | 28,362 | 53,487 | 3,787,084 |

| **$NO_X$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Canada | | | 36,145 | | | 760,556 | | | 796,701 |
| CENSARA | 363,505 | 109,019 | 557,062 | 490,554 | 761,921 | 85,310 | 327,189 | 268,183 | 2,962,744 |
| LADCO | 137,121 | 187,281 | 366,419 | 70,100 | 588,930 | 6,378 | 239,631 | 222,125 | 1,817,984 |
| MANE-VU | 29,470 | 203,037 | 267,946 | 47,647 | 460,932 | 2,349 | 135,599 | 88,200 | 1,235,180 |
| Mexico | | | | | | 614,540 | | | 614,540 |
| SESARM | 126,299 | 124,391 | 417,099 | 120,487 | 1,020,780 | 66,352 | 339,686 | 246,232 | 2,461,325 |
| US EEZ | | | 355,591 | 48,691 | | | | | 404,283 |
| WRAP | 207,255 | 24,661 | 164,942 | 154,095 | 217,036 | 23,172 | 159,202 | 53,293 | 1,003,657 |
| $NO_X$ Total | 863,650 | 648,388 | 2,165,204 | 931,574 | 3,049,600 | 1,558,657 | 1,201,308 | 878,033 | 11,296,413 |

| **$PM_{2.5}$ Primary** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 635 | | | 888,305 | | | 888,941 |
| CENSARA | | 106,476 | 31,409 | 13,119 | 23,288 | 1,137,586 | 27,570 | 57,993 | 1,397,440 |
| LADCO | | 194,150 | 25,827 | 1,435 | 19,626 | 591,570 | 21,301 | 59,910 | 913,820 |
| MANE-VU | | 154,432 | 18,718 | 1,314 | 16,967 | 160,610 | 12,716 | 21,831 | 386,588 |
| Mexico | | | | | | 75,109 | | | 75,109 |
| SESARM | | 200,522 | 28,851 | 2,724 | 29,465 | 744,926 | 41,284 | 75,011 | 1,122,783 |
| US EEZ | | | 10,845 | 667 | | | | | 11,512 |
| WRAP | | 20,065 | 10,030 | 4,388 | 6,694 | 477,827 | 7,734 | 16,106 | 542,844 |
| $PM_{2.5}$ Primary Total | | 675,646 | 126,315 | 23,645 | 96,039 | 4,075,934 | 110,605 | 230,851 | 5,339,036 |

| **$SO_2$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 1,486 | | | 730,469 | | | 731,955 |
| CENSARA | | 13,658 | 6,331 | 25,187 | 5,404 | 38,514 | 582,918 | 186,925 | 858,936 |
| LADCO | | 23,279 | 3,998 | 2,120 | 3,675 | 3,769 | 368,592 | 160,086 | 565,520 |
| MANE-VU | | 49,162 | 5,004 | 1,144 | 5,302 | 1,269 | 128,406 | 56,290 | 246,577 |
| Mexico | | | | | | 345,538 | | | 345,538 |
| SESARM | | 39,637 | 9,588 | 8,195 | 8,977 | 28,695 | 284,289 | 212,397 | 591,778 |
| US EEZ | | | 59,663 | 502 | | | | | 60,165 |
| WRAP | | 4,933 | 1,288 | 14,304 | 966 | 12,841 | 119,466 | 27,814 | 181,612 |
| $SO_2$ Total | | 130,668 | 87,359 | 51,453 | 24,324 | 1,161,094 | 1,483,671 | 643,512 | 3,582,082 |

| **VOC** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 1,922 | | | 1,641,721 | | | 1,643,644 |
| CENSARA | 11,695,659 | 750,206 | 197,589 | 1,547,740 | 349,737 | 1,032,394 | 7,878 | 201,799 | 15,783,002 |
| LADCO | 2,651,949 | 767,885 | 257,146 | 114,262 | 337,263 | 161,852 | 5,767 | 159,266 | 4,455,390 |
| MANE-VU | 2,102,166 | 762,883 | 217,025 | 98,201 | 242,681 | 47,382 | 3,225 | 45,274 | 3,518,836 |
| Mexico | | | | | | 404,676 | | | 404,676 |
| SESARM | 12,656,451 | 991,935 | 334,056 | 198,855 | 532,189 | 674,806 | 11,088 | 262,466 | 15,661,845 |
| US EEZ | | | 18,860 | 48,210 | | | | | 67,069 |
| WRAP | 4,272,470 | 165,153 | 55,163 | 867,623 | 100,655 | 414,084 | 2,635 | 40,278 | 5,918,061 |
| VOC Total | 33,378,694 | 3,438,062 | 1,081,761 | 2,874,892 | 1,562,523 | 4,376,915 | 30,593 | 709,083 | 47,452,524 |

## 5.7 US Future Year Base Case Emissions Inventories

The Collaborative's documentation includes the growth and control assumptions that were used to derive the future year projections. For point source EGUs, the Inventory Collaborative projected emissions using two methods: EPA's IPM and ERTAC-EGU. For future year projections, OTC continued to use the ERTAC-EGU projections for its 2016 modeling platform. EPA's non-EGU Point source inventories had to be adjusted also to account for differences in what units were included in IPM vs ERTAC. For all other sectors, projected emissions were taken directly from the EPA/Inventory Collaborative projections. Documentation for the projections can be found on EPA's website for beta[11] and for V1[12].

### 5.7.1 Canadian and Mexican Future Base Case Emissions

The methodologies used to project and develop 2023 and 2028 inventories for Canada and Mexico are provided on the Collaborative's 2016 V1 Emissions Modeling Platform wiki page in the individual Specification Sheets for the Canadian and Mexican source sectors.[27-32]

### 5.7.2 SMOKE Processed Emission Results

Maps of projected emissions in each model grid cell were produced to quality assure that the outputs from SMOKE were properly distributed to the modeling domain and to gain a better understanding of the geographic distribution of the emissions. These maps present emissions for a typical summer weekday, July 12, for 2023 and 2028 projections. **Figure 5-3** shows total projected 2023 NOx emissions, **Figure 5-4** shows total projected 2023 VOC emissions, and **Figure 5-5** shows projected 2023 anthropogenic-only VOC. **Figures 5-6** to **5-8** show projected total NOx, total VOC, and anthropogenic-only VOC for future year 2028. These sector maps are separated because of the large biogenic contribution to total VOC. Significant emissions decreases can be seen when comparing the 2023 and 2028 emissions maps to those for 2016 (**Figures 5-1 and 5-2**).

Additionally, summary tables of future year emissions by RPO, sector, and pollutant were produced from the SMOKE output and from state summaries provided on the EPA's 2016 V1 modeling emission inventory ftp site.[46] Summaries of projected future year emissions for 2023 and 2028 are shown in **Tables 5-3** and **5-4** respectively.

[46] US EPA 2016 V1 Emission Inventory Data Download. https://gaftp.epa.gov/Air/emismod/2016/v1/

***Figure 5-3.*** *Projected 2023 total NOx emissions (tons/day) for a typical summer weekday.*

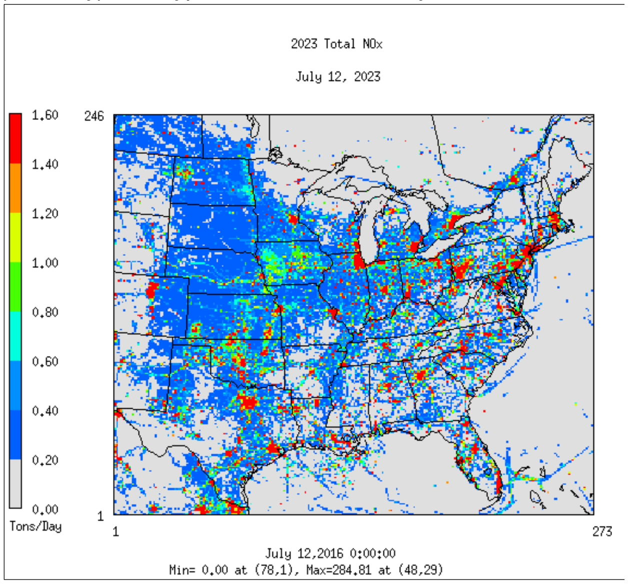



***Figure 5-4.*** *Projected 2023 total VOC emissions (tons/day) for a typical summer weekday.*

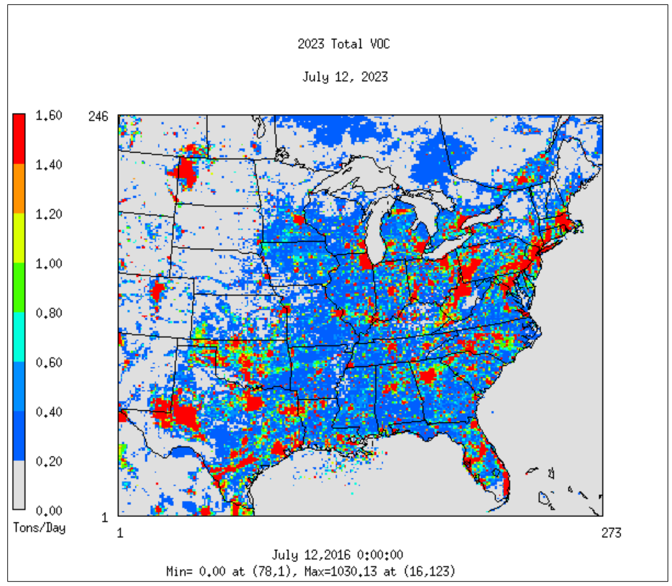



***Figure 5-5****. Projected 2023 anthropogenic VOC emissions (tons/day) for a typical summer weekday.*

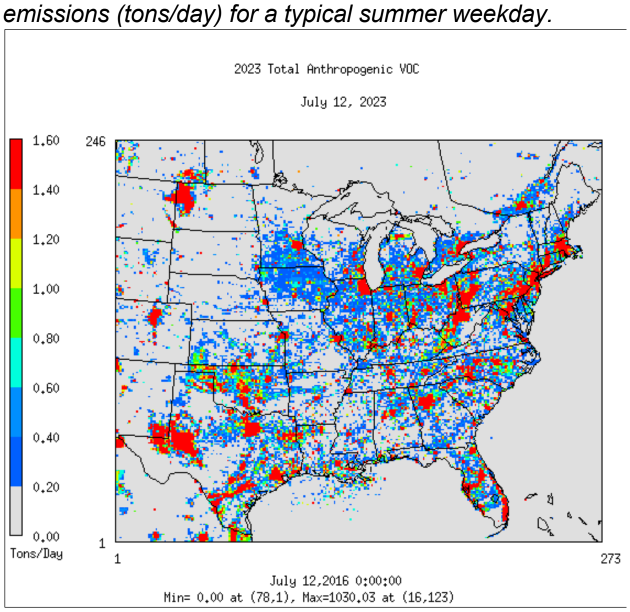



***Figure 5-6.*** *Projected 2028 total NOx emissions (tons/day) for a typical summer weekday.*

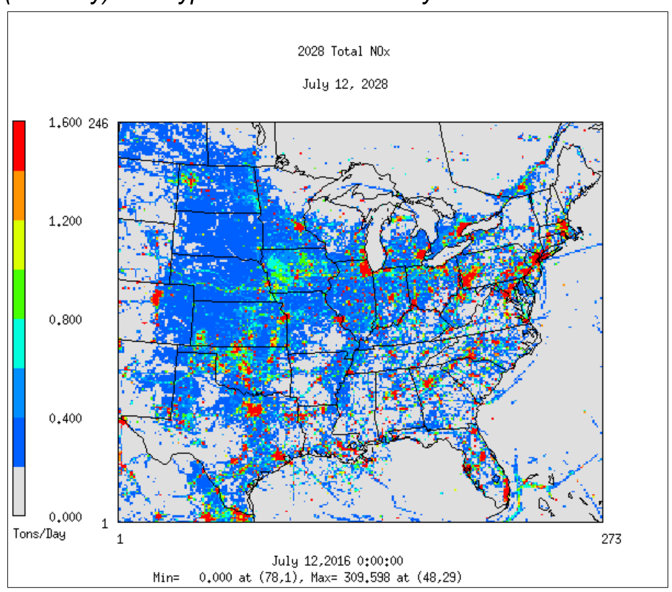


***Figure 5-7.*** *Projected 2028 total VOC emissions (tons/day) for a typical summer weekday.*

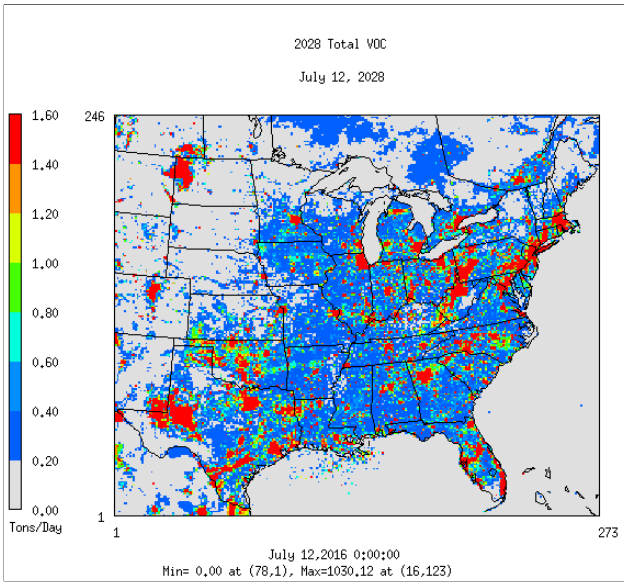



***Figure 5-8*** *Projected 2028 anthropogenic VOC emissions (tons/day) for a typical summer weekday.*

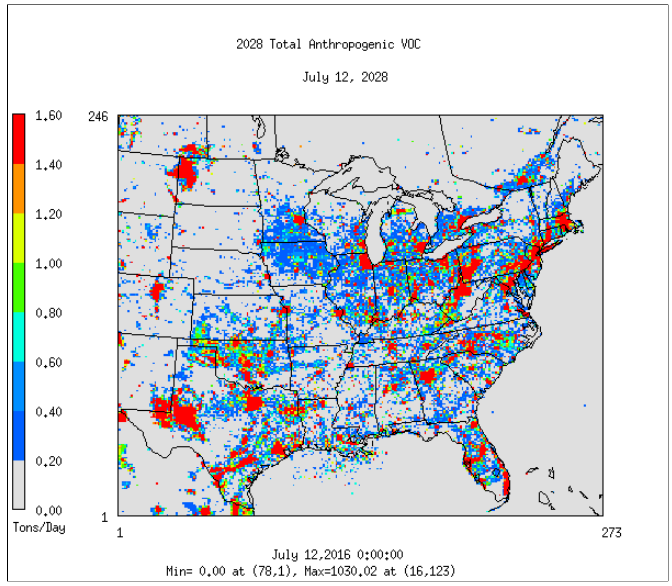



***Table 5-3.*** *Projected 2023 emissions (tons/day) by pollutant and RPO.*

| **CO** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 4,354 | | | 5,856,823 | | | 5,860,734 |
| CENSARA | 2,008,649 | 659,559 | 1,773,076 | 530,146 | 2,546,823 | 4,341,805 | 240,472 | 274,839 | 12,375,368 |
| LADCO | 498,011 | 1,117,684 | 2,064,892 | 55,319 | 2,572,337 | 549,425 | 91,448 | 513,580 | 7,462,696 |
| MANE-VU | 333,097 | 951,339 | 2,240,903 | 54,319 | 1,902,271 | 164,462 | 140,806 | 112,829 | 5,900,027 |
| Mexico | | | | | | 1,192,879 | | | 1,192,879 |
| SESARM | 1,482,299 | 1,157,828 | 3,085,208 | 116,824 | 4,257,411 | 3,048,919 | 159,428 | 385,842 | 13,693,758 |
| US EEZ* | | | 47,021 | | | | | | 47,021 |
| WRAP | 995,842 | 125,781 | 538,709 | 190,965 | 693,532 | 1,735,325 | 29,113 | 53,128 | 4,362,395 |
| CO Total | 5,317,898 | 4,012,191 | 9,754,164 | 947,572 | 11,972,374 | 16,889,195 | 661,597 | 1,340,218 | 50,894,878 |

| **$NH_3$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 13 | | | 462,173 | | | 462,186 |
| CENSARA | | 11,350 | 556 | 110 | 16,404 | 1,490,566 | 13,594 | 23,346 | 1,556,286 |
| LADCO | | 24,436 | 466 | 83 | 14,462 | 576,113 | 8,533 | 7,257 | 631,352 |
| MANE-VU | | 14,015 | 348 | 66 | 13,471 | 127,527 | 9,235 | 4,131 | 168,793 |
| Mexico | | | | | | 85,813 | | | 85,813 |
| SESARM | | 11,125 | 509 | 3 | 24,273 | 591,063 | 14,262 | 17,517 | 658,753 |
| US EEZ* | | | | | | | | | |
| WRAP | | 3,147 | 172 | 4,049 | 3,710 | 421,384 | 1,354 | 1,108 | 434,923 |
| $NH_3$ Total | | 64,072 | 2,065 | 4,310 | 72,321 | 3,754,639 | 47,338 | 53,360 | 3,998,105 |

| **$NO_X$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 25,622 | | | 598,273 | | | 623,894 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CENSARA | 363,505 | 107,543 | 409,135 | 498,510 | 364,080 | 85,310 | 265,710 | 265,136 | 2,358,931 |
| LADCO | 137,121 | 182,534 | 277,917 | 74,597 | 279,240 | 6,378 | 174,724 | 210,708 | 1,343,219 |
| MANE-VU | 29,470 | 204,614 | 218,253 | 52,162 | 213,216 | 2,349 | 103,916 | 94,767 | 918,748 |
| Mexico | | | | | | 611,529 | | | 611,529 |
| SESARM | 126,299 | 129,743 | 333,700 | 129,747 | 475,013 | 66,352 | 244,714 | 240,289 | 1,745,856 |
| US EEZ* | | | 315,191 | 48,691 | | | | | 363,882 |
| WRAP | 207,255 | 24,224 | 125,410 | 162,161 | 117,101 | 23,172 | 92,696 | 54,976 | 806,994 |
| $NO_X$ Total | 863,650 | 648,658 | 1,705,229 | 965,867 | 1,448,651 | 1,393,363 | 881,760 | 865,876 | 8,773,053 |

| **$PM_{2.5}$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 693 | | | 919,395 | | | 920,089 |
| CENSARA | | 106,702 | 20,074 | 15,770 | 13,326 | 1,143,189 | 28,482 | 58,901 | 1,386,444 |
| LADCO | | 188,389 | 17,545 | 1,768 | 11,597 | 594,750 | 22,697 | 60,791 | 897,536 |
| MANE-VU | | 151,047 | 14,023 | 1,957 | 10,138 | 164,893 | 18,302 | 22,473 | 382,833 |
| Mexico | | | | | | 78,642 | | | 78,642 |
| SESARM | | 204,058 | 21,347 | 3,410 | 17,825 | 753,016 | 45,506 | 75,645 | 1,120,807 |
| US EEZ* | | | 12,873 | 667 | | | | | 13,539 |
| WRAP | | 20,106 | 6,898 | 4,689 | 3,891 | 479,535 | 7,054 | 16,160 | 538,333 |
| $PM_{2.5}$ Total | | 670,302 | 93,453 | 28,260 | 56,776 | 4,133,421 | 122,040 | 233,970 | 5,338,223 |

| **$SO_2$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 1,572 | | | 674,491 | | | 676,064 |
| CENSARA | | 14,018 | 6,905 | 38,050 | 2,495 | 38,514 | 415,280 | 175,852 | 691,114 |
| LADCO | | 22,604 | 4,478 | 2,562 | 1,957 | 3,769 | 239,823 | 141,940 | 417,134 |
| MANE-VU | | 17,902 | 5,736 | 1,085 | 1,782 | 1,269 | 86,250 | 49,294 | 163,319 |
| Mexico | | | | | | 332,203 | | | 332,203 |
| SESARM | | 38,649 | 11,101 | 7,909 | 3,296 | 28,695 | 185,655 | 177,805 | 453,110 |
| US EEZ* | | | 73,533 | 502 | | | | | 74,035 |
| WRAP | | 4,530 | 1,430 | 18,483 | 553 | 12,841 | 77,952 | 27,610 | 143,398 |
| $SO_2$ Total | | 97,703 | 104,756 | 68,591 | 10,084 | 1,091,782 | 1,004,959 | 572,502 | 2,950,377 |

| **VOC** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 2,081 | | | 1,556,676 | | | 1,558,757 |
| CENSARA | 11,695,659 | 761,286 | 151,331 | 1,755,609 | 192,340 | 1,037,976 | 9,443 | 201,893 | 15,805,537 |
| LADCO | 2,651,949 | 769,276 | 190,836 | 115,882 | 197,298 | 164,249 | 6,928 | 159,822 | 4,256,240 |
| MANE-VU | 2,102,166 | 753,420 | 171,812 | 111,907 | 147,845 | 47,690 | 5,506 | 44,846 | 3,385,190 |
| Mexico | | | | | | 443,867 | | | 443,867 |
| SESARM | 12,656,451 | 1,019,910 | 262,529 | 219,712 | 316,362 | 676,341 | 11,184 | 264,685 | 15,427,174 |
| US EEZ* | | | 22,500 | 48,210 | | | | | 70,710 |
| WRAP | 4,272,470 | 167,296 | 45,806 | 1,065,150 | 64,009 | 414,557 | 2,305 | 40,425 | 6,072,018 |
| VOC Total | 33,378,694 | 3,471,187 | 846,895 | 3,316,470 | 917,854 | 4,341,355 | 35,366 | 711,671 | 47,019,493 |

***Table 5-4.*** *Projected 2028 emissions (tons/day) by pollutant and RPO.*

| **CO** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 4,550 | | | 5,803,682 | | | 5,808,232 |
| CENSARA | 2,008,649 | 661,524 | 1,824,676 | 514,196 | 1,871,666 | 4,341,805 | 245,400 | 277,561 | 11,745,477 |
| LADCO | 498,011 | 1,105,065 | 2,092,269 | 54,284 | 1,918,524 | 549,425 | 105,368 | 516,697 | 6,839,644 |
| MANE-VU | 333,097 | 946,737 | 2,303,949 | 53,597 | 1,438,511 | 164,462 | 148,806 | 113,789 | 5,502,943 |
| Mexico | | | | | | 1,141,631 | | | 1,141,631 |
| SESARM | 1,482,299 | 1,166,039 | 3,218,636 | 116,032 | 3,177,852 | 3,048,919 | 184,418 | 394,613 | 12,788,807 |
| US EEZ* | | | 53,795 | | | | | | 53,795 |
| WRAP | 995,842 | 126,079 | 562,365 | 190,065 | 520,350 | 1,735,325 | 25,346 | 53,745 | 4,215,089 |
| CO Total | 5,317,898 | 4,005,191 | 10,060,240 | 934,144 | 8,926,902 | 16,785,249 | 709,339 | 1,356,399 | 48,095,617 |

| **$NH_3$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 14 | | | 519,166 | | | 519,180 |
| CENSARA | | 11,408 | 576 | 118 | 16,315 | 1,496,903 | 15,715 | 23,446 | 1,564,480 |
| LADCO | | 24,365 | 477 | 85 | 14,214 | 584,257 | 10,699 | 7,314 | 641,412 |
| MANE-VU | | 13,868 | 362 | 66 | 13,275 | 129,114 | 9,858 | 4,173 | 170,716 |
| Mexico | | | | | | 87,270 | | | 87,270 |
| SESARM | | 11,274 | 530 | 3 | 23,839 | 597,531 | 17,109 | 17,648 | 667,935 |
| US EEZ* | | | | | | | | | |
| WRAP | | 3,156 | 176 | 4,049 | 3,620 | 420,141 | 1,702 | 1,126 | 433,968 |
| $NH_3$ Total | | 64,071 | 2,135 | 4,321 | 71,263 | 3,834,382 | 55,083 | 53,706 | 4,084,961 |

| **$NO_X$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 27,122 | | | 534,427 | | | 561,549 |
| CENSARA | 363,505 | 108,786 | 353,833 | 477,982 | 257,574 | 85,310 | 276,230 | 264,761 | 2,187,982 |
| LADCO | 137,121 | 178,963 | 245,860 | 72,108 | 196,686 | 6,378 | 168,507 | 214,619 | 1,220,241 |
| MANE-VU | 29,470 | 202,471 | 203,510 | 50,316 | 150,344 | 2,349 | 104,926 | 95,670 | 839,057 |
| Mexico | | | | | | 633,544 | | | 633,544 |
| SESARM | 126,299 | 132,510 | 306,841 | 126,075 | 326,819 | 66,352 | 250,131 | 244,132 | 1,579,158 |
| US EEZ* | | | 295,545 | 48,691 | | | | | 345,236 |
| WRAP | 207,255 | 24,131 | 107,910 | 150,546 | 83,094 | 23,172 | 84,184 | 56,218 | 746,509 |
| $NO_X$ Total | 863,650 | 646,861 | 1,541,621 | 935,717 | 1,014,516 | 1,351,533 | 883,978 | 875,400 | 8,113,276 |

| **$PM_{2.5}$** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 725 | | | 942,837 | | | 943,563 |
| CENSARA | | 108,799 | 16,333 | 16,127 | 10,282 | 1,145,811 | 29,870 | 59,479 | 1,386,702 |
| LADCO | | 187,699 | 14,433 | 1,794 | 9,077 | 596,072 | 23,303 | 60,166 | 892,543 |
| MANE-VU | | 150,219 | 12,580 | 2,097 | 7,945 | 166,000 | 18,451 | 22,641 | 379,932 |
| Mexico | | | | | | 84,550 | | | 84,550 |
| SESARM | | 209,754 | 18,959 | 3,528 | 14,222 | 756,826 | 47,346 | 76,922 | 1,127,558 |
| US EEZ* | | | 14,655 | 667 | | | | | 15,322 |
| WRAP | | 20,311 | 5,487 | 4,849 | 2,940 | 480,504 | 7,536 | 16,234 | 537,860 |
| $PM_{2.5}$ Total | | 676,782 | 83,173 | 29,061 | 44,465 | 4,172,600 | 126,506 | 235,442 | 5,368,029 |

| $SO_2$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 1,660 | | | 688,263 | | | 689,923 |
| CENSARA | | 14,473 | 7,727 | 41,125 | 2,389 | 38,514 | 371,501 | 175,492 | 651,221 |
| LADCO | | 22,583 | 5,091 | 2,578 | 1,817 | 3,769 | 235,630 | 144,207 | 415,675 |
| MANE-VU | | 17,598 | 6,350 | 1,090 | 1,628 | 1,269 | 88,200 | 49,641 | 165,776 |
| Mexico | | | | | | 358,516 | | | 358,516 |
| SESARM | | 38,545 | 12,131 | 7,927 | 3,095 | 28,695 | 179,965 | 177,950 | 448,308 |
| US EEZ* | | | 85,122 | 502 | | | | | 85,624 |
| WRAP | | 4,562 | 1,607 | 20,020 | 540 | 12,841 | 71,992 | 28,302 | 139,864 |
| $SO_2$ Total | | 97,761 | 119,688 | 73,241 | 9,469 | 1,131,866 | 947,287 | 575,593 | 2,954,906 |

| VOC | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **biogenic** | **nonpoint** | **nonroad** | **Oil & gas** | **onroad** | **other** | **ptertac** | **ptnonertac** | **Grand Total** |
| Canada | | | 2,175 | | | 1,587,480 | | | 1,589,655 |
| CENSARA | 11,695,659 | 767,048 | 143,083 | 1,796,224 | 142,905 | 1,038,483 | 10,468 | 201,242 | 15,795,113 |
| LADCO | 2,651,949 | 770,816 | 177,195 | 116,417 | 151,072 | 164,900 | 7,639 | 159,547 | 4,199,536 |
| MANE-VU | 2,102,166 | 753,565 | 164,533 | 117,354 | 115,128 | 47,817 | 5,673 | 44,966 | 3,351,201 |
| Mexico | | | | | | 476,275 | | | 476,275 |
| SESARM | 12,656,451 | 1,038,672 | 250,282 | 218,448 | 237,967 | 676,859 | 11,986 | 268,433 | 15,359,099 |
| US EEZ* | | | 25,745 | 48,210 | | | | | 74,954 |
| WRAP | 4,272,470 | 168,358 | 44,644 | 1,143,945 | 49,036 | 414,458 | 2,453 | 40,495 | 6,135,858 |
| VOC Total | 33,378,694 | 3,498,459 | 807,658 | 3,440,598 | 696,108 | 4,406,271 | 38,219 | 714,684 | 46,980,692 |

# 6 Model Performance and Assessment of 8-Hour Ozone

## 6.1 Air quality model evaluation

One of the requirements for demonstrating attainment of the 8-hour NAAQS is the evaluation of the air quality modeling system used to predict future air quality (US EPA, 2018a). To assess attainment of the 2015 $O_3$ NAAQS, the CMAQ and CAMx photochemical models were first used to simulate air quality with emissions and WRF meteorological fields corresponding to the 2016 base year. Simulated pollutant concentrations were then compared with available measurements to ensure the credibility and overall utility of the modeling system. The comparisons and results presented in this section should serve as an illustration of the performance of the base year simulations with both CMAQ and CAMx. Additional information on model assessment is available and can be requested from the NYSDEC.

### 6.1.1 Air Quality Simulations

This section focuses on the results for the base year 2016 simulations using the V1 emissions inventory and both CMAQ and CAMx. Consistent WRF meteorological fields were applied for these base year simulations.

### 6.1.2 Air Quality Measurements

Hourly pollutant concentrations are reported at State and Local Air Monitoring Stations (SLAMS) and National Core (NCore) stations across the US on a routine basis. For overall ozone model performance, hourly data was obtained for 977 stations across the 12OTC2 domain – 200 in the OTR and 777 outside the OTR. Diurnal patterns of nitrogen dioxide ($NO_2$) and ozone at sites we examined at locations where both pollutants are measured (191 sites across the 12OTC2 domain; 23 of these are within the OTR). These data are available from the US EPA Air Quality System (AQS).[47] In addition, related reactive nitrogen data at two of these sites – one rural and one urban, both in NY – were used to evaluate modeled ozone production efficiency.

Daily $NO_2$ and HCHO column amounts were obtained from the Ozone Monitoring Instrument (OMI)[48] aboard the Aura satellite. The OMI instrument yields pollutant fields at an approximate horizontal resolution of 0.1°×0.1°. Both $NO_2$ and formaldehyde (HCHO) are $O_3$ precursors, and the ratio HCHO/$NO_2$ has been used to infer regional patterns of VOC-limited versus NOx-limited $O_3$ production regimes (e.g., Jin et al., 2017). A qualitative comparison with CMAQ and CAMx predictions is presented here.

[47] US EPA Air Quality System. https://www.epa.gov/aqs
[48] NASA Ozone Monitoring Instrument. https://aura.gsfc.nasa.gov/omi.html

## 6.2 Daily maximum 8-hour $O_3$ concentrations

### 6.2.1 Time Series of Daily Maximum 8-hour $O_3$

Observed and predicted MDA8 $O_3$ concentrations were computed at each site across the 12OTC2 domain. Five sites in the OTR region were selected to illustrate the variation of MDA8 $O_3$ over the entire season. These sites are among those in the OTR that have base year 2014-2018 average design values exceeding 75 ppb. Three of these sites – Westport, CT, Stratford, CT, and Susan Wagner HS, NY – are in the New York-Northern New Jersey-Long Island, NY-NJ-CT non-attainment area, while Bucks County, PA and Camden, NJ are in the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE non-attainment area. Regional background sites are included for Chester, NJ, Piney Run, MD, and State College, PA.

**Figures 6-1** through **6-8** show the time series of MDA8 $O_3$ concentrations at these eight sites from April through October 2016. The observations are shown in black, CMAQ predictions are shown in red, and CAMx predictions are shown in blue. Both models were broadly consistent with each other, generally capturing the day-to-day observed variation in ozone reasonably well, although both models tended to underpredict ozone in the early part of the season and overpredict ozone later in the season. This was typical of many sites across the modeling domain.

***Figure 6-1.*** *Observed and predicted MDA8 O3 concentrations at Westport, CT, April-October 2016 (090019003).*

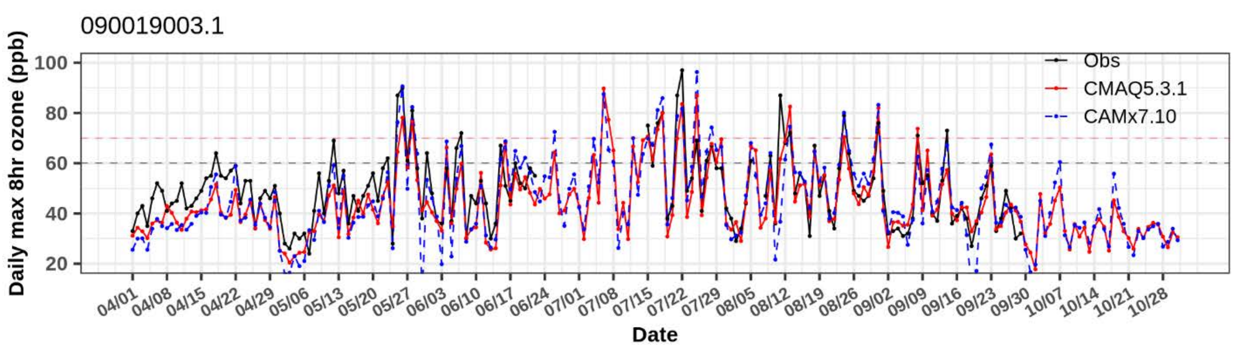



***Figure 6-2.*** *Observed and predicted MDA8 O3 concentrations at Stratford, CT, April-October 2016 (090013007).*

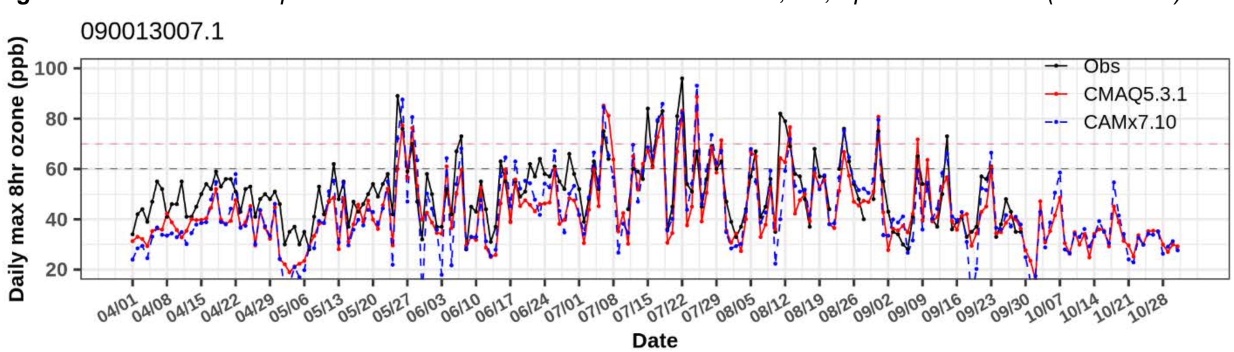


***Figure 6-3.*** *Observed and predicted MDA8 O3 concentrations at Susan Wagner HS, NY, April-October 2016 (360850067).*

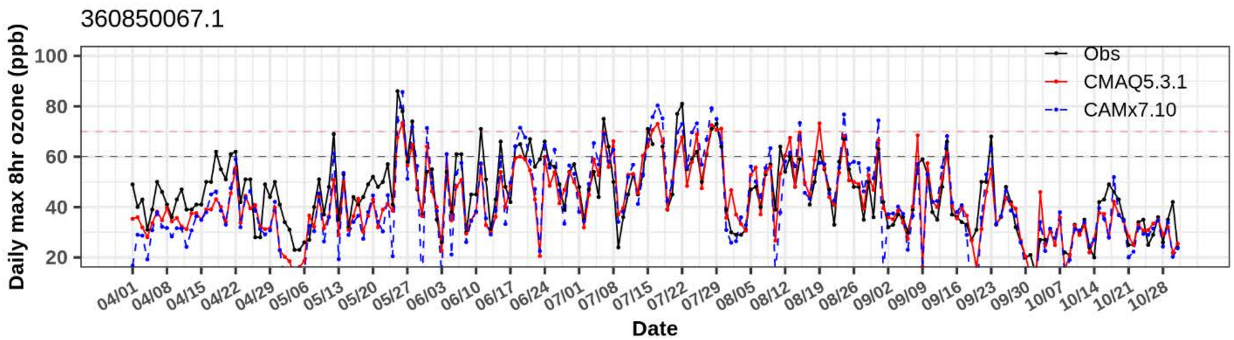



***Figure 6-4.*** *Observed and predicted MDA8 O3 concentrations at Bucks County, PA, April-October 2016 (420170012).*

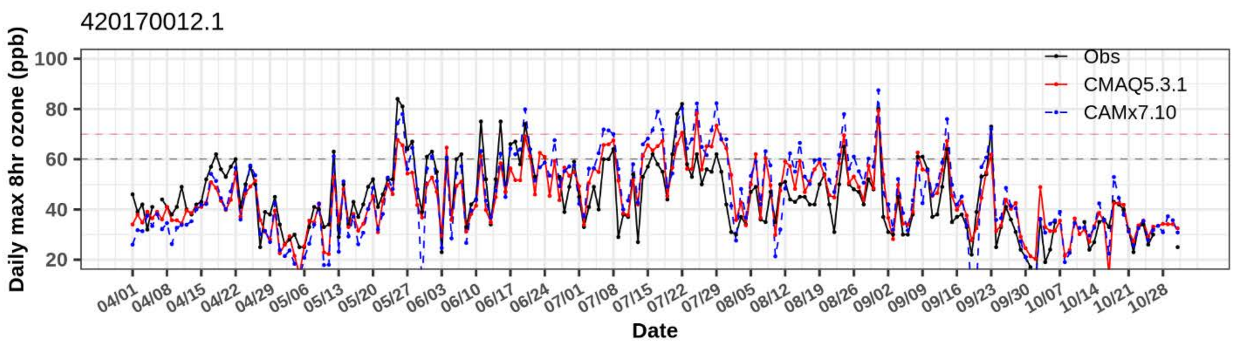



***Figure 6-5.*** *Observed and predicted MDA8 O3 concentrations at Camden, NJ, April-October 2016 (340070002).*

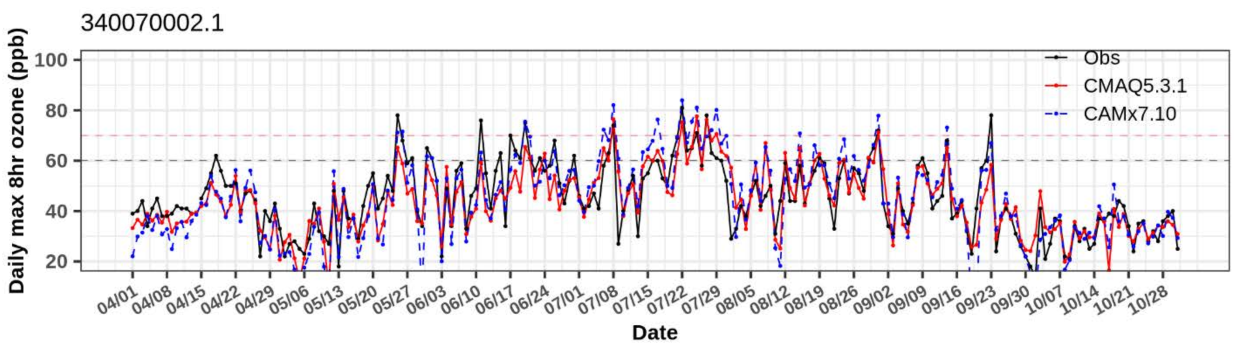



***Figure 6-6.*** *Observed and predicted MDA8 O3 concentrations at Chester, NJ, April-October 2016 (340273001).*

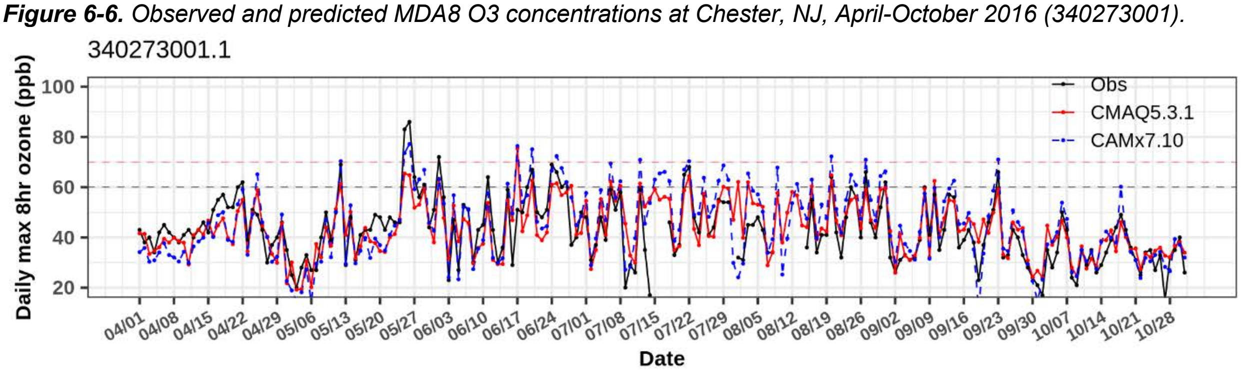


***Figure 6-7****. Observed and predicted MDA8 O3 concentrations at Piney Run, MD, April-October 2016 (240230002).*

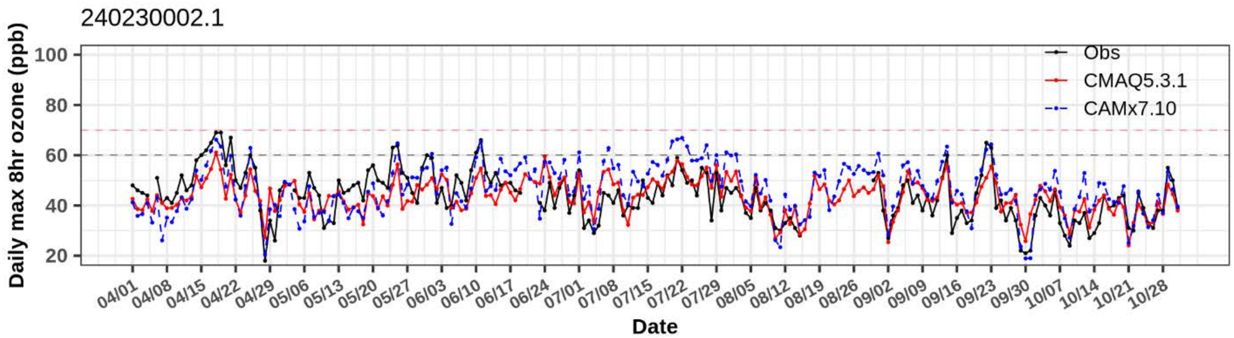
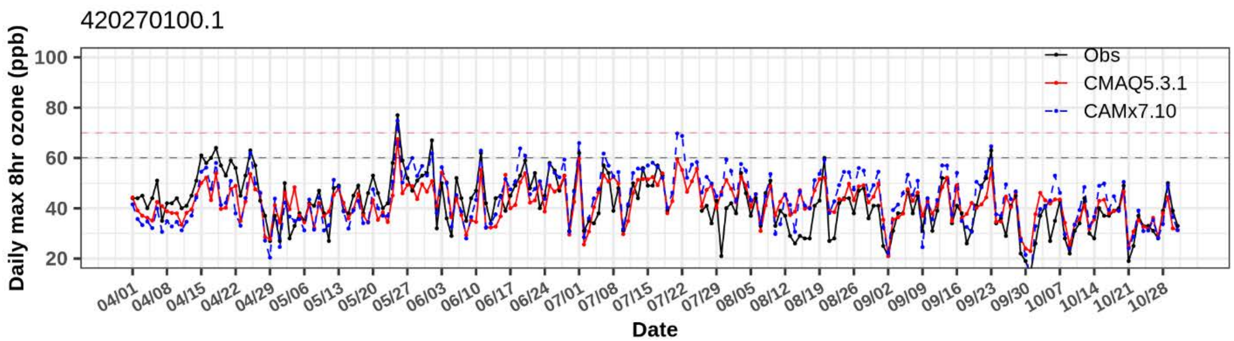



***Figure 6-8****. Observed and predicted MDA8 O3 concentrations at State College, PA, April-October 2016 (420270100).*




### 6.2.2 Comparison of observed and predicted daily maximum 8-hour $O_3$

**Figure 6-9** displays the fourth highest observed and CMAQ-predicted MDA8 $O_3$ concentrations at OTR (blue) and non-OTR (red) sites across the 12OTC2 domain over the entire simulation, while **Figure 6-10** displays the fourth highest observed and CAMx-predicted MDA8 $O_3$ concentrations at OTR and non-OTR sites. Least-squares regression equations are displayed, as are the 1:1 (black dashed) line and the 70 ppb NAAQS (red dashed) line. Both models tended to perform better at the OTR sites, as indicated by regression slopes near unity and higher $R^2$ values. Overall, CMAQ tended to underpredict the fourth highest daily maximum ozone concentrations at a large majority of sites, especially for observed values below 70 ppb. However, there were a few sites where CMAQ exceeded observed values by >10 ppb; six of the highest seven predicted values occurred at sites defined as water cells in the modeling system (1 site in RI and 2 each in CT, OH, and FL), highlighting the difficulty in simulating ozone along coastal regions. This is likely related to model grid resolution, and this issue is explored further in **Section 7**. The results for CAMx were qualitatively similar, although the CAMx overpredictions were more numerous but not quite as extreme at those from CMAQ.

***Figure 6-9.*** *Comparison of 4th highest MDA8 O3 at OTR and non-OTR sites, observed vs CMAQ.*

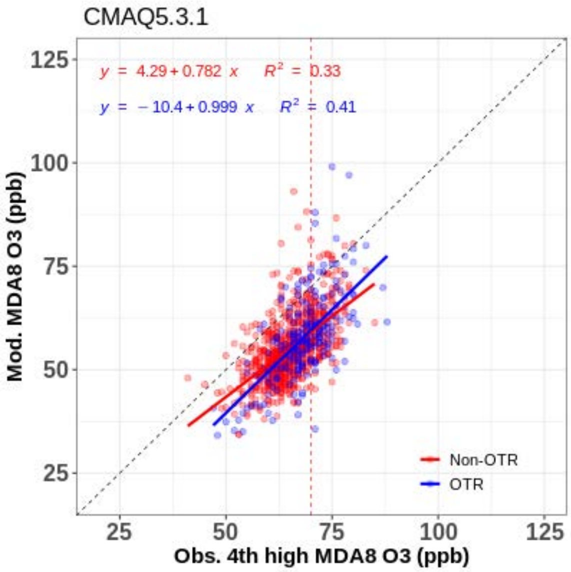
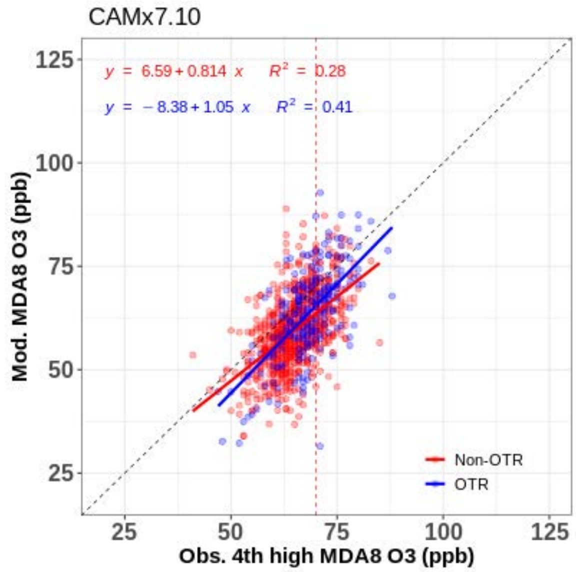



***Figure 6-10****. Comparison of 4th highest MDA8 O3 at OTR and non-OTR sites, observed vs CAMx.*




### 6.2.3 Distributions of Daily Maximum 8-hour $O_3$

Distributions of MDA8 $O_3$ concentrations were analyzed for different non-attainment areas across the 12OTC2 domain. **Figures 6-11** through **6-15** illustrate the monthly distributions for the five non-attainment areas in the OTR. In these figures the boxes denote the $25^{th}$ percentiles, medians, and $75^{th}$ percentiles; the whiskers denote ±1.5× the interquartile ranges (IQR); and the circles are outliers beyond 1.5×IQR. Observed values are shown in green, CMAQ predictions are shown in orange, and CAMx predictions are shown in blue.

As mentioned earlier both models broadly reproduced the seasonal variation in ozone but tended to underpredict MDA8 $O_3$ early in the modeling season, especially in April. By July and August, the tendency was for the models to overpredict daily maximum ozone on average. During the peak of the ozone season, CAMx tended to predict higher MDA8 concentrations than CMAQ.

***Figure 6-11.*** *Monthly distributions of MDA8 O3, Greater Connecticut.*

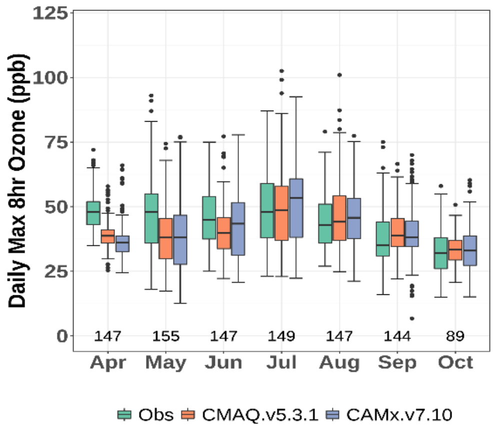



***Figure 6-12.*** *Monthly distributions of MDA8 O3, New York-Northern New Jersey-Long Island, NY-NJ-CT.*

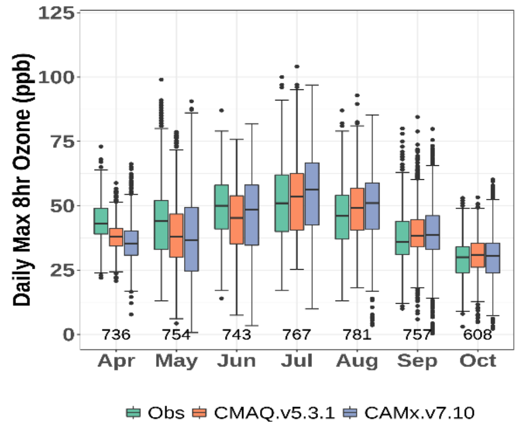



***Figure 6-13****. Monthly distributions of MDA8 O3, Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE.*

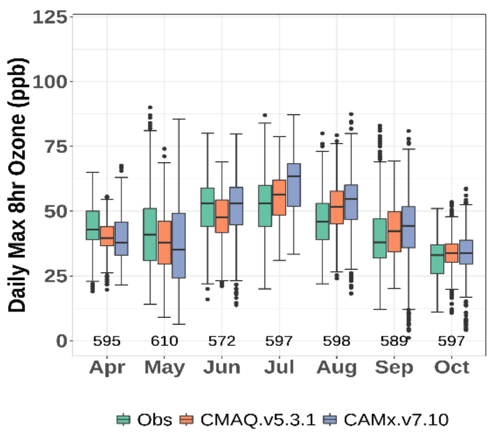



***Figure 6-14.*** *Monthly distributions of MDA8 O3, Baltimore, MD.*

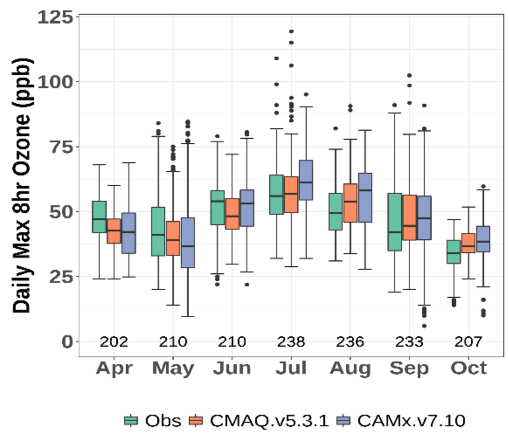
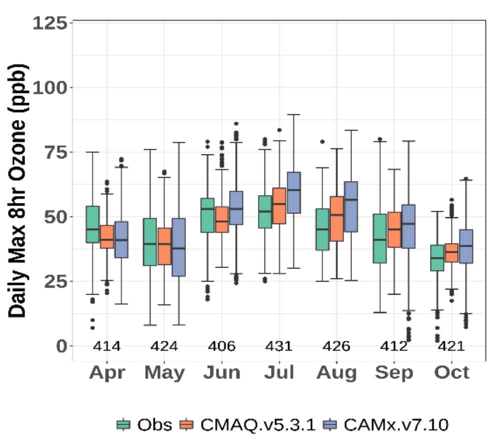



***Figure 6-15.*** *Monthly distributions of MDA8 O3, Washington, DC-MD-VA.*



### 6.2.4 Statistical Evaluation of Daily Maximum 8-hour $O_3$

At each site in across the 12OTC2 domain, we computed model evaluation statistics over the entire April-October 2016 period; **Appendix B** lists all the statistical formulae. Here we illustrate overall model performance with two metrics – normalized mean bias (NMB) and normalized mean error (NME), which are commonly used in operational assessments of ozone, fine particulate matter and regional haze model applications (e.g., Emery et al., 2017; Simon et al., 2012).

Emery et al. (2017) recommended NMB and NME benchmarks for ozone and speciated particulate matter based on the concepts of "goals" and "criteria." Goals are statistical thresholds that a third of past model applications have met and are reflective of the best performance that grid models can be expected to achieve. Criteria are statistical thresholds that two-thirds of past model applications have met and are reflective of performance that most grid models should be able to achieve. In the case of MDA8 $O_3$, with no lower cutoff threshold concentration, Emery et al. (2017) suggested the following: NMB goal <±5%, NMB criteria <±15%; NME goal <15%, and NME criteria <25%.

**Table 6-1** lists the numbers and percentages of monitors across the 12OTC2 domain that meet these recommended benchmarks for both CMAQ and CAMx over the entire ozone season, while **Table 6-2** lists the corresponding values for the monitors in the OTR specifically. Overall, CMAQ performed slightly better in terms of achieving the stricter NMB and NME goals, but both models met the corresponding NMB and NME criteria at a vast majority of sites in each respective region.

***Table 6-1.** Numbers (and percentages) of monitoring sites that met NMB and NME goals and criteria across the 12OTC2 domain (N=977).*

| | CMAQ | CAMx |
|---|---|---|
| **NMB goal <±5%** | 586 (60%) | 479 (49%) |
| **NMB criteria <±15%** | 948 (97%) | 917 (94%) |
| **NME goal <15%** | 647 (66%) | 543 (56%) |
| **NME criteria <25%** | 965 (99%) | 958 (98%) |

***Table 6-2.** Numbers (and percentages) of monitoring sites that met NMB and NME goals and criteria across the OTR (N=200).*

| | CMAQ | CAMx |
|---|---|---|
| **NMB goal <±5%** | 115 (58%) | 115 (58%) |
| **NMB criteria <±15%** | 196 (98%) | 193 (97%) |
| **NME goal <15%** | 114 (57%) | 82 (41%) |
| **NME criteria <25%** | 198 (99%) | 196 (98%) |

To focus on high ozone days, **Figures 6-16** and **6-17** display the seasonal NMB across the 12OTC2 domain with CMAQ and CAMx on days with observed daily maximum 8-hour $O_3 \geq 60$ ppb, while **Figures 6-18** and **6-19** display the corresponding seasonal NME across the 12OTC2 domain with CMAQ and CAMx. Throughout much of the southeastern portion of the modeling domain, CAMx predictions on average were higher than CMAQ; as a result, on the highest ozone days, CMAQ tended to underpredict observed $O_3$.

***Figure 6-16**. NMB of MDA8 $O_3$, April-October 2016, with CMAQ.*

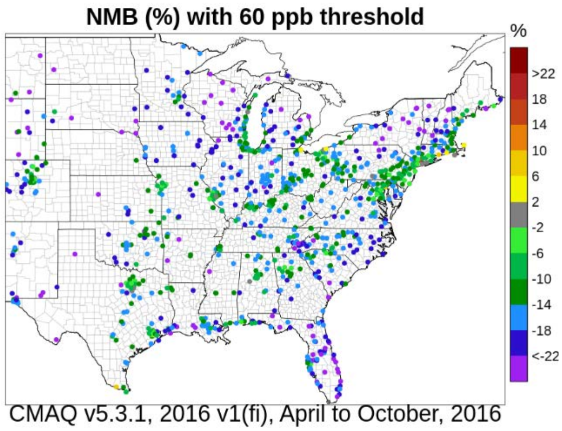



***Figure 6-17.** NMB of MDA8 $O_3$, April-October 2016, with CAMx.*

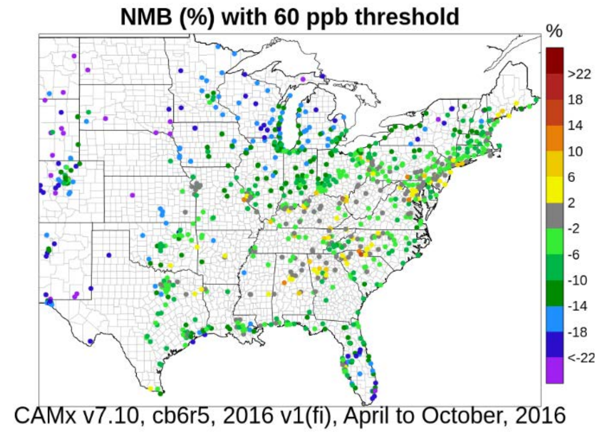



***Figure 6-18**. NME of MDA8 $O_3$, April-October 2016, with CMAQ.*

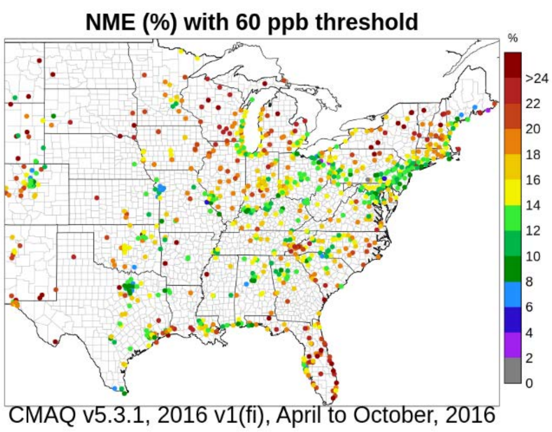
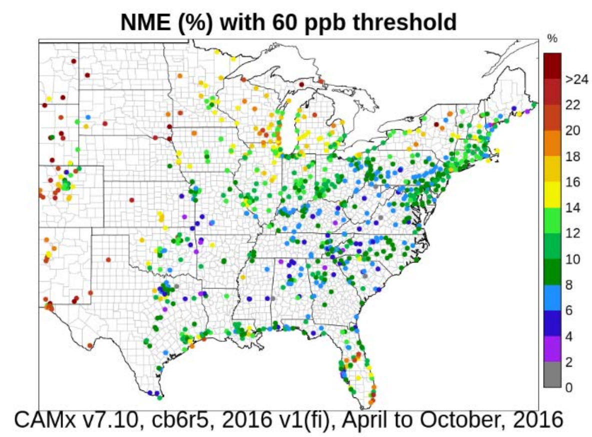



**Figure 6-19**. NME of MDA8 $O_3$, April-October 2016, with CAMx.




Model performance varied over the course of the ozone season. **Figures 6-20** and **6-21** display the May-June average NMB for CMAQ and CAMx, respectively, while **Figures 6-22** and **6-23** display the July-August NMB for the two models, using all days. Early in the season (e.g., May and June), both models tended to underpredict ozone in the northern and western portions of the domain. CMAQ tended to underpredict ozone throughout most of the domain, with only a few exceptions in the Southeast, whereas CAMx overpredictions were more widespread throughout the Southeast. Later in the ozone season, both models tended to exhibit higher overpredictions over much of the modeling domain, again with CAMx overpredictions comparable to or higher than CMAQ.

***Figure 6-20.*** *NMB of MDA8 $O_3$, May-June 2016, with CMAQ.*

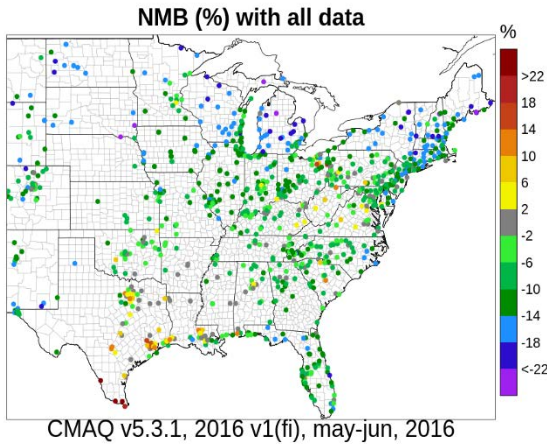



***Figure 6-21****. NMB of MDA8 $O_3$, May-June 2016, with CAMx.*

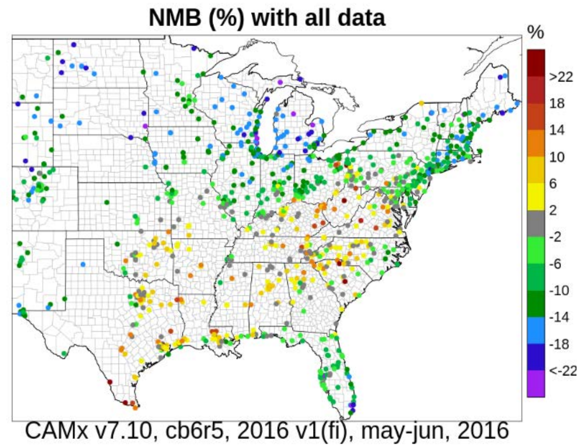



***Figure 6-22.*** *NMB of MDA8 $O_3$, July-August 2016, with CMAQ.*

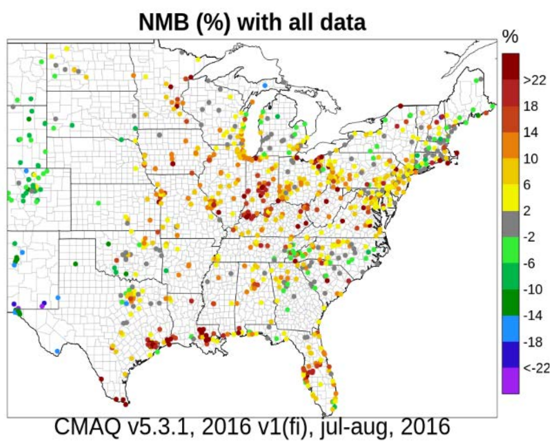
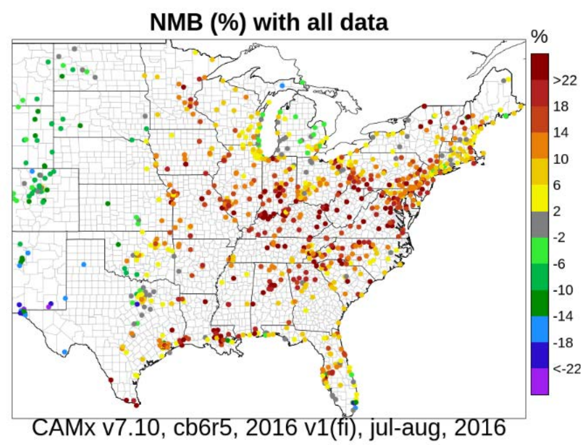



***Figure 6-23.*** *NMB of MDA8 $O_3$, July-August 2016, with CAMx.*




### 6.2.5 Diurnal Variations of $O_3$ and $NO_2$ at Collocated Monitoring Sites

In order to assess model performance over the course of a day, average diurnal patterns were examined. The results from 191 sites across the 12OTC2 domain were reviewed with collocated $O_3$ and $NO_2$ monitors. Observed values are shown in black, CMAQ in blue, and CAMx in red. For this model assessment, we classified sites as "urban" and "rural," based on the gridded 2011 National Land Cover Database categories in the WRF model; sites as those having low, medium, or high density developed land cover were defined as urban (N=76), while all others were classified as rural (N=115).

**Figures 6-24** and **6-25**, respectively, display the diurnal average ozone and $NO_2$ patterns at rural sites across the 12OTC2 domain in May 2016, while **Figures 6-26** and **6-27** display the diurnal patterns at urban sites. Early in the ozone season, both CMAQ and CAMx on average tend to slightly underpredict peak afternoon ozone concentrations at rural and urban sites. Both models tend to predict consistent peak afternoon ozone concentrations, while CAMx tended to predict higher nighttime and early morning ozone concentrations than CMAQ. On average, CMAQ was better able to reproduce the diurnal amplitude in ozone in May. Both models qualitatively were able to reproduce the observed diurnal patterns in $NO_2$, with maxima in the shallow nocturnal boundary layer and minima during enhanced photochemistry during the afternoon hours. Both models on average overpredict $NO_2$ during the early morning and nighttime observed peaks, especially CAMx at urban sites.

***Figure 6-24.*** *Observed and predicted $O_3$ at rural sites, May 2016.*

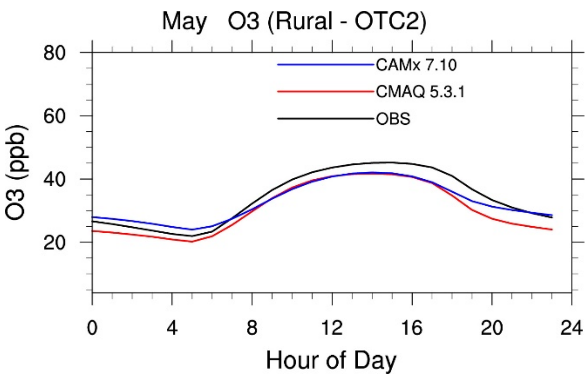



***Figure 6-25.*** *Observed and predicted $NO_2$ at rural sites, May 2016.*

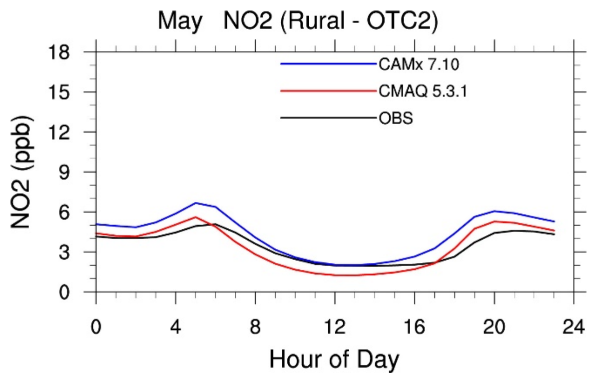



***Figure 6-26.*** *Observed and predicted $O_3$ at urban sites, May 2016.*

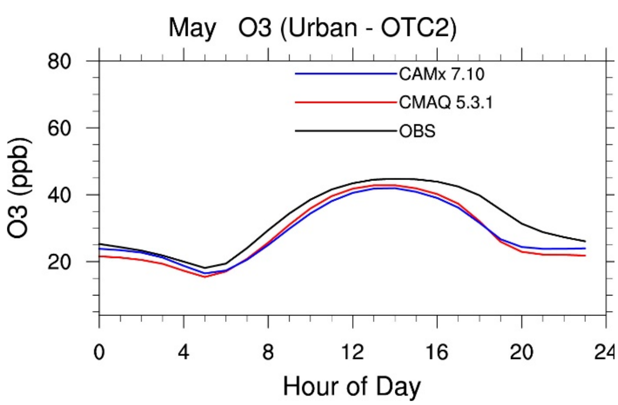
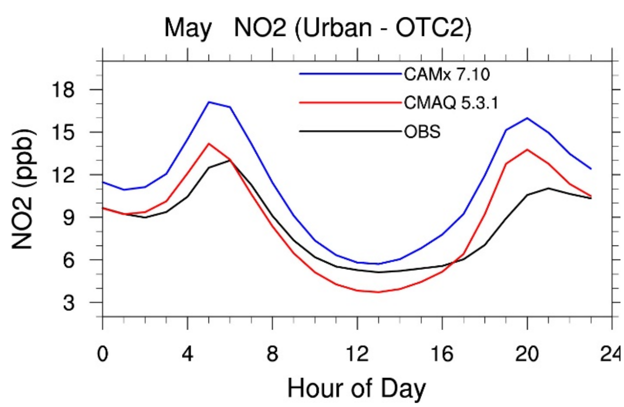



***Figure 6-27****. Observed and predicted $NO_2$ at urban sites, May 2016.*




To illustrate model performance later in the season, the corresponding August average diurnal patterns of ozone and $NO_2$ at rural and urban monitors are displayed in **Figures 6-28** to **6-31**. Unlike earlier in the season, both models tend to slightly overpredict afternoon ozone concentrations, especially at the urban sites. At both urban and rural sites, CAMx tended to predict higher ozone than CMAQ in the early morning and nighttime hours, whereas CMAQ on average predicted slightly higher afternoon ozone than CAMx at urban sites. Similar to May, both models tended to predict a larger daily amplitude in $NO_2$ than was observed; however, in August the early morning and nighttime peak overpredictions were considerably larger than in May, with modeled $NO_2$ concentrations approximately double the observed values.

***Figure 6-28.*** *Observed and predicted $O_3$ at rural sites, August 2016.*

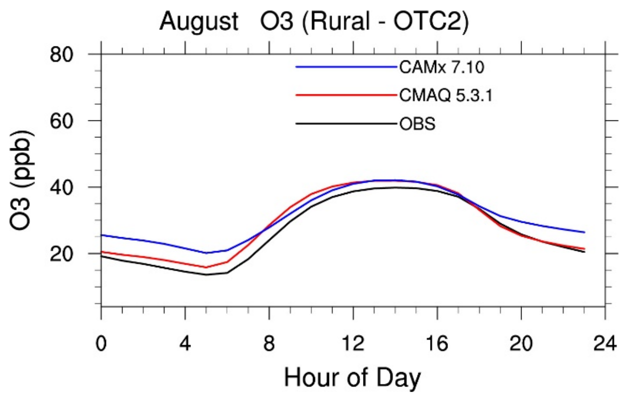



***Figure 6-29.*** *Observed and predicted $NO_2$ at rural sites, August 2016.*

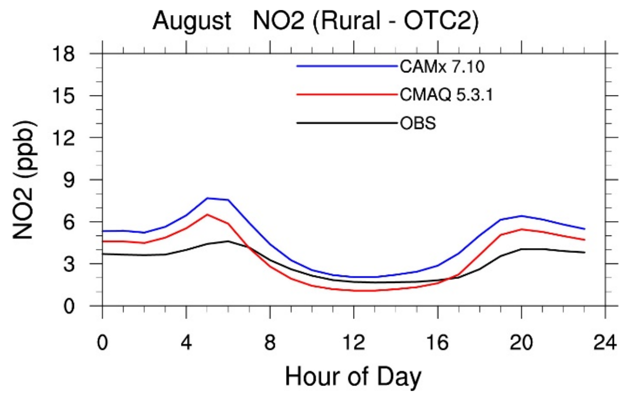



***Figure 6-30****. Observed and predicted $O_3$ at urban sites, August 2016.*

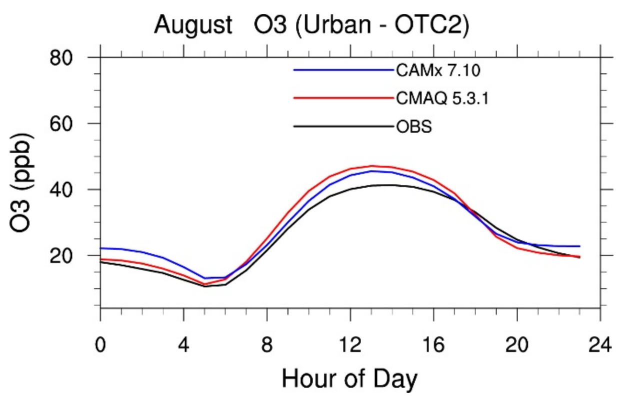
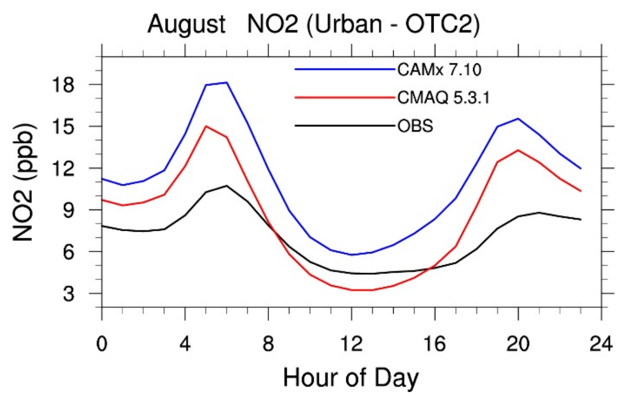



***Figure 6-31.*** *Observed and predicted $NO_2$ at urban sites, August 2016.*




## *6.3 Dynamic Model Evaluation*

### 6.3.1 Comparison of Column $NO_2$ and HCHO with OMI Data

It is well-known that tropospheric ozone formation is the result of the relative abundance of $NO_X$ and VOCs. Ozone formation in relatively low-NOx environments is generally determined by the availability of $NO_X$ ("$NO_X$ -limited"). In contrast ozone formation in urban areas, with large sources of $NO_X$, may be "VOC-limited" or in a transitional regime. Recent work (e.g., Jin et al., 2017) has demonstrated the utility of satellite-based retrievals of column $NO_2$ (proxy for total $NO_X$), column formaldehyde (HCHO, proxy for total VOCs), and the HCHO/$NO_2$ ratio to examine spatial patterns in ground-level ozone formation chemistry. Comparing similar values from CMAQ and CAMx is an example of dynamic model evaluation, used to *qualitatively* assess the models' ability to predict ozone chemistry regimes across the OTR and beyond.

Retrievals of $NO_2$ and HCHO were obtained from the OMI aboard NASA's Aura satellite. For $NO_2$, both daily and monthly averages column amounts were obtained (Lamsal et al., 2021), while for HCHO, daily data were available (Gonzalez Abad and Sun, 2019). The OMI overpass time is approximately 13:30 local time, and the horizontal resolution is about 0.1°×0.1°. Daily OMI data, in particular HCHO, can be very noisy and available data is limited by the presence of clouds, so for this analysis we computed monthly averages to smooth the day-to-day variability. To compare with the OMI data retrievals, we used the **Vertintegral** program[49] to compute corresponding vertical-column integrals over the 35 layers in both CMAQ and CAMx, which were also aggregated to monthly averages.

**Figures 6-32** to **6-34** display the July 2016 average $NO_2$ column concentrations from OMI, CMAQ, and CAMx, respectively. This analysis focused on the northeastern portion of the model domain. For this month, both CMAQ and CAMx tended to underpredict $NO_2$ in rural regions of the domain but predicted higher $NO_2$ in the core urban areas – generally consistent with the findings in the previous section. On average, CAMx tended to better reproduce the general spatial patterns observed from OMI, although the CAMx overpredictions were higher than CMAQ in urban areas.

**Figures 6-35** to **6-37** display the July 2016 average HCHO column concentrations from OMI, CMAQ, and CAMx, respectively. While both models tended to predict higher HCHO concentrations in the northern portions of the domain, both models were able to qualitatively reproduce the pattern of higher concentrations in the Southeast and lower concentrations at northern latitudes. In general, CMAQ predicted lower HCHO concentrations than CAMx, particularly through the Southeast.

**Figures 6-38** to **6-40** display the July 2016 $HCHO/NO_2$ ratios from OMI, CMAQ, and CAMx, respectively, focusing on the urban corridor. Higher ratios are more reflective of $NO_X$-limited conditions, intermediate values (~3-4; e.g., Jin et al., 2017) denote a transitional regime, and lower values are more indicative of VOC-limited conditions. Both models qualitatively reproduce the observed $NO_X$-limited conditions over rural areas, and both models tended to predict small areas of VOC-limited conditions in the core urban centers. The observed values from OMI suggest larger transitional regions over land than predicted by CMAQ and CAMx, which is likely related to the fact that the models underpredicted $NO_2$ over most of the non-urban areas.

This analysis reflects the difficulties in comparing observed and modeled column concentrations of these pollutants. Not shown here are the seasonal variations in these concentration fields, which can be substantial for both $NO_2$ and HCHO. Another caveat is that ozone sensitivity to $NO_X$ and VOCs can vary by day and time at the same location, therefore monthly means may not reflect sensitivities on the highest ozone days that are the focus of ozone attainment strategies. As such, monthly means may favor VOC-sensitive conditions. Comparisons with TropOMI columns on the highest ozone days suggest the VOC-limited area in urban cores shrinks in size. However, it should serve as an illustration of how the model performance evaluation can be expanded beyond an operational assessment based primarily on statistical metrics.

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[49] More information at https://www.cmascenter.org

***Figure 6-32.*** *July 2016 column $NO_2$ from OMI.*

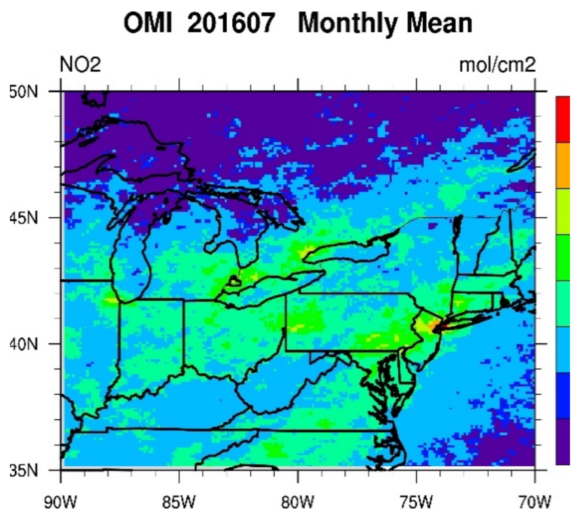



***Figure 6-33.*** *July 2016 column $NO_2$ from CMAQ.*

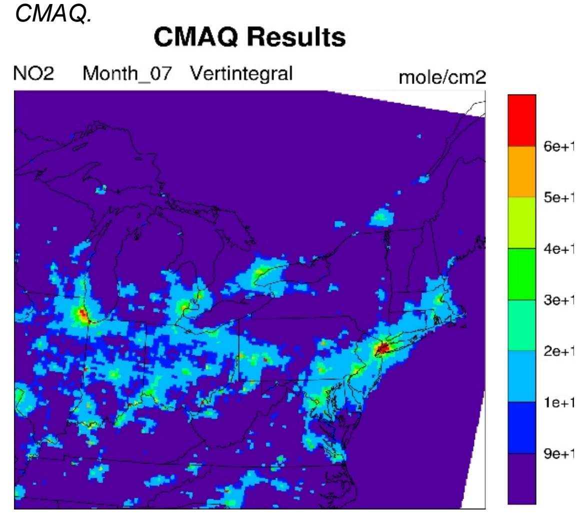



***Figure 6-34.*** *July 2016 column $NO_2$ from CAMx*

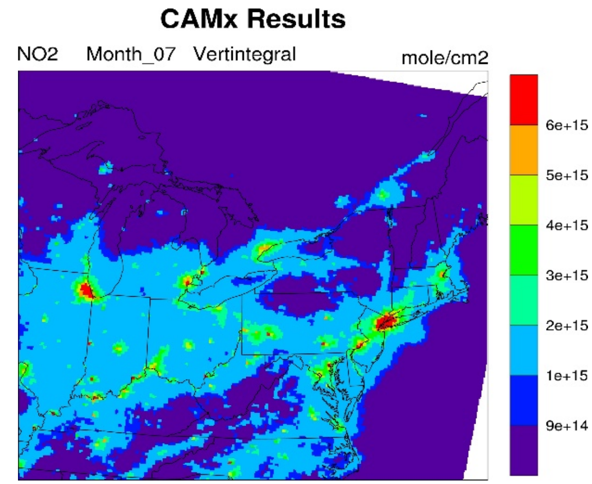


***Figure 6-35.*** *July 2016 column HCHO from OMI.*

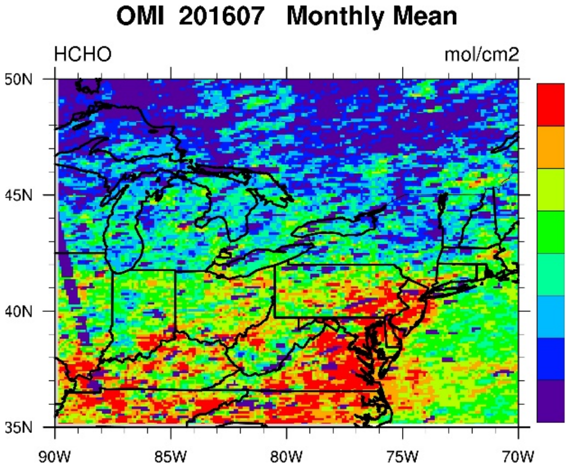



***Figure 6-36.*** *July 2016 column HCHO from CMAQ.*

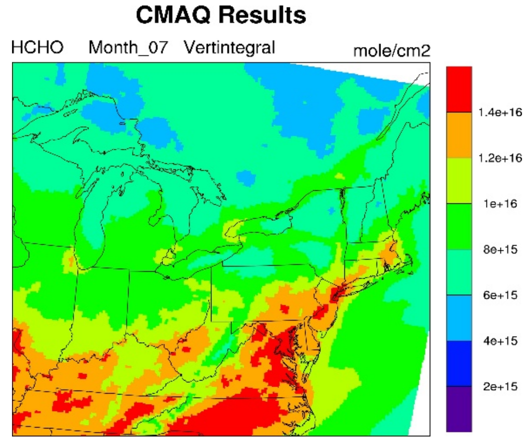



***Figure 6-37****. July 2016 column HCHO from CAMx.*

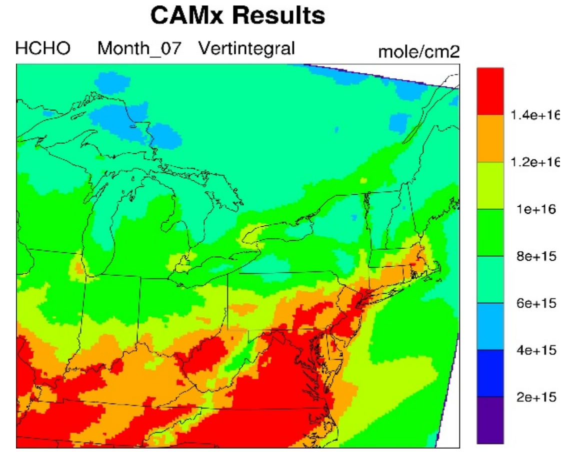


*Figure 6-38. July 2016 HCHO/$NO_2$ ratio from OMI.*

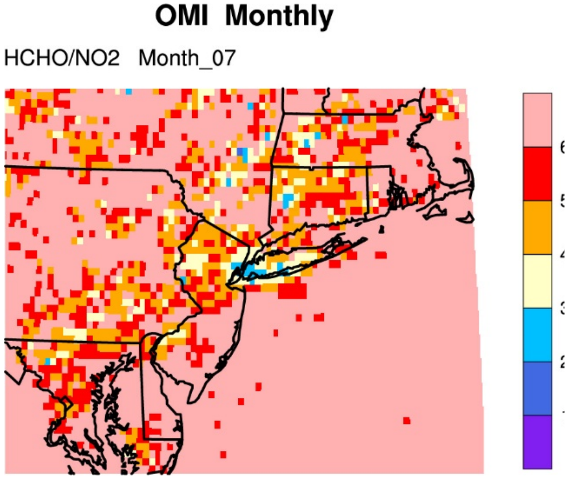



***Figure 6-39.** July 2016 HCHO/$NO_2$ ratio from CMAQ.*

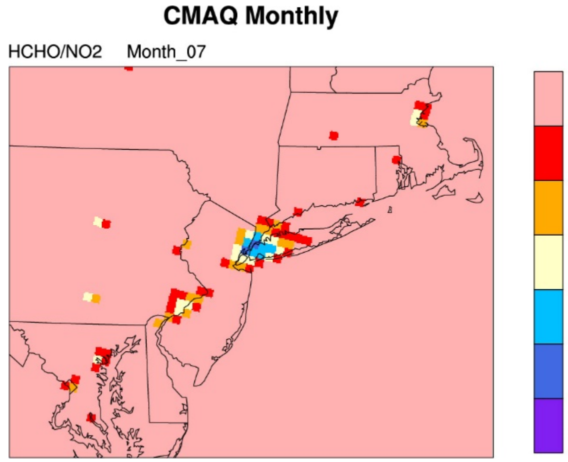
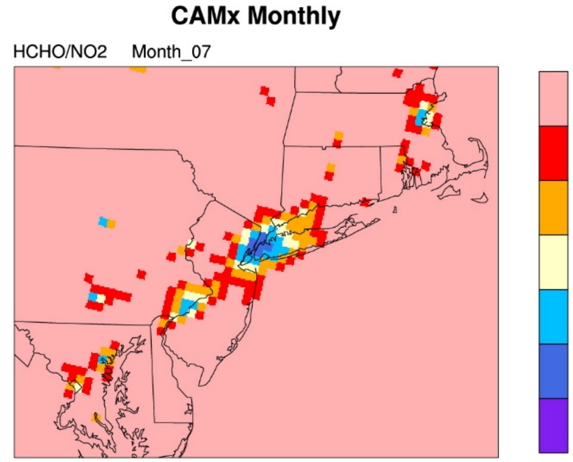



***Figure 6-40.** July 2016 HCHO/$NO_2$ ratio from CAMx.*



### 6.3.2 Ozone Production Efficiency

One concept used to characterize the conditions for oxidant formation is the ozone production efficiency (OPE). The OPE is defined as the amount of oxidant formed resulting from the photochemical oxidation of $NO_X$ to more stable end products (e.g., nitric acid ($HNO_3$), organic nitrates, etc.). The OPE can be expressed as:

$$OPE = \frac{\Delta Ox}{\Delta NOz}$$ **Equation 6-1**

Where Ox = $O_3$ + $NO_2$, and $NO_Z$ is the relatively stable portion of total reactive nitrogen ($NO_y$) and is defined as $NO_Z = NO_y - NO_X$. The OPE can be inferred from the slope in a graph of Ox versus $NO_Z$, where higher slopes indicate more efficient ozone production.

To begin to examine the models' ability to characterize OPE, hourly air concentration data were obtained for Pinnacle State Park, a rural site in the Southern Tier of New York State, and Queens College in New York City. These two sites are principally operated by the University at Albany's Atmospheric Sciences Research Center,[50] and both had $O_3$, NO, $NO_2$, and NOy data during the summer of 2016 to compare model predictions in contrasting environments (e.g., Ninneman et al., 2021). To focus on times of peak photochemistry, only those hours with surface temperatures ≥20°C and incident solar radiation ≥500 W/m$^2$, as described in Ninneman et al. (2019), were included in this analysis.

**Figures 6-38** and **6-41** plot Ox versus NOz during peak photochemical hours at Pinnacle State Park (PSP) and Queens College (QC), respectively, August 2016. Both models were able to reproduce the range in observed daytime Ox concentrations but overpredicted NOz, leading to underpredictions of OPE. At the urban QC site, the modeled OPE values were much closer to the observed value in August.

To examine the variation in OPE over the modeling season, **Figures 6-42** and **6-43** display the monthly observed and modeled values at these two sites. It should be noted that the urban QC site only had NOz and Ox data in August and September. At the rural PSP site, the models underpredicted the observed OPE from June through September, with CAMx predictions were closer to the observed values. This is in part due to the difficulty in trying to model NOy and NOx concentrations in rural regions. At the urban QC site, both models only slightly underpredicted OPE in August and September, again with CAMx predictions being closer to the observed values. Both models did capture the contrasting urban-rural OPE values, generally higher at the rural, low-NOx/NOy/NOz PSP site.

[50] University at Albany's Atmospheric Sciences Research Center. https://www.albany.edu/asrc

***Figure 6-41**. $O_X$ vs. $NO_Z$ at Pinnacle State Park, August 2016.*

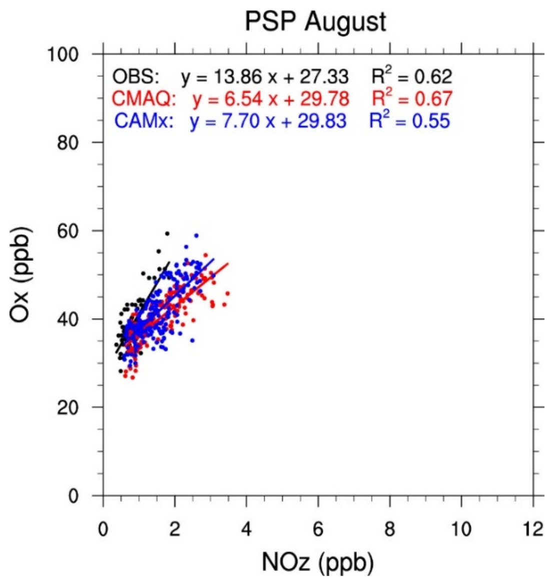



***Figure 6-42.** $O_X$ vs. $NO_Z$ at Queens College, August 2016.*

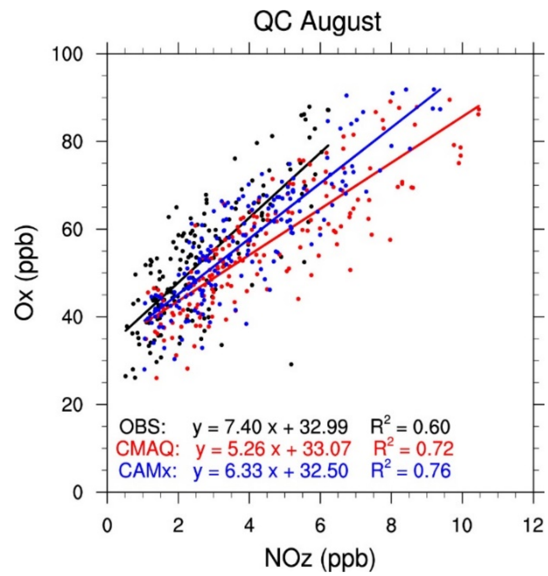



***Figure 6-43.** Monthly OPE at Pinnacle State Park, June-September 2016.*

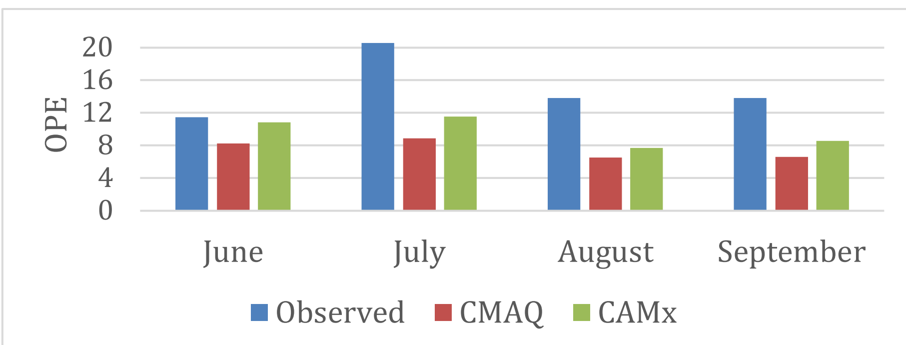
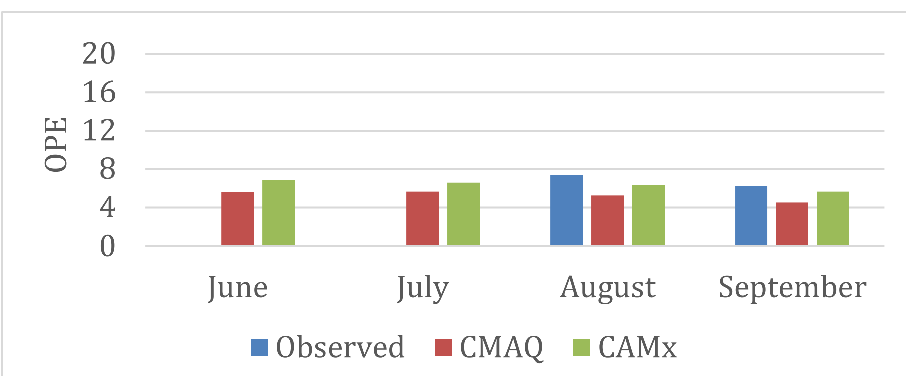



***Figure 6-44.** Monthly OPE at Queens College, June-September 2016.*



## 6.4 Summary

Various analyses are presented here to assess the predictions of ozone and precursors from both CMAQ and CAMx. Overall, both models' performance meet criteria set out by EPA for SIP Quality Modeling allow the states to use it to support SIPs and estimate future ozone concentrations. Both models generally capture the day-to-day and diurnal variations in ozone, however, they tended to generally underpredict ozone early in the season and overpredict later in the season. Across much of the domain, CAMx generally predicted higher $O_3$ than CMAQ, except at some coastal sites with substantial overprediction in CMAQ. The performance of the CMAQ model at 12 km resolution decreased along the coastal areas, in particular along the Connecticut (CT) coastline.

# 7 Evaluation of 4 km Resolution Nested Modeling Domain

One technique to improve model performance in areas with complex meteorology is to conduct photochemical modeling with a finer-resolution nested grid in the areas needing improvement. A finer grid allows emissions, particularly from point sources, to be located more precisely. It may better characterize the complex meteorological processes and their role in $O_3$ formation. The downside of using a finer grid is the increase in model run time, necessary computing power, and staff resources. In previous SIP modeling using the 2011 OTC modeling platform, it was found that model performance improved at 4 km resolution in many of the high ozone portions of the OTR. The OTC Modeling Committee examined the impact of using a finer, 4 km grid in the core of the OTR, denoted as “4OTC2” in **Figure 2-1**, in order to examine the potential benefits of refined grid modeling.

## 7.1 Meteorological Data

EPA provided WRF v3.8 4 km results consistent with the 12 km platform. The reader is referred to **Section 3** for details on the WRF set-up.

## 7.2 Emission Inventory

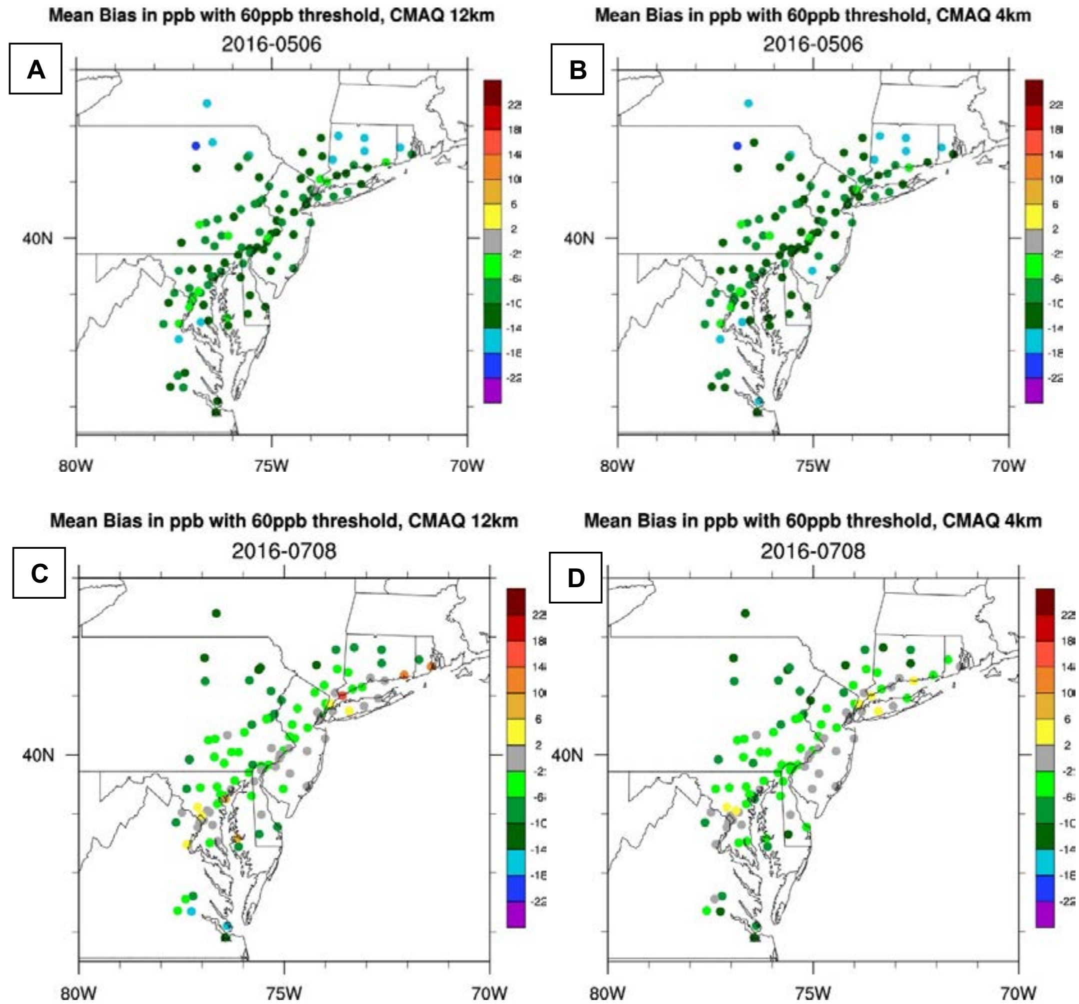
We relied on the latest emissions modeling platform (2016 V1) from the 2016 National Emission Inventory Collaborative for the nested grid modeling work. All sectors used in the 12 km modeling were re-processed through SMOKE to generate emissions for the 4 km domain. Sectors specific to Canada and Mexico (othar, othpt, othafdust, othptdust, onroad_can, onroad_mex, and ptfire_othna) were not used as these areas are outside the 4 km OTC domain. California onroad emissions (onroad_ca_adj) were also not used for the same reason. Inventories for the CMV sectors (cmv_c1c2 and cmv_c3) specific to the grid cell size were provided by the EPA. These were processed through SMOKE to generate the location specific marine emissions.

## 7.3 Performance Results

### 7.3.1 Mean Bias Over the 4 km Domain

The MDA8 $O_3$ mean bias (top two panels of **Figure 7-1**) with a threshold of 60 ppb in the early part of the $O_3$ season (average of May and June) showed that CMAQ at both 12 km and 4 km underestimated $O_3$ in these two months. For most of these sites, the two simulations exhibited similar negative biases. The mean bias of MDA8 $O_3$ in the middle of the $O_3$ season (average of July and August) showed that both simulations have similar results for most of sites, except along the CT coast, which had very high positive $O_3$ biases as shown in red (~14-18 ppb) and orange (~ 10-14 ppb) occur in the 12 km simulation. Lower biases were modeled with the 4km platform (gray and green).

***Figure 7-1 (A-D).*** *The mean biases in MDA8 $O_3$ with a threshold of 60 ppb from CMAQ 12 km (left) and 4 km (right) simulations across the 4 km domain in May/June (top panels) and July/August (bottom panels).*




## 7.3.2 Root Mean Square Error (RMSE) Over the 4 km Domain

The root mean square error (RMSE) of MDA8 $O_3$ with a threshold of 60 ppb (**Figure 7-2**) more clearly shows that the 4 km simulations outperformed 12 km simulations for these sites along the CT coastline with smaller RMSE values, in both May-June and July-August. In addition, one site over Upper Chesapeake Bay showed lower RMSE in July/August. However, for most of the other sites, the two simulations still showed similar results.

***Figure 7-2 (A-D).*** *The RMSE in MDA8 $O_3$ with a threshold of 60 ppb from CMAQ 12 km (left) and 4 km (right) simulations across the 4 km domain in May-June (top panels) and July-August (bottom panels).*

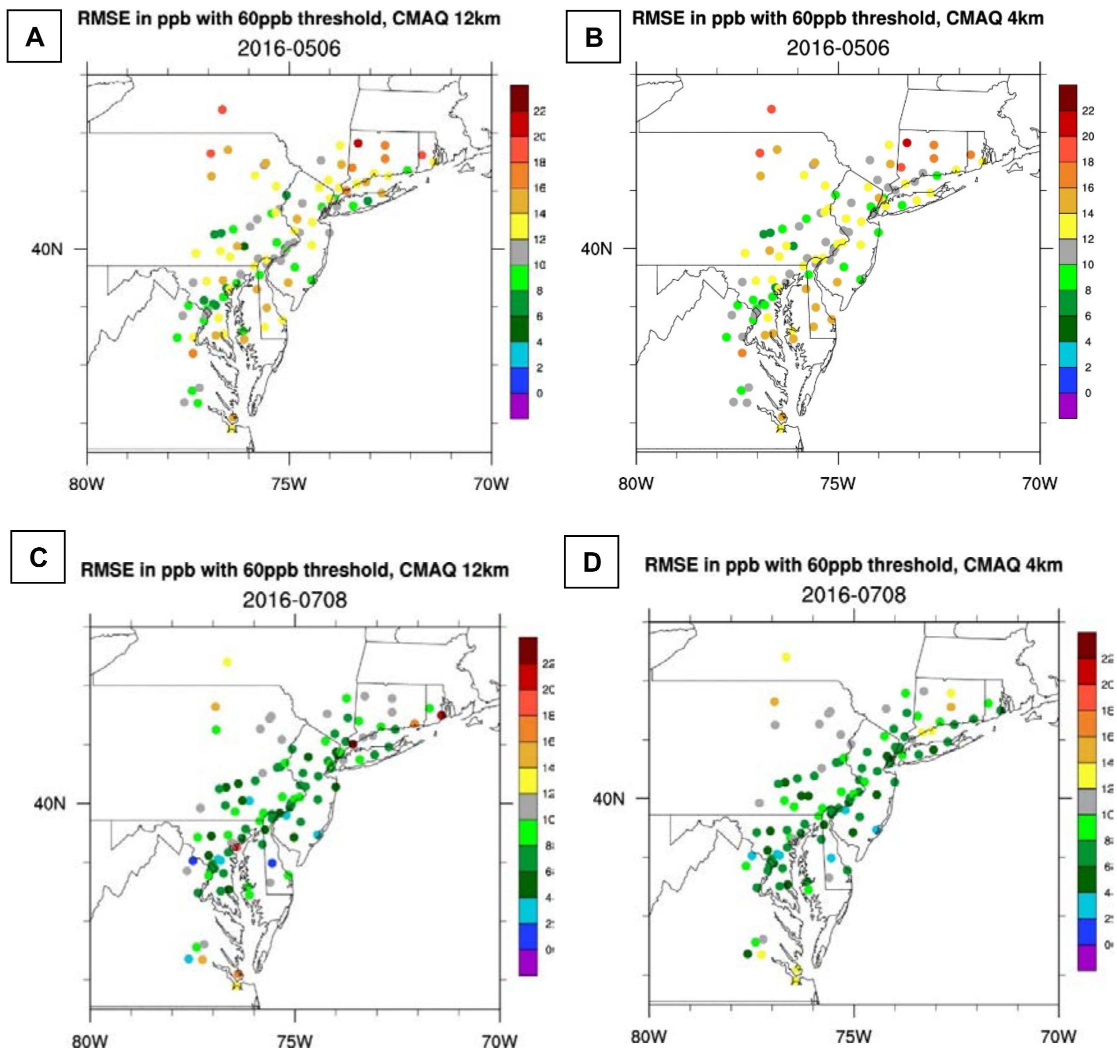


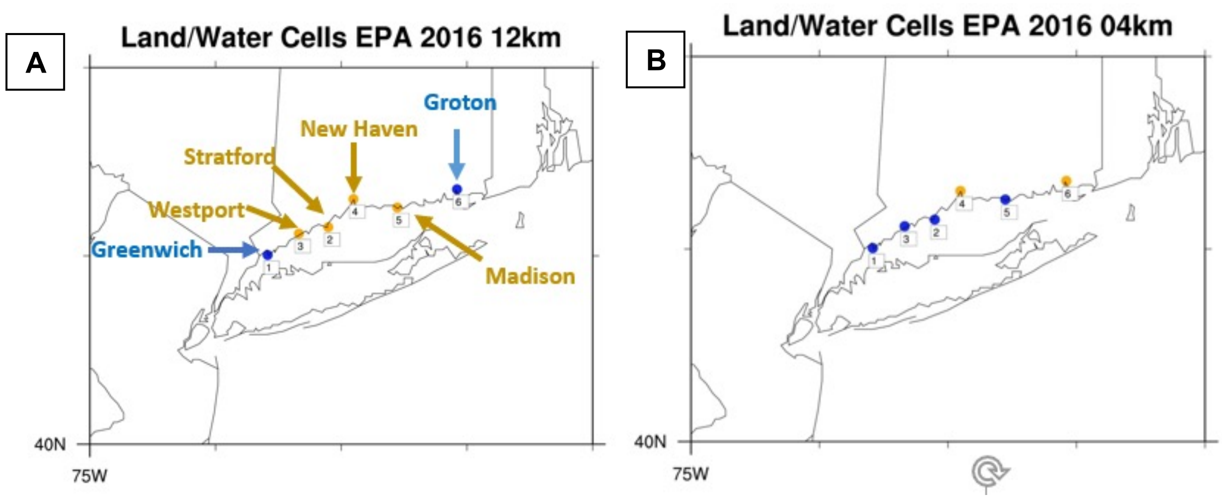

**Table 7-1** shows the mean RMSEs for all 113 monitoring sites in the 4 km model domain and for the six CT monitoring sites along the north shore of Long Island Sound. These six monitoring sites are Greenwich, Stratford, Westport, New Haven, Madison, and Groton. **Figure 7-3** shows the locations of the six monitoring sites. At 12 km resolution, ozone concentrations were highly overestimated in some of these coastal grid cells, defined as water (i.e., a water cell is a grid cell where more than 50% of the area is water as classified by the WRF), due to difficulty in characterizing the land/water interface in both the air quality and meteorological models. Special attention was paid here to focus on these six monitoring sites, whose land cover types change (water to land or land to water) depending on the grid resolution.

Greenwich and Groton are defined as water cells at 12 km by the WRF model; the other four are land cells. However, at 4 km resolution, Greenwich, Stratford, Westport, and Madison are labeled as water cells by the WRF model; only New Haven and Groton are land cells. Better performance (lower RMSE) was observed at the six CT sites with about 1-2 ppb RMSE improvement in May-June, and ~3 ppb RMSE improvement in July-August for the 4 km simulation.

***Table 7-1.*** *The mean RMSE (in ppb) for 12 km and 4 km model simulations with 60 ppb and 0 ppb threshold over 4 km domain.*

| | May-Jun 60 ppb threshold | Jul-Aug 60 ppb threshold | May-Jun 0 ppb threshold | Jul-Aug 0 ppb threshold |
|---|---|---|---|---|
| **113 Sites** | | | | |
| **12 km** | 11.94 | 8.34 | 9.18 | 8.24 |
| **4 km** | 12.08 | 7.98 | 9.10 | 7.57 |
| **6 CT Sites** | | | | |
| **12 km** | 13.71 | 13.29 | 10.20 | 11.22 |
| **4 km** | 11.20 | 10.10 | 9.15 | 8.77 |

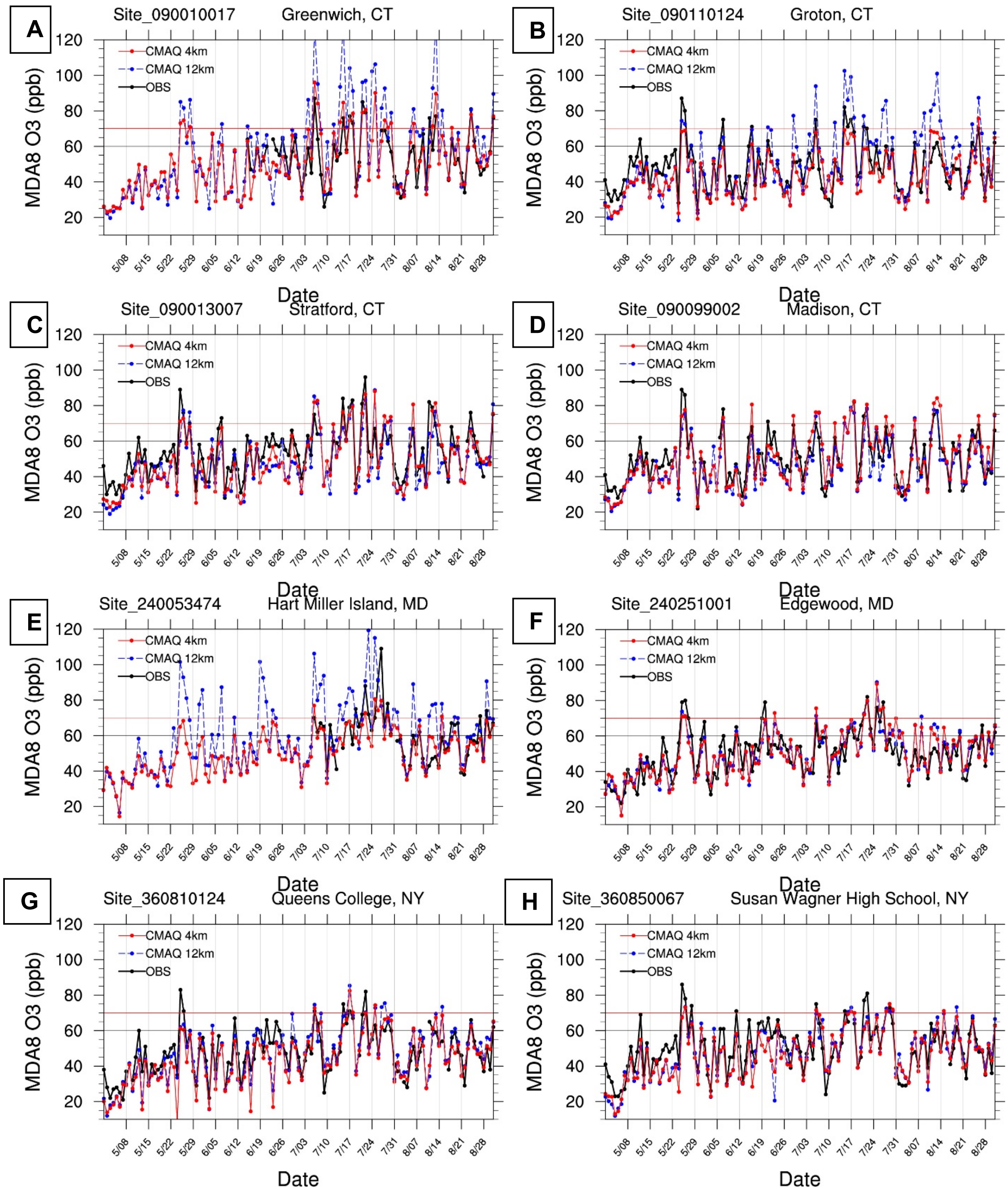
***Figure 7-3 (A-B).*** *The location of the six monitoring sites over CT coastal line and their land cover types at 12 km (left) and 4 km (right) domain. The blue colors represent water cells and the orange colors represent land cells.*




## 7.3.3 MDA8 $O_3$ for Individual Sites

**Figure 7-4** shows time series of MDA8 $O_3$ from May 1 to August 31 at eight sites traditionally associated with high ozone in the OTR. Greenwich and Groton are defined as water cells at 12 km by the WRF model. Greenwich is a water cell at 4 km, and Groton is a land cell at 4 km. At 12 km, CMAQ showed very high positive ozone biases in July and August. However, the 4 km model run showed much lower ozone values that were more consistent with observed values.

***Figure 7-4 (A-H).*** *Time series of MDA8 $O_3$ from May 1 to Aug. 31 for eight monitoring sites. From left to right, top to bottom, site 090010017 is Greenwich, CT; 090110124 is Groton, CT; 090013007 is Stratford, CT; 090099002 is Madison, CT; 240053474 is Hart Miller Island, MD; 240251001 is Edgewood, MD; 360810124 is Queens College, NY; and 360850067 is Susan Wagner High School, NY.*



The Stratford and Madison monitoring locations are defined as land cells at 12 km and water cells at 4 km by the WRF model. Both simulations are similar to observations for most of these days. In July and August, CMAQ at 4 km performed slightly better than the 12 km simulations during the low ozone days, e.g., below 60 ppb. On average, CMAQ simulations at 4 km resolution do not get worse over these two monitoring sites that were defined as water at 4 km resolution, but as land at 12 km resolution.

Hart Miller Island and Edgewood are two high ozone monitor location in Maryland. The Hart Miller Island monitor is located in a water grid cell at 12 km and a land cell at 4 km. Again, CMAQ at 12 km showed very high positive ozone biases in July and August. CMAQ predictions at 4 km were lower and closer to the measured ozone values. For Edgewood, both simulations are similar to observations, except in late July and early August, during which time CMAQ at 4 km displayed lower positive biases than the 12 km simulations.

Queens College and Susan Wagner High School are two monitoring sites in New York City. They are land cells in both grid cell domains. For Queen's College, CMAQ at 4 km performed worse than the 12 km simulations in May and June, with larger underpredictions during these two months. In July and August, ozone values from the 4 km simulations are much closer to observations than these of the 12 km run, i.e., CMAQ at 4 km displayed lower positive biases than the 12 km simulations. For Susan Wagner High School, both simulations are very similar to each other over the entire period.

In a previous section**, Figure 6-6** displayed the fourth highest observed and 12 km CMAQ-predicted MDA8 $O_3$ concentrations at OTR and non-OTR sites across the 12OTC2 domain over the entire simulations. It showed that there were a few sites where CMAQ exceeded observed values by >10 ppb. In **Table 7-2**, we listed five sites where the 12 km CMAQ exceeded observed values by >5 ppb. The 4 km CMAQ predicted values are also listed to compare the model performance at the 4 km resolution. Three sites are defined as water cells and two are defined as land cells near New York City area. The differences between observations and model predictions are smaller from the 4 km run than from the 12 km CMAQ simulations at each of these five sites.

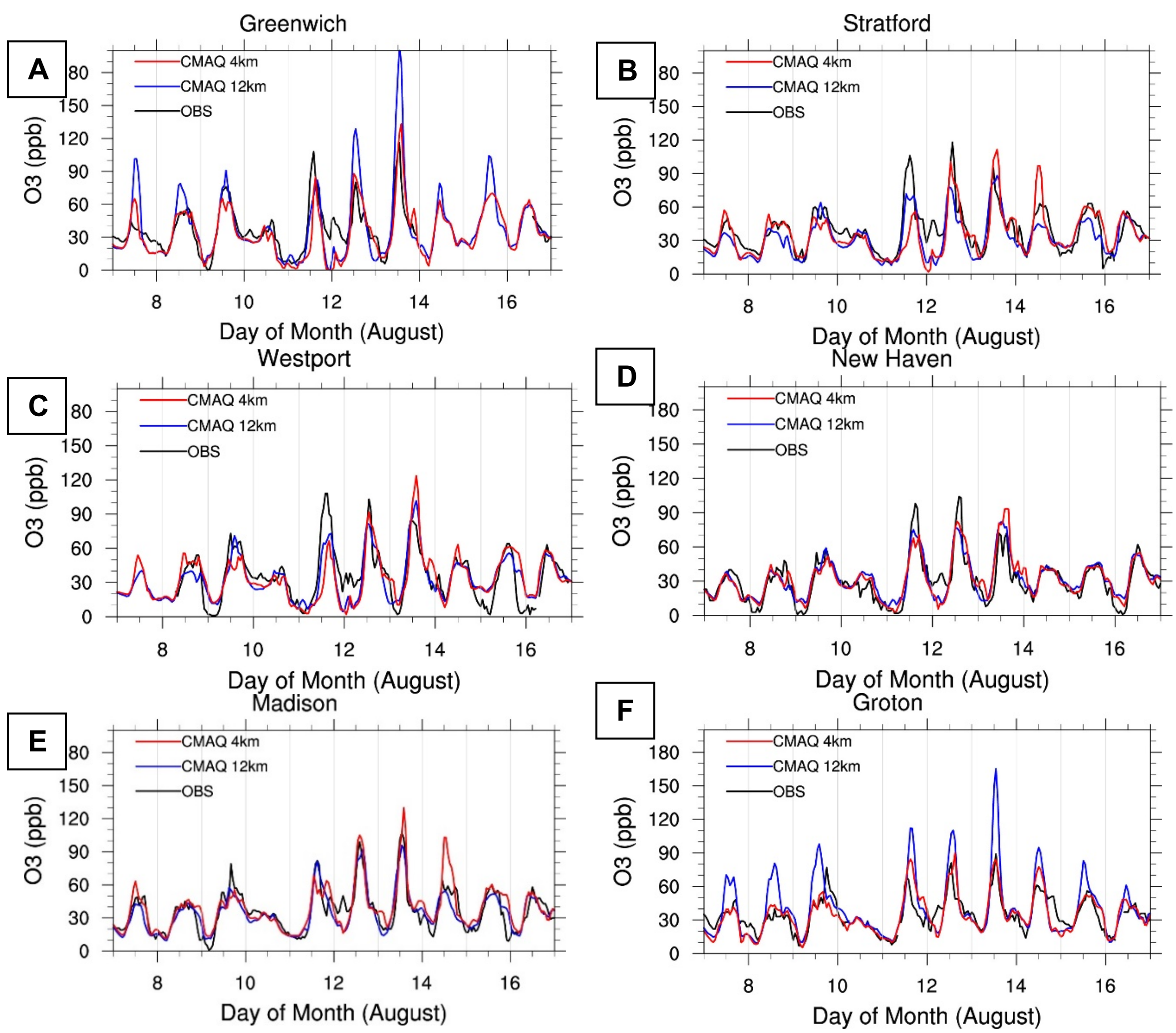
***Table 7-2.*** *Comparison of 4th highest MDA8 $O_3$ at OTR sites, observed vs modeled from 12 km and 4 km CMAQ. Sites where 12 km CMAQ exceeded observed values by >5 ppb are listed.*

| Site | State | County | Date | Obs | CMAQ 12 km | CMAQ 4 km | Land/water at 12 km |
|---|---|---|---|---|---|---|---|
| **90110124** | CT | New London (Groton) | 7/17/2016 | 75 | 99.07 | 66.99 | Water |
| **90010017** | CT | Fairfield (Greenwich) | 7/22/2016 | 79 | 97.03 | 80.69 | Water |
| **440090007** | RI | Washington | 7/15/2016 | 71 | 88.02 | 82.07 | Water |
| **360810124** | NY | Queens (Queens College) | 7/17/2016 | 71 | 85.35 | 82.49 | Land |
| **340230011** | NJ | Middlesex | 7/29/2016 | 76 | 81.73 | 77.03 | Land |

### 7.3.4 Diurnal $O_3$ Variation for the Six Near-Coastal CT Monitoring Sites During a 10-Day Episode

**Figure 7-5** shows the diurnal variation of $O_3$ for August 7-16, 2016, for the six CT monitoring sites along the Long Island Sound coast. As previously mentioned, the Greenwich ozone monitoring is located in a water cell at both 12 km and 4 km resolutions. Predicted ozone from the 12 km simulations displayed very high positive biases, especially on August 13. The maximum positive bias is about 80 ppb on that day. The results from the 4 km CMAQ are much lower than these from 12 km CMAQ and are very close to observations. Stratford, Westport, and Madison are land cells at 12 km, but water cells at 4 km resolution. The ozone values predictions from 4 km CMAQ are very similar to 12 km CMAQ for most of these days. New Haven is a land cell at both 12 km and 4 km resolutions. The simulated ozone from 4 km CMAQ are close to 12 km CMAQ. Groton is a water cell at 12 km, but it is a land cell at 4 km resolution. Again, ozone values from 4 km CMAQ are much lower than these at 12 km and generally closer to observed values.

***Figure 7-5. (A-F).*** *The diurnal variation of $O_3$ for the time period of August 7-16, 2016 for the six CT monitoring sites.*



Changes in total emissions or representation of meteorological fields may impact the ozone concentration differences at an individual site. We compared meteorological data and total emissions of $NO_2$ and VOC from the two grid resolution platforms to examine the model performance at the six coastal CT sites. **Figure 7-6** showed the diurnal variation of PBL heights and emissions of total $NO_2$, total VOC_BEIS (sum of all biogenic VOCs), and total VOC_INV (sum of all anthropogenic VOCs) during the time period of August 7-16 at Greenwich. August 7, 13 and 14 are weekend days. The emission units are converted to moles/hr/unit area or g/hr/unit area, so that 12 km and 4 km emissions can be compared side by side.

Greenwich is a water cell at both 12 km and 4 km resolutions. Therefore, the PBL heights at 4 km are similar to those at 12 km. However, the total $NO_2$ and VOC emissions at 4 km are much lower than these at 12 km. The modeled ozone predictions from 4 km CMAQ are much lower than these from 12 km CMAQ and are very similar to observations. The results indicate that land cover type and emission data discrepancies, such as a water cell with large $NO_2$ and VOC emissions, may cause unrealistic $O_3$ biases in the CMAQ simulations. However, accurate allocation of emissions can improve the performance of CMAQ simulations, which indicates the importance to use finer and more accurate land cover classification dataset while processing the emission data.

***Figure 7-6 (A-D).*** *The diurnal variation of PBL heights and emissions of total $NO_2$, total VOC_BEIS and total VOC_INV during the time period of August 7-16, 2016 at Greenwich.*

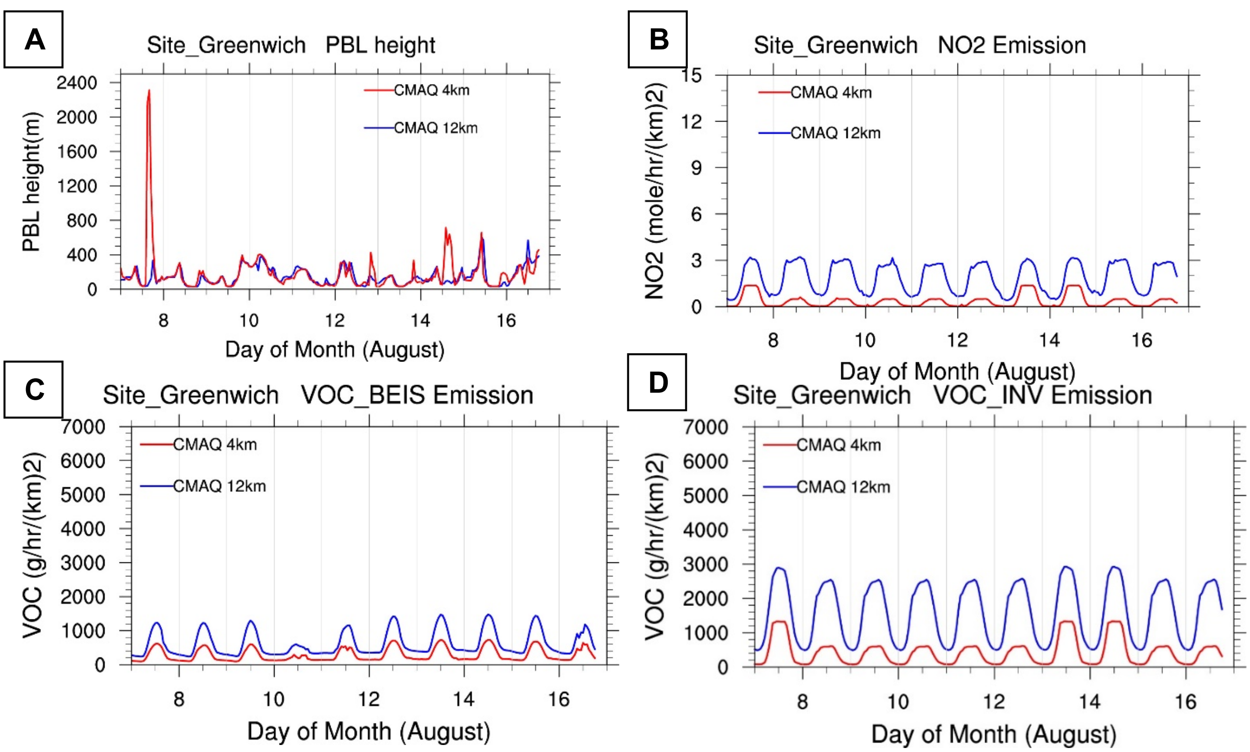
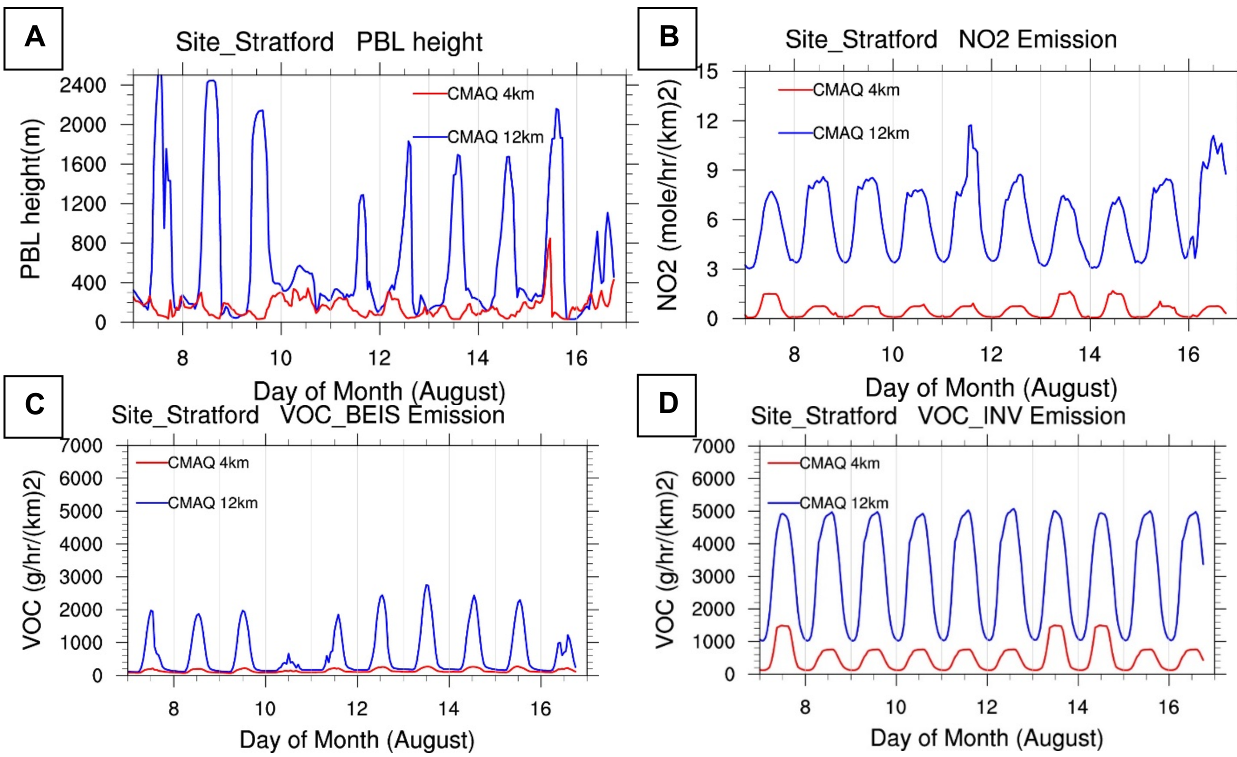



**Figure 7-7** shows the results for Stratford. The Stratford monitor is located in a land cell at 12 km, but a water cell at 4 km resolution. Because of this land cover change, the PBL heights decrease

during daytime compared to 12 km WRF simulation. With lower PBL heights, higher ozone values were expected from 4 km CMAQ. However, ozone simulations from 4 km CMAQ are very similar to 12 km CMAQ for most of these days. The $NO_2$ and VOC emissions at 4 km are much lower than these at 12 km platform, which may explain the reason. Just like Stratford, Westport and Madison (not shown here) are land cells at 12 km, but water cells at 4 km resolution. Because the $NO_2$ and VOC emissions at 4 km are much lower than these at 12 km, the ozone values don't change much between these two platforms.

***Figure 7-7 (A-D).*** *The diurnal variation of PBL heights and emissions of total $NO_2$, total VOC_BEIS and total VOC_INV during the time period of August 7-16, 2016 at Stratford.*




Groton (**Figure 7-8**) is located in a water cell at 12 km, but a land cell at 4 km resolution. Due to this land cover change, the PBL heights increase dramatically during daytime compared to those from the 12 km WRF simulation. The total $NO_2$ and VOC emissions at 4 km are much higher than these at the 12 km resolution. However, the $O_3$ predictions from 4 km CMAQ are much lower than these at 12 km CMAQ since the PBL heights increase drastically compared to 12 km platform, which may help to disperse the ozone and its precursors more effectively.

Greenwich and Groton were selected to illustrate the monthly average of diurnal ozone variation. There are clear improvements at 4 km resolution with predicting the average diurnal variation ozone at these two monitors in August.

***Figure 7-8 (A-D)**. The diurnal variation of PBL heights and emissions of total $NO_2$, total VOC_BEIS and total VOC_INV during the time period of August 7-16, 2016 at Groton.*

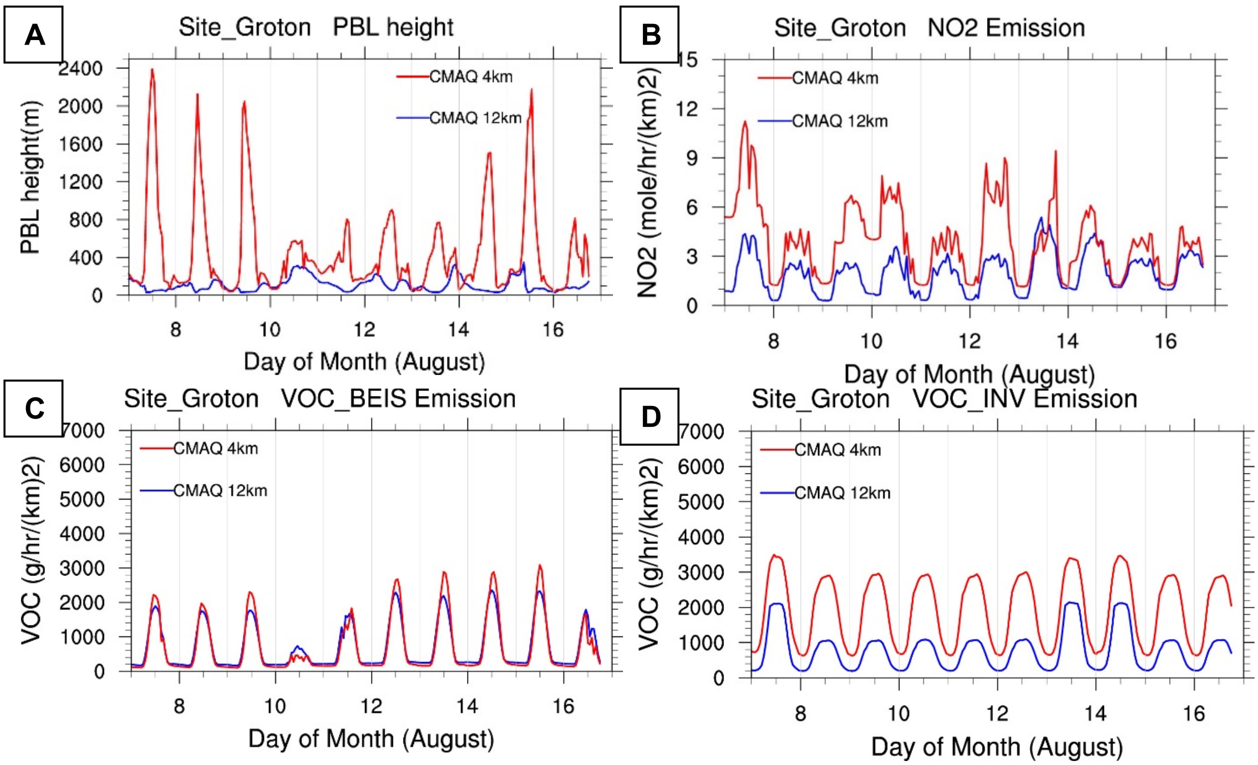
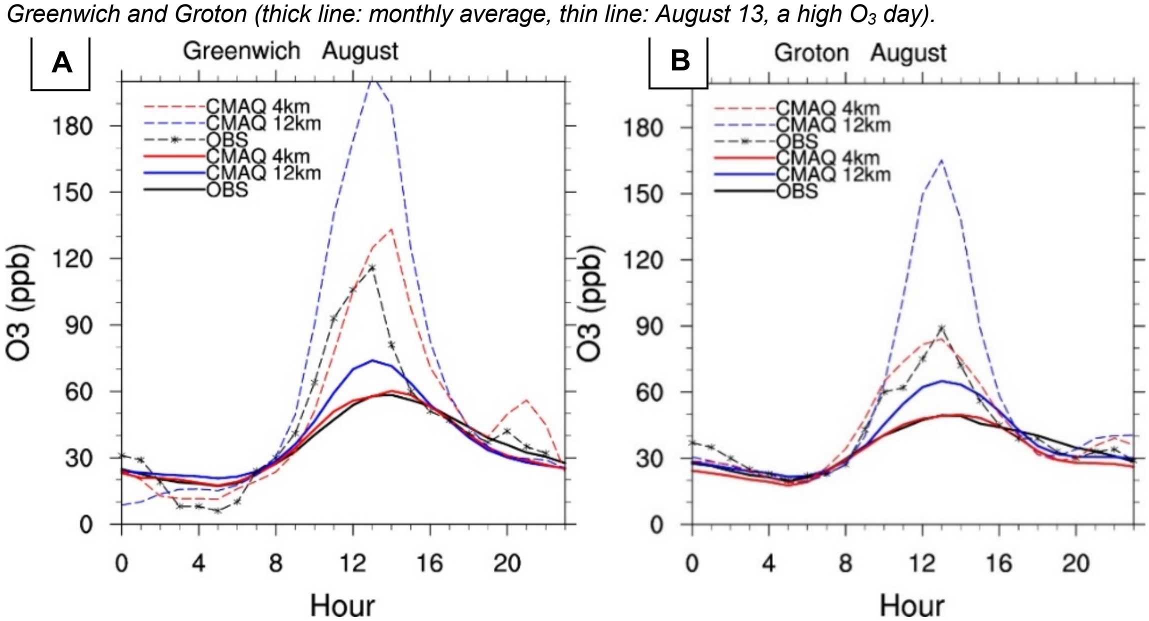



***Figure 7-9 (A-B).** Observed and modeled (12 km/4 km grids) ozone (ppb) for August 2016 at monitoring sites Greenwich and Groton (thick line: monthly average, thin line: August 13, a high $O_3$ day).*




## 7.4 Projected Design Values in 2023

**Sections 8 and 9** detail the methods for calculating the projected future design values at 12 km. $O_3$ design values were computed at all monitor locations located within the 4 km domain, using the 2016 base year and 2023 projected V1 inventory. Results are presented based on the standard 3x3 method, as well as a modified 3x3 method in which all grid cells identified as water were excluded (See “3x3 No Water 1 method” in **Section 9**).

The base and future year $O_3$ design values, both average and maximum, from CMAQ at 4 km and at 12 km domain are shown in **Table 7-3** for the 11 monitors with the highest base year design values across the 4 km domain. Future year values that exceed 70 ppb are indicated in orange, while values that exceed 75 ppb are shown in red.

Overall, future design values across these sites were generally consistent in the 4 km and 12 km simulations. In summary, the future design values from both domains are close to each other, even though 4 km CMAQ shows relatively better base ozone model performance than the 12 km model run. Although model performance improved with higher grid resolution, it did not have a large impact on the future design values. The projected 2023 $O_3$ design values for all 112 sites across the 4 km domain are available upon request to NYS DEC.

## *7.5 Conclusions*

On average, the performance of CMAQ at 4 km and at 12 km resolution are similar at most monitoring sites in the OTR but were found to be significantly improved with CMAQ modeling at 4 km resolution during July and August at monitoring sites defined as water cells at 12 km resolution. For sites that were defined as land both at 4 km and 12 km resolutions, both platforms have very similar performance. CMAQ simulations at 4 km resolution do not get worse over sites that were defined as water at 4 km resolution and as land cells at 12 km resolution. This NYSDEC work suggests that for CMAQ, finer grid resolution plays a crucial role in modeling $O_3$ along the land-water interface where more accurate meteorological conditions and allocation of emissions can improve the $O_3$ estimates.

***Table 7-3.*** *Baseline (2014-2018) and projected 2023 $O_3$ design values from CMAQ at 4 km and 12 km resolutions for the top 11 monitoring sites, which have highest base year design values, across the 4 km domain, using the standard 3x3 method and the 3x3 No Water 1 method. Future design values that exceed 70 ppb are highlighted in orange, and values that exceed 75 ppb are highlighted in red.*

| | | | 2014-2018 DVB | | 4 km CMAQ v5.3.1 | | | | 12 km CMAQ v5.3.1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3x3 | | 3x3 no water 1 | | 3x3 | | 3x3 no water 1 | |
| **Site ID** | **State** | **County** | **AVG** | **MAX** | **AVG** | **MAX** | **AVG** | **MAX** | **AVG** | **MAX** | **AVG** | **MAX** |
| 90019003 | CT | Fairfield (Westport) | 82.7 | 83 | 76 | 76 | 76 | 77 | 80 | 80 | 75 | 75 |
| 90013007 | CT | Fairfield (Stratford) | 82 | 83 | 75 | 76 | 75 | 76 | 74 | 75 | 75 | 76 |
| 90099002 | CT | New Haven (Madison) | 79.7 | 82 | 73 | 76 | 73 | 75 | 71 | 73 | 71 | 73 |
| 420170012 | PA | Bucks | 79.3 | 81 | 69 | 71 | 69 | 71 | 69 | 70 | 69 | 70 |
| 90010017 | CT | Fairfield (Greenwich) | 79.3 | 80 | 75 | 75 | 74 | 75 | 71 | 72 | 78 | 79 |
| 90079007 | CT | Middlesex | 78.7 | 79 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| 90011123 | CT | Fairfield | 77 | 78 | 69 | 70 | 69 | 70 | 69 | 70 | 69 | 70 |
| 421010024 | PA | Philadelphia | 77.7 | 78 | 69 | 69 | 69 | 69 | 68 | 68 | 68 | 68 |
| 90090027 | CT | New Haven (New Haven) | 75.7 | 77 | 70 | 71 | 69 | 70 | 69 | 70 | 68 | 69 |
| 340070002 | NJ | Camden | 75.3 | 77 | 67 | 68 | 67 | 68 | 66 | 67 | 66 | 67 |
| 90110124 | CT | New London (Groton) | 74.3 | 76 | 68 | 70 | 68 | 69 | 67 | 69 | 71 | 73 |

# 8 Relative Response Factor and Modeled Attainment Test for Ozone

Air quality models such as CMAQ and CAMx are used to simulate current and future air quality, and model estimates are used in a “relative” rather than “absolute” sense to estimate future year design values. That is, one calculates the ratio of the model’s future to current “baseline” predictions at ozone monitors. These ratios, the fractional changes in ozone concentrations, are called relative response factors (RRF). For each existing monitoring site, the future ozone design value is estimated by multiplying the RRF at the location by the observation-based monitor-specific “baseline” ozone design value. The projected future ozone design values are compared to the NAAQS to determine whether attainment will be reached or not.

Equation 8-1 describes the approach as applied to a monitoring site *i*:

$$DVF_i = RRF_i * DVB_i \qquad \textbf{Equation 8-1}$$

$DVF_i$ is the projected future design value at monitoring site i; $RRF_i$ is the relative response factor calculated at monitoring site *i*; and $DVB_i$ is the observation-based “baseline” design value at monitoring site *i*. The RRF is the ratio of future MDA8 $O_3$ concentration to the baseline MDA8 $O_3$ concentration predicted at the monitor location averaged over the top 10 highest daily maximum 8-hour ozone concentration days, if possible, determined from the base case.

Ozone predictions from the 2016 (base year) and 2023 (future year) CMAQ and CAMx model simulations were used to calculate projected average and maximum MDA8 $O_3$ DVF for 2023. This section describes the procedures for calculating projected 2023 design values following the EPA’s guidance (US EPA 2018a, 2018b). A new method is also introduced and compared to the EPA’s methods.

## *8.1 Projected Design Value Calculation*

The Software for Modeled Attainment Test-Community Edition (SMAT-CE) tool[51] was developed by the EPA for the modeled attainment tests for ozone and $PM_{2.5}$, as well as for calculating changes in future year visibility at Class I areas. To discount inaccuracies due to individual grid characteristics, EPA recommends an approach to calculating the $DVF_i$ that considers model values from the 3x3 array of grid cells centered on the grid where the monitor is located. NYSDEC developed an in-house computer program following and building on EPA’s approach for the modeled attainment test for ozone to provide additional detail and enhanced methods. The DVF outputs of the 3x3 method from NYDEC’s program were compared with EPA’s standard SMAT-CE 3x3 method in order to make bsure the results are consistent, and they matched each other.

[51] US EPA Photochemical Modeling Tools. https://www.epa.gov/scram/photochemical-modeling-tools.

Grid cell characteristics such as land use can have a significant effect on modeled ozone concentrations. Coastal monitors particularly may be influenced by whether the land use of the grid in which the monitor is located is characterized as water or land. A water cell is a grid cell where more than 50% of the area is water as classified by the WRF (US EPA, 2018b). **Figure 8-1** shows 36 monitoring sites located in a water cell where 2016 measured DVs are available in the 12OTC2 domain. A list of monitoring sites defined as water cells for each domain is shown in **Table 8-1**. There are eight monitoring sites located in a water cell in the OTR in the 12OTC2 domain.

*Figure 8-1. Monitoring sites located in a water cell where 2016 measured DVs are available in the 12OTC2 domain for the 2016 platform.*

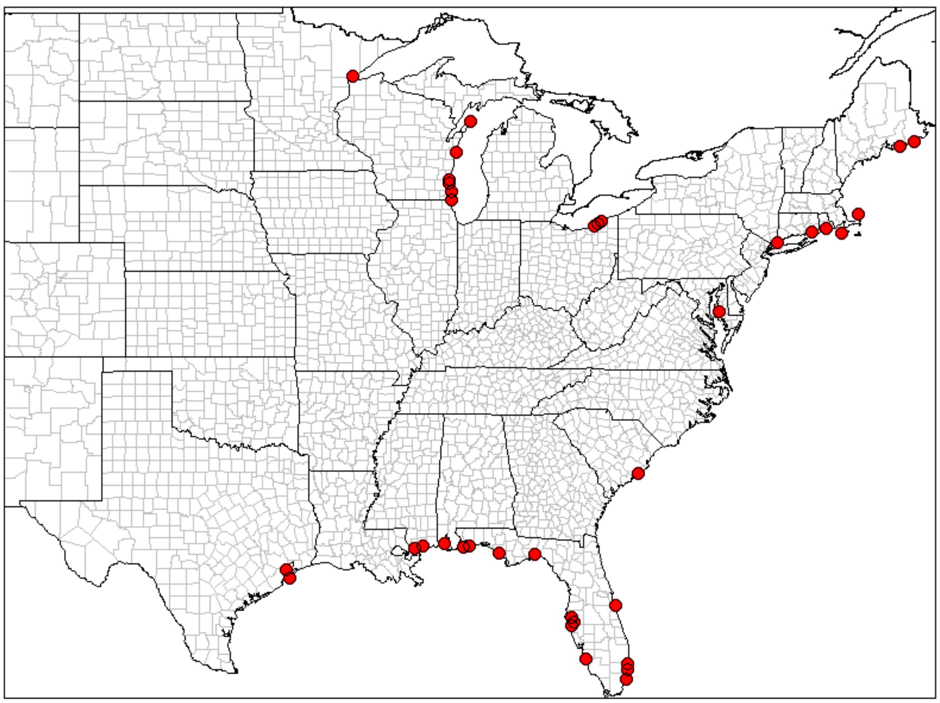


***Table 8-1**. List of Monitoring sites located in a water cell in the OTR in the 12OTC2 domain.*

| Site ID | State | County | Location |
|---|---|---|---|
| **090010017** | Connecticut | Fairfield | Greenwich |
| **090110124** | Connecticut | New London | Groton |
| **230090102** | Maine | Hancock | Cadillac Mt Summit |
| **230290019** | Maine | Washington | Jonesport |
| **240190004** | Maryland | Dorchester | Horn Point |
| **250010002** | Massachusetts | Barnstable | Truro |
| **250070001** | Massachusetts | Dukes | Martha's Vineyard |
| **440090007** | Rhode Island | Washington | Narragansett |

When one or more grid cells in the 3x3 array occur over a body of water, conditions of overlaying land-based emissions with overwater meteorology at those coastal monitors often cause difficulty in modeling $O_3$ (Ozone Transport Commission, 2018). For those coastal monitors, the maximum values in the 3x3 grid tend to occur in a grid cell over water where $O_3$ overpredictions are likely to be more pronounced. For those monitors, it may be appropriate to re-assess the DVB/RRF calculations to reduce that bias. Three methods in addition to the standard 3x3 method are described below which vary in their approach to eliminate or minimize the effect of the water grids in the RRF calculation (Yun et al., 2020).

Thus, the methods are:

1) The EPA's standard 3x3 method (US EPA, 2018b and US EPA, 2021a).
2) The EPA's alternative approach for near-coastal areas: a modified 3x3 method that eliminates the grid cells that are classified as water cells provided that they do not contain the monitoring site (US EPA, 2018b and US EPA, 2021a). This method ("No Water 1") includes a water cell in the RRF calculation only if the monitoring site is located in the water cell.
3) A further modified 3x3 method that excludes all water cells even if the monitoring site is located in a water cell ("No Water 2").
4) A 1x1 method that uses the one grid cell where the monitoring site is located regardless of grid classification.

The following steps describe the calculation of each of the elements in **Equation 8-1** as implemented by the NYSDEC through the in-house computer program. All calculations are performed on a monitor-by-monitor basis.

### 8.1.1 Step 1 - Calculation of DVB

Design values for monitored data are calculated in accordance with 40 CFR Part 50 Appendix U (2015 NAAQS) and are based on MDA8 $O_3$ concentrations at each monitoring site. The MDA8 $O_3$ concentration for a given day is the highest of the 17 consecutive 8-hour averages beginning with the 8-hour period from 7:00 am to 3:00 pm and ending with the 8-hour period from 11:00 pm to 7:00 am the following day. Design values are the average value of three consecutive fourth highest annual MDA8 $O_3$ concentration at each monitoring site. Monitored design values are labeled with the most recent year of data used in the design value calculation. For example, the 2016 design value for a monitor is the average of the fourth highest MDA8 $O_3$ values from 2014, 2015 and 2016 at that monitor.

Average DVB is the average of three consecutive design values starting with the design value of the baseline year. **Equation 8-2** shows the average DVB calculation for the 2016 baseline emissions inventory year for each site *i*:

$$average\ DVB_i = \frac{(2016\ DV)_i + (2017\ DV)_i + (2018\ DV)_i}{3}$$ **Equation 8-2**

Here, average DVB is the average of the "2016 DV" (determined from 2014-2016 observations), the "2017 DV" (determined from 2015-2017 observations), and the "2018 DV" (determined from 2016-2018 observations). Consequently, the average DVB is derived from observations covering a five-year period with 2016 observations “weighted” three times, 2015 and 2017 observations weighted twice, and 2014 and 2018 observations weighted once.

A maximum DVB for the 2016 base year is the highest of the three design values (2016 DV, 2017 DV, and 2018 DV) in the period 2014-2018.

The following criteria are applied for calculating average DVB when there are missing DVs:

a) For monitors with only four years of consecutive data, the guidance allows DVB to be computed as the average of two design values within that period.
b) For monitors with only three years of consecutive data, the DVB is equal to the design value calculated for that three-year period.
c) For monitors with less than three years of consecutive data, no DVB can be estimated.

### 8.1.2 Step 2 - Calculation of RRF

EPA’s approach for calculating modeled future year design values deviates from the procedure for calculating design values with monitored data. EPA guidance recommends calculation of RRFs using photochemical air quality model (such as CMAQ or CAMx) output from the grid cell where the monitor is located as well as grid cells immediately surrounding the monitoring site. This is in part due to limitations in the inputs and model physics that can affect model performance at the grid cell level. In addition, possible inappropriate results may occur due to the artificial geometry of the superimposed grid system when monitoring sites and emission sources are located close to the border of a grid cell.

The EPA recommends the use of a 3x3 grid cell array centered on the grid cell containing the monitoring site to calculate the RRF. Following the EPA’s approach, for each day, the grid cell with the highest base year MDA8 $O_3$ value in the 3x3 array is used in the calculation of the RRF. The 10 highest days in the base year modeling are used at each monitoring site. If the base year modeling results do not have 10 days with MDA8 $O_3$ value >= 60 ppb at a site, but if there are at least 5 days with MDA8 $O_3$ >= 60 ppb, all of the days >= 60 ppb are used. If there are fewer than 5 days with MDA8 $O_3$ value >= 60 ppb, RRFs and DVFs are not calculated for that site. Therefore, there are 5 to 10 days used in each site’s RRF calculation. A site-specific RRF is calculated as follows:

$$RRF = \frac{\text{average future year MDA8 O3 over selected high O3 days}}{\text{average base year MDA8 O3 over selected high O3 days}}$$ **Equation 8-3**

The following describes the logic with which NYSDEC implemented these screening criteria into its code in the RRF calculation for each monitor:

a) <u>Selecting $O_3$ concentrations from grid cells surrounding the monitor</u>
   i. Identify the grid cell in which the monitor is located and include the surrounding eight grid cells to form a 3x3 grid cell array.
   ii. Determine MDA8 $O_3$ concentrations for each day for each of the 9 grid cells for both the base and future year (control case) simulations.

iii. For each day, identify the grid cell with the highest MDA8 $O_3$ value out of all nine grid cells in the base year. This is the MDA8 $O_3$ concentration for that monitor for that day to be used in the RRF calculation (following the screening criteria listed below).

iv. The future year MDA8 $O_3$ concentration is chosen by pairing to the same grid cell selected in the base year for that day. (Note that this may not result in selection of the highest future year modeled MDA8 $O_3$ concentration in the 3x3 grid array overlaying the monitor.)

b) Selecting modeling days to be used in the RRF calculation on a monitor-by-monitor basis

i. Identify the 10 highest days with the MDA8 $O_3$ concentrations ≥ 60 ppb in the base year simulation.

ii. If there are between 5 and 10 days ≥ 60 ppb, then use all days ≥ 60 ppb.

iii. An RRF is not calculated for the monitor if there are fewer than five days with the MDA8 $O_3$ concentration ≥ 60 ppb. These were recorded with ”-999.9.”

c) RRF calculations: Compute the RRF by averaging the MDA8 $O_3$ concentrations for the base year and future year determined in step (a) over all days determined in step (b).

### 8.1.3 Step 3 - Computation of DVF

For each monitor for which an RRF was able to be calculated, compute DVF as the product of DVB from step (1) and RRF from Step 2. The average and maximum DVF are calculated as described in **Equations 8-4** and **8-5**, respectively.

$$average\ DVF = average\ DVB * RRF \quad \textbf{Equation 8-4}$$

$$maximum\ DVF = maximum\ DVB * RRF \quad \textbf{Equation 8-5}$$

Note, the following conventions on numerical precision (i.e., truncation, rounding) were applied:

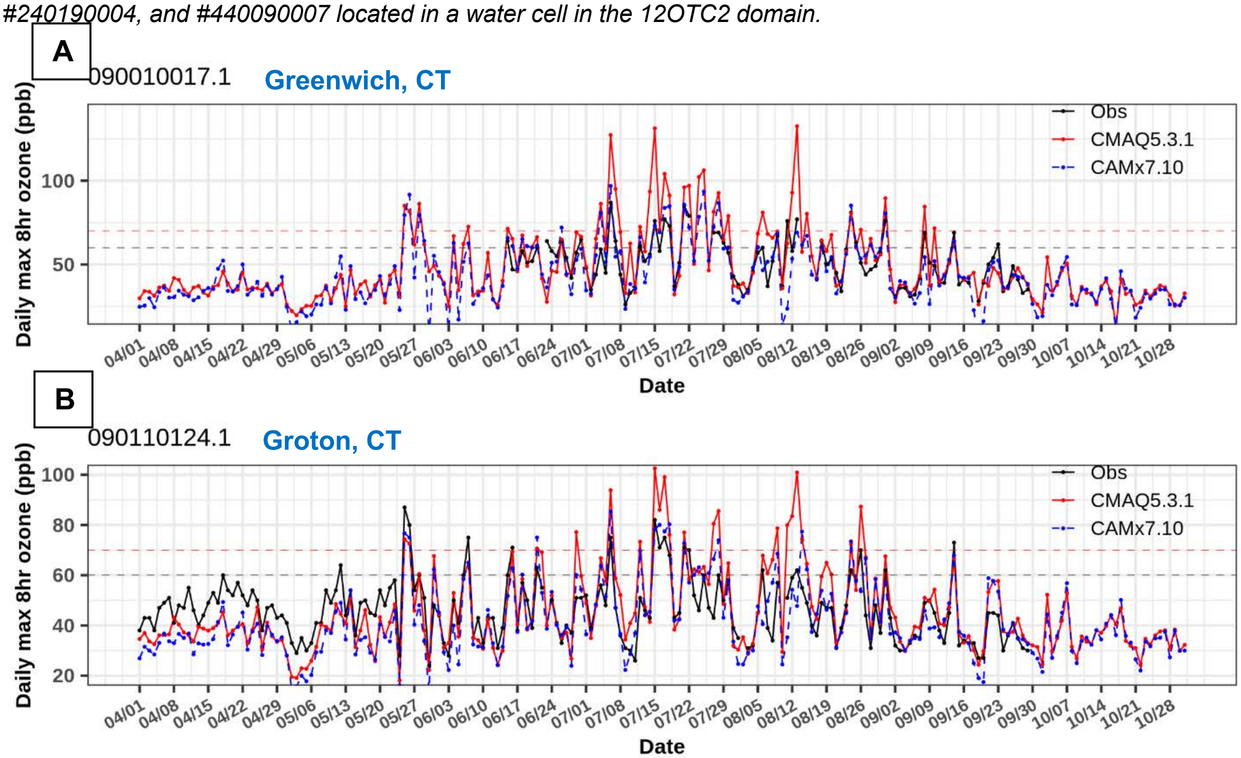
a) DVs are truncated in accordance with 40 CFR Part 50 Appendix U. This applies to the 2016, 2017, and 2018 design values.
b) DVBs are calculated in ppb and rounded to the nearest tenth of a ppb.
c) Model estimates of MDA8 $O_3$ (in ppb) are calculated to at least four places to the right of the decimal, with the last digit truncated.
d) Multi-day MDA8 $O_3$ (in ppb) are averaged, maintaining at least four places to the right of the decimal.
e) RRFs are rounded to four places to the right of the decimal.
f) “Pre-truncation” DVFs (ppb) are truncated to one decimal place and the “final” DVFs (ppb) are truncated to integer values.

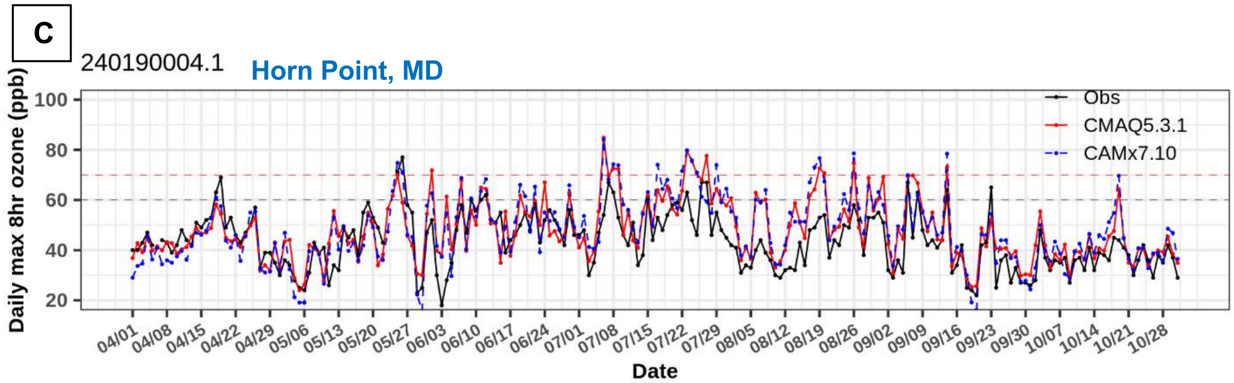
## *8.2 Model Performance at the Monitoring Sites Located in a Water Cell*

These approaches can be applied to assessment of base year model performance. Model performance described in **Section 6** was based on observed values at the monitor compared with predicted values at the grid containing the monitor (i.e., the 1x1 method).

Observed MDA8 $O_3$ was compared to modeled MDA8 $O_3$ at those monitoring sites located in a water cell, for the 12OTC2 domain listed in **Table 8-1**. Comparisons at four selected monitoring sites (#090010017 (Greenwich, CT), #090110124 (Groton), #240190004 (Horn Point), #440090007 Narragansett)) are shown in **Figures 8-2** and **8-3**. Both models tend to overpredict $O_3$ levels at sites located in a water cell especially in July and August. Overprediction of $O_3$ is more pronounced with the CMAQ model by up to 55 ppb compared to 38 ppb with the CAMx model. Model performance statistics on days with observed MDA8 $O_3 \geq 60$ ppb at each monitoring site located in a water cell in the OTR in the 12OTC2 domain are shown in **Table 8-2**. CMAQ overpredicts $O_3$ at monitor #090010017 (Greenwich, 16% Normalized Mean Bias (NMB)), #090110124 (Groton, 6.6% NMB), #250010002 (Truro, 2.6% NMB)), and #440090007 (Narragansett, -4.6% NMB) while CAMx underpredicts $O_3$ at monitors #090010017 (Greenwich, -4.7% NMB), #090110124 (Groton, -5.2% NMB), #250010002 (Truro, -6.7% NMB), and #440090007 (Narragansett, -5.5% NMB). Both models underpredict $O_3$ at monitor #230090102 (Cadillac Mt Summit) and #250070001 (Martha's Vineyard). Normalized Mean Error (NME) for the seven monitoring sites ranges from 8.7 to 24.8% for CMAQ and from 9.6 to 28% for CAMx.

***Figure 8-2 (A-D).*** *Observed and modeled MDA8 $O_3$ (ppb) for 2016 at monitors #090010017, #090110124, #240190004, and #440090007 located in a water cell in the 12OTC2 domain.*





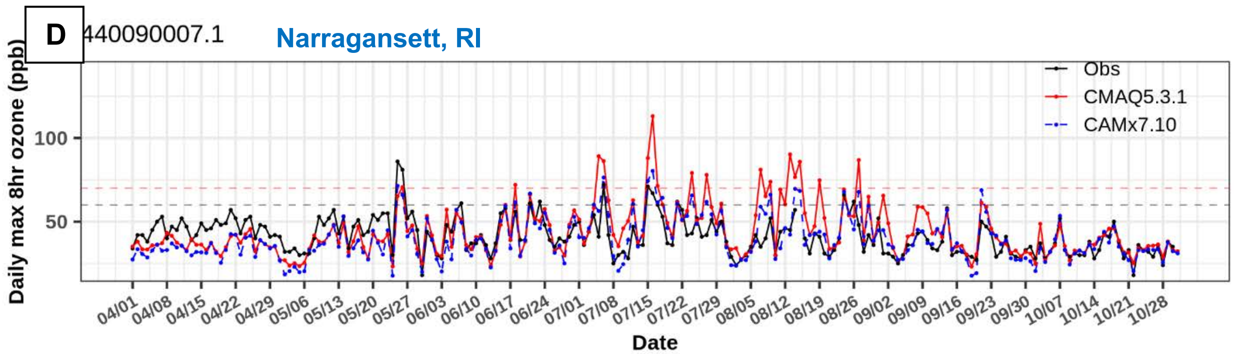




***Table 8-2** Model performance statistics at monitoring sites located in a water cell in the OTR in the 12OTC2 domain (where observed MDA8 $O_3$ >= 60 ppb).*

| | | | CMAQ v5.3.1 | | | | CAMx v7.10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Site ID | Location | # obs | MB (ppb) | ME (ppb) | NMB (%) | NME (%) | MB (ppb) | ME (ppb) | NMB (%) | NME (%) |
| **090010017** | Greenwich, CT | 27 | 11.2 | 16.7 | 16 | 23.9 | -3.2 | 8.9 | -4.6 | 12.8 |
| **090110124** | Groton, CT | 25 | 4.5 | 12 | 6.6 | 17.6 | -3.6 | 9.4 | -5.2 | 13.8 |
| **230090102** | Cadillac MT Summit, ME | 12 | -16.1 | 16.1 | -24.7 | 24.8 | -18.2 | 18.2 | -28 | 28 |
| **240190004** | Horn Point, MD | 17 | 0.4 | 7 | 0.6 | 10.7 | 1 | 6.3 | 1.5 | 9.6 |
| **250010002** | Truro, MA | 11 | 1.7 | 14.5 | 2.6 | 22.6 | -4.3 | 9.5 | -6.7 | 14.8 |
| **250070001** | Martha's Vineyard, MA | 7 | -1 | 5.8 | -1.4 | 8.7 | -1.1 | 9.5 | -1.7 | 14.1 |
| **440090007** | Narragansett, RI | 12 | 2.9 | 13.2 | 4.3 | 19.5 | -3.7 | 8.7 | -5.5 | 12.9 |

## *8.3 Comparing Model Performance Using the Four Methods*

Model performance for the monitoring sites located near water cell tends to be poor. Here the various approaches, discussed above, to eliminate the influence of water grids on model performance is assessed. **Table 8-2** shows the model performance statistics for the seven monitoring sites located in a water cell in the OTR.

***Figure 8-3 (A-D).*** *Modeled vs. observed MDA8 $O_3$ (ppb) at monitors #090010017, #090110124, #240190004, and #440090007 in the 12OTC2 domain.*

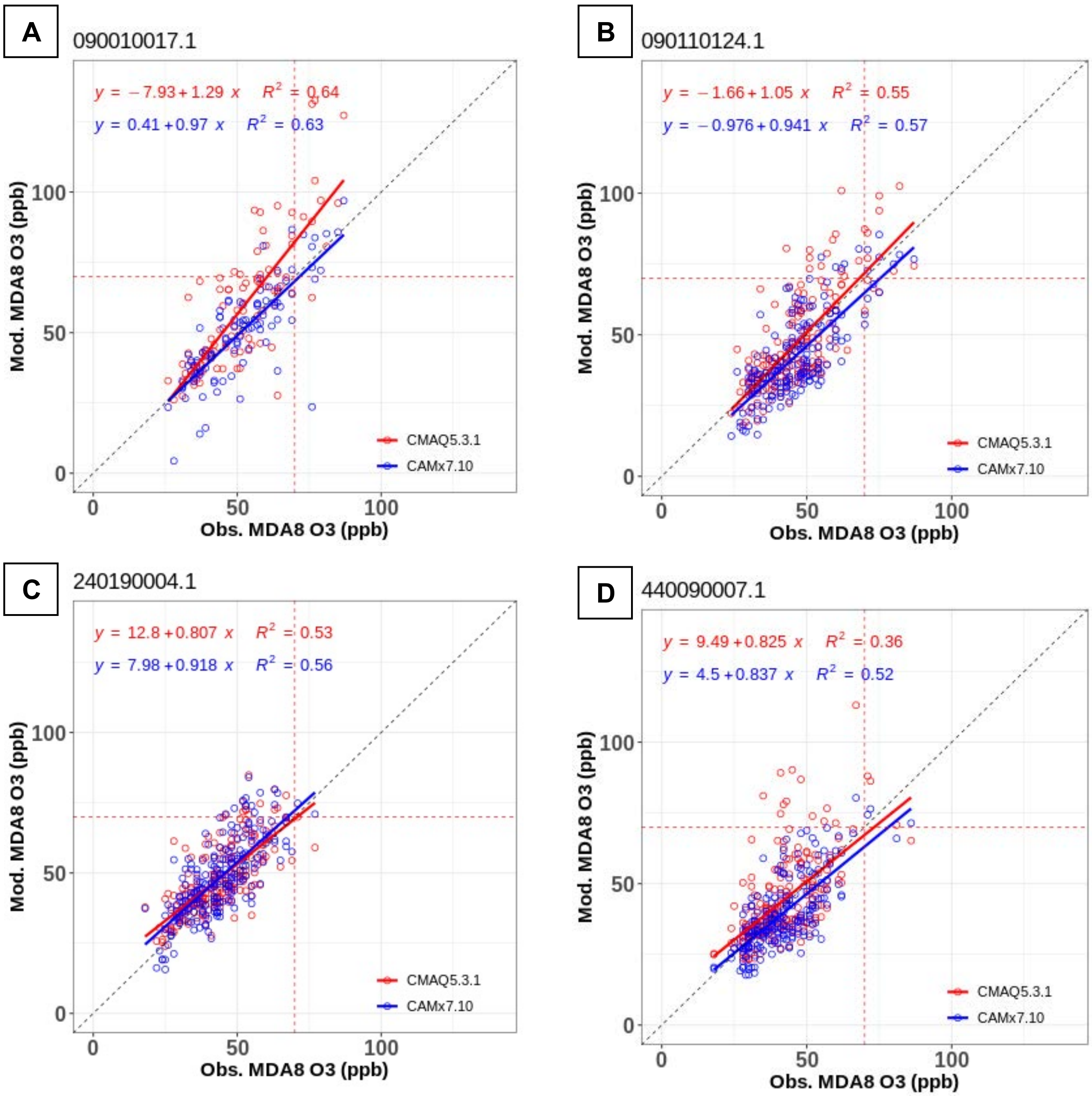



**Figure 8-4** illustrates the 3x3 grid cell array centered over each monitoring site located in a water cell. Green shading indicates a grid cell classified as land, while blue shading indicates a grid cell classified as water. The grid cells used in the RRF calculation using the three methods are shown with numbers representing how many times the grid cell was used. If numbers are not shown (e.g., the 3x3 method with CMAQ for #230290019, Jonesport, ME), an RRF was not calculated due to not enough days ≥ 60 ppb MDA8 $O_3$. With the No Water 1 method, for CMAQ, six out of eight monitors utilize only the centered grid cell containing water for the RRF calculation, which is identical to the 1x1 method (e.g., 10 times used for #090010017 (Greenwich) and 6 times used

for #230090102 (Cadillac MT Summit)). On the other hand, for CAMx, there is one site (Truro, #250010002) that used only the centered grid cell containing water because all nine grid cells are water cells for this site. The No Water 2 method uses only land cells in the RRF calculation as shown in the figure.

**Figure 8-5** shows observed and CMAQ modeled MDA8 $O_3$ (ppb) for 2016 at monitor #090110124 (Groton), respectively, for the days used in the RRF calculation using the four different methods. For each method, MDA8 $O_3$ values from the water cell where the monitor is located (indicated as Mod_grid_1x1) are compared for each day. The No Water 1 (**Figure 8-5B**) and 1x1 method (**Figure 8-5D**) show identical results because the water cell where the monitor is located is used for all of the top 10 days for the No Water 1 method (see **Figure 8-4**). The No Water 2 method resulted in reducing the overprediction of $O_3$ for the days used in the RRF calculation (**Figure 8-5C**).

**Figure 8-6** illustrates observed and CAMx modeled MDA8 $O_3$ (ppb) for 2016 at monitor #090110124 (Groton) for the days used in the RRF calculation using the four methods. The differences between the observed and modeled $O_3$ for each method for CAMx are smaller than for CMAQ. **Table 8-3** shows NMB (%) restricted to those days and grid cells used in the RRF calculation (modeled MDA8 $O_3$ from the grid cell used in the RRF calculation), as opposed to **Table 8-2**, which shows overall statistics at the grid cell where the site is located on all days with observed MDA8 $O_3 \geq 60$ ppb. For both models, NMB values are the lowest using the No Water 2 method.

## *8.4 2023 Projected Design Values for monitors located in a grid classified as a water cell (CMAQ vs CAMx)*

The pre-truncated projected 2023 design values for monitors located in a water cell in the OTR region are listed in **Table 8-4**. The values exceeding 65 ppb are shown in yellow, while values that exceed 70 ppb (2015 NAAQS) and 75 ppb (2008 NAAQS) are in orange and dark red, respectively. The values based on different methods show a wider range for CMAQ by up to 7 ppb, compared to CAMx which vary by up to 3 ppb as shown in **Figure 8-4**. The values using the 3x3 No Water 1 method are the same as the values using the 1x1 method for most of sites for CMAQ as expected from the grid cells used in the RRF calculation. The values using the 3x3 No Water 2 method are substantially lower than the 3x3 No Water 1 method for monitor 090010017 (Greenwich) and 090110124 (Groton) for CMAQ. However, for CAMx, the difference is not as substantial. For the 3x3 No Water 2 method, monitors #230090102, #230290019 (for CMAQ) and #250010002 (for CMAQ and CAMx) had fewer than 5 days ≥ 60 ppb MDA8 $O_3$. Therefore, RRFs or DVFs were not calculated.

## *8.5 Summary*

This section described the four different methods to calculate the RRFs for monitors located in a water cell. We compared the performance statistics for the days and grid cells used in the RRF calculation among the four methods. Performance statistics show that the 3x3 No Water 2 method has the lowest bias for most of cases when the RRFs were calculated. Even though there were large differences in NMB between the 3x3 and 3x3 No Water 2, the projected DVFs were similar for most cases. Using the four different methods on different modeling platform may result in different outcomes.

***Figure 8-4*** *Grid cells used in the RRF calculation for monitors located in a water cell in the OTR in the 12OTC2 domain for CMAQ and CAMx, green for a land cell and blue for a water cell.*

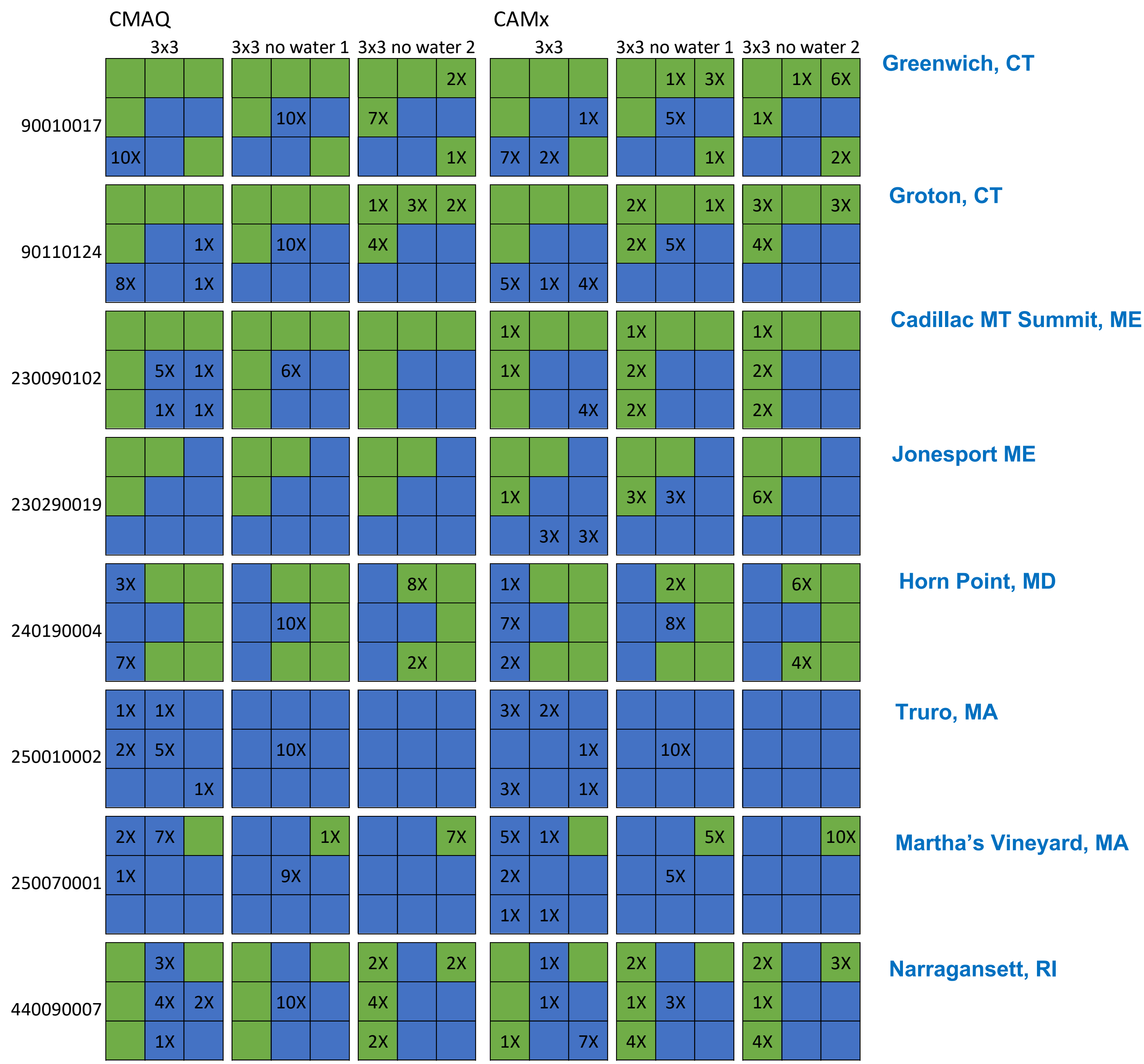


***Figure 8-5*** *Observed and CMAQ modeled MDA8 $O_3$ (ppb) for 2016 at the Groton, CT monitor #090110124 using the 3x3 (top left), 3x3 No Water 1 (top right), 3x3 No Water 2 (bottom left), and 1x1 method (bottom right) for 10 selected days used in the RRF calculation and associated observed $O_3$.*

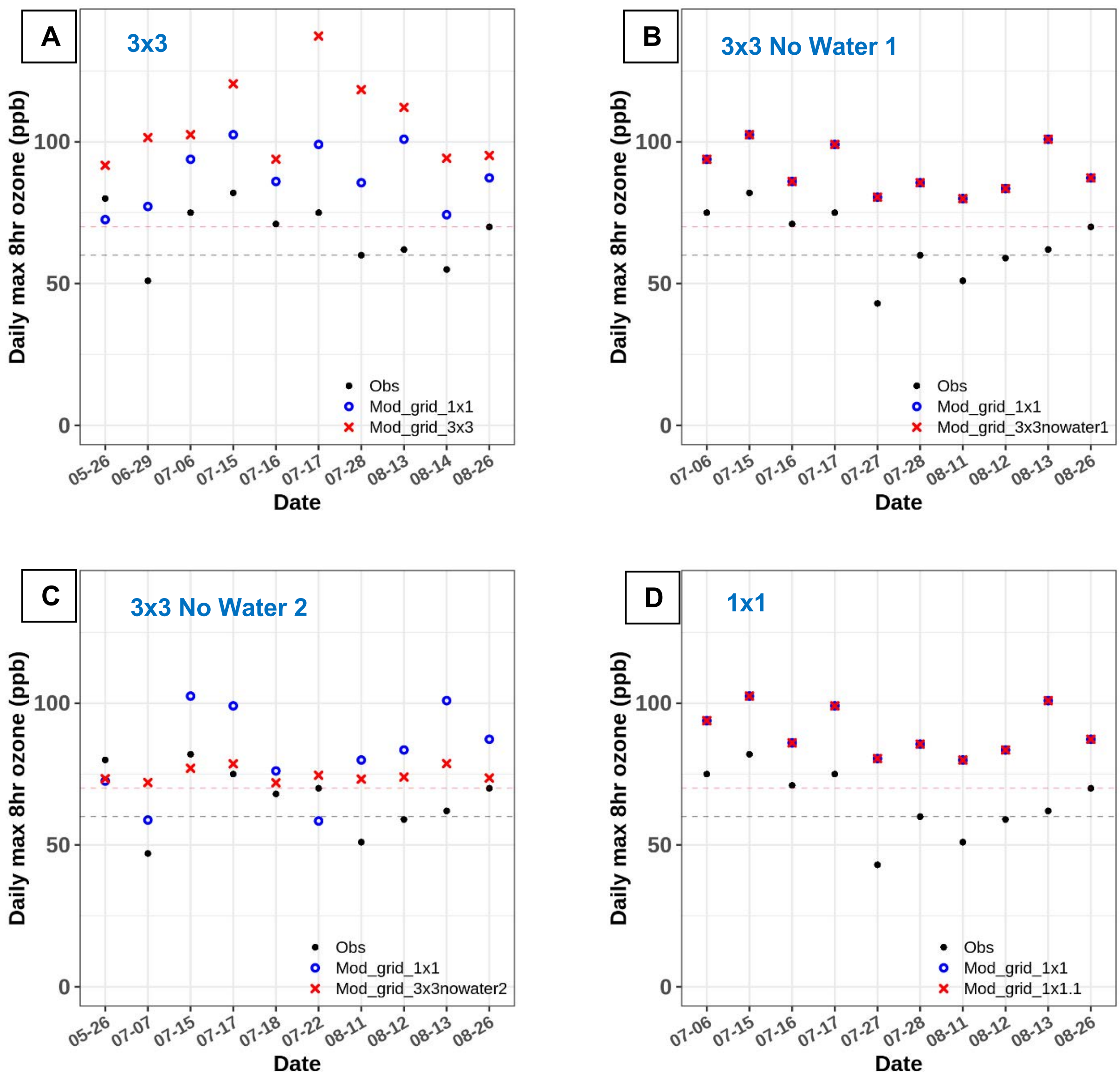


***Figure 8-6 (A-D).*** *Observed and CAMx modeled MDA8 $O_3$ (ppb) for 2016 at Groton, CT monitor #090110124 using the 3x3 (top left), 3x3 No Water 1 (top right), 3x3 No Water 2 (bottom left), and 1x1 method (bottom right) for 10 selected days used in the RRF calculation and associated observed $O_3$.*

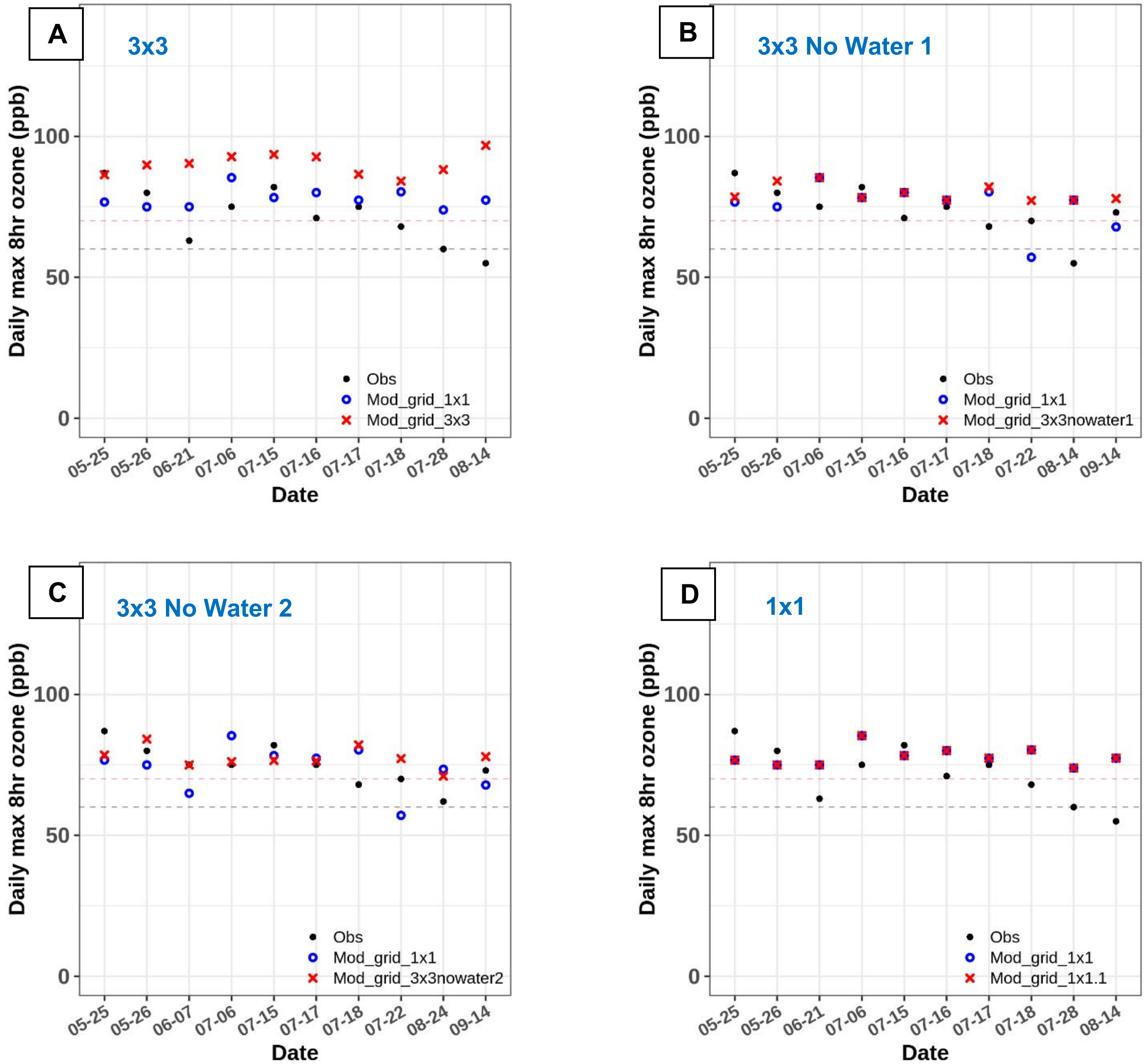


***Table 8-3*** *NMB (%) for the days and grid cells used in the RRF calculation using the four methods in the OTR.*

| Site ID | Location | Projected 2023 DVF (CMAQ v5.3.1) | | | | Projected 2023 DVF (CAMx v7.10) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 3x3 | 3x3 No Water 1 | 3x3 No Water 2 | 1x1 | 3x3 | 3x3 No Water 1 | 3x3 No Water 2 | 1x1 |
| 090010017 | Greenwich, CT | 130.4 | 46 | 10.5 | 46 | 27.3 | 11.3 | 7.7 | 12.8 |
| 090110124 | Groton, CT | 56.6 | 38.7 | 12.4 | 38.7 | 25.8 | 8.4 | 3.6 | 8.8 |
| 230090102 | Cadillac MT Summit, ME | 30.7 | 21.7 | n/a | 21.7 | 12.1 | 4 | 4 | n/a |
| 230290019 | Jonesport, ME | n/a | n/a | n/a | n/a | 37 | 36 | 33.5 | n/a |
| 240190004 | Horn Point, MD | 46.8 | 30.3 | 10.4 | 30.3 | 36.4 | 26.9 | 18.8 | 31.3 |
| 250010002 | Truro, MA | 65 | 55.2 | n/a | 55.2 | 25.9 | 15.4 | n/a | 15.4 |
| 250070001 | Martha's Vineyard, MA | 73.1 | 34.3 | 10.5 | 29.7 | 34.8 | 29 | 19.9 | 27.6 |
| 440090007 | Narragansett, RI | 75.8 | 70.6 | 12.5 | 70.6 | 25.2 | 11.4 | 10 | 11.2 |

***Table 8-4*** *2023 $O_3$ projected design values (DVF) in ppb for monitors located in a water cell in the OTR in the 12OTC2 domain.*

| Site ID | Location | 2014-2018 DVB | 2023 DVF (CMAQ v5.3.1) | | | | 2023 DVF (CAMx v7.10) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3x3 | 3x3 No Water 1 | 3x3 No Water 2 | 1x1 | 3x3 | 3x3 No Water 1 | 3x3 No Water 2 | 1x1 |
| **090010017** | Greenwich, CT | 79.3 | 71.7 | 78.5 | 72.4 | 78.5 | 74 | 74.5 | 73.5 | 76.1 |
| **090110124** | Groton, CT | 74.3 | 67.9 | 71.3 | 66.7 | 71.3 | 67 | 68 | 67 | 68.8 |
| **230090102** | Cadillac MT Summit, ME | 69 | 61.5 | 61.5 | n/a | 61.5 | 60.7 | 60.6 | 60.6 | n/a |
| **230290019** | Jonesport, ME | 59.3 | n/a | n/a | n/a | n/a | 52.4 | 52.2 | 52.2 | n/a |
| **240190004** | Horn Point, MD | 64.7 | 58 | 57.2 | 56.6 | 57.2 | 56.9 | 57 | 56.6 | 57.2 |
| **250010002** | Truro, MA | 69 | 60.1 | 59.8 | n/a | 59.8 | 61.6 | 61.4 | n/a | 61.4 |
| **250070001** | Martha's Vineyard, MA | 70 | 62.6 | 62.6 | 63.8 | 62.7 | 63.4 | 62.8 | 63.4 | 62.9 |
| **440090007** | Narragansett, RI | 69.3 | 66.2 | 65 | 61.2 | 65 | 63.1 | 62.1 | 62 | 63.1 |

# 9 Projected 8-hour Ozone Air Quality over the Ozone Transport Region

EPA guidance recommends the use of the RRF approach to demonstrate attainment of the 8-hour $O_3$ NAAQS (US EPA 2018b), however occasionally model grid cells code coastal monitors as in water cells which can be problematic for model to observation comparison. The OTC Modeling Committee compared several approaches to assess modeled attainment including two modified approaches that excluded grid cells identified as majority water, as described in **Section 8**. In this section, the results based on the standard 3x3 method, as well as the modified 3x3 no water 1 method, are presented for all ozone monitor location grid cells identified as water that were excluded ("3x3 No Water 1 method"), as per the EPA guidance.

## *9.1 Projected Design Values*

As described in **Section 8**, RRFs and $O_3$ design values were computed for all monitors across the 12OTC2 domain, using the 2016 base year and 2023 projected V1 inventories. Using the standard 3x3 method, the average future year design values across the 12OTC2 domain using CAMx and CMAQ are displayed in the panels of **Figure 9-1**, whereas the 3x3 No Water 1 method results are displayed in **Figure 9-2**. Similar versions of these plots but focusing on the Northeast are shown in **Figures 9-3** and **9-4**, respectively.

The average projected design values from both CAMx and CMAQ are broadly consistent across the 12OTC2 domain; both models predict the highest design values in the Northeast urban corridor, Lake Michigan region, urban regions in TX (Dallas and Houston), and Denver, CO. Over portions of the Southeast, CMAQ tended to predict lower design values than CAMx, as evidenced by the larger number of sites where future design values could not be computed (fewer than five days with base year MDA8 ≥ 60 ppb). Both the standard 3x3 method and 3x3 No Water 1 approach yielded broadly consistent design values across the entire domain.

Focusing on the Northeast region, CAMx projected six monitors—one each in NY and PA, four in CT—to have average future design values to exceed 70 ppb with the 3x3 method. Similarly, CMAQ projected five monitors to exceed 70 ppb with the regular 3x3 method, and five monitors to exceed 70 ppb with the No Water 1 method.

The base and future year ozone design values from CMAQ and CAMx are shown in **Table 9-1** for the highest ozone monitors in the OTR (a full list is provided in **Appendix C**). Color-shading in **Table 9-1** is consistent with **Figures 9-1** through **9-4**: future year values that exceed 65 ppb are indicated in yellow, while values that exceed 70 ppb are shown in orange; values that exceed 75 ppb are show in red. These projections for any of the monitors listed in **Appendix C** can be made available upon request to the NYSDEC. **Appendix D** lists all monitors available in the 12OTC2 domain used in DVF calculations, and **Appendix E** lists calculated 2023 DVFs for these monitors.

***Figure 9-1*** *Full model domain projected 2023 V1 (fi) $O_3$ design values across the 12OTC2 domain, using the standard 3x3 method, with A) CAMx (left) and B) CMAQ*

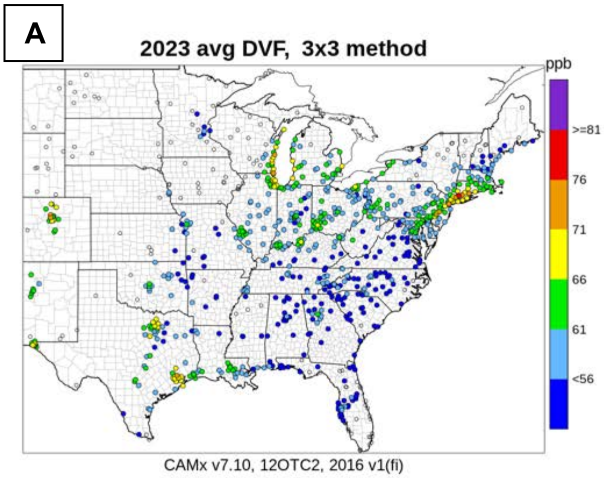



***Figure 9-2*** *Full model domain projected 2023 V1 (fi) $O_3$ design values across the 12OTC2 domain, using the 3x3 No Water 1 method, with A) CAMx (left) and B) CMAQ (right).*

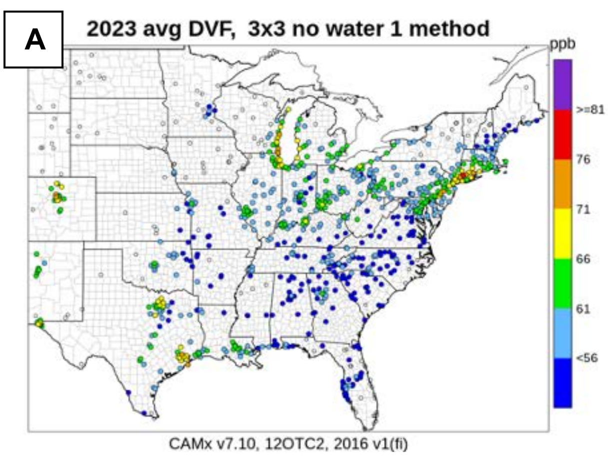


***Figure 9-3*** *OTR projected 2023 V1 (fi) $O_3$ design values across the Northeast region, using the standard 3x3 method, with A) CAMx (left) and B) CMAQ (right).*

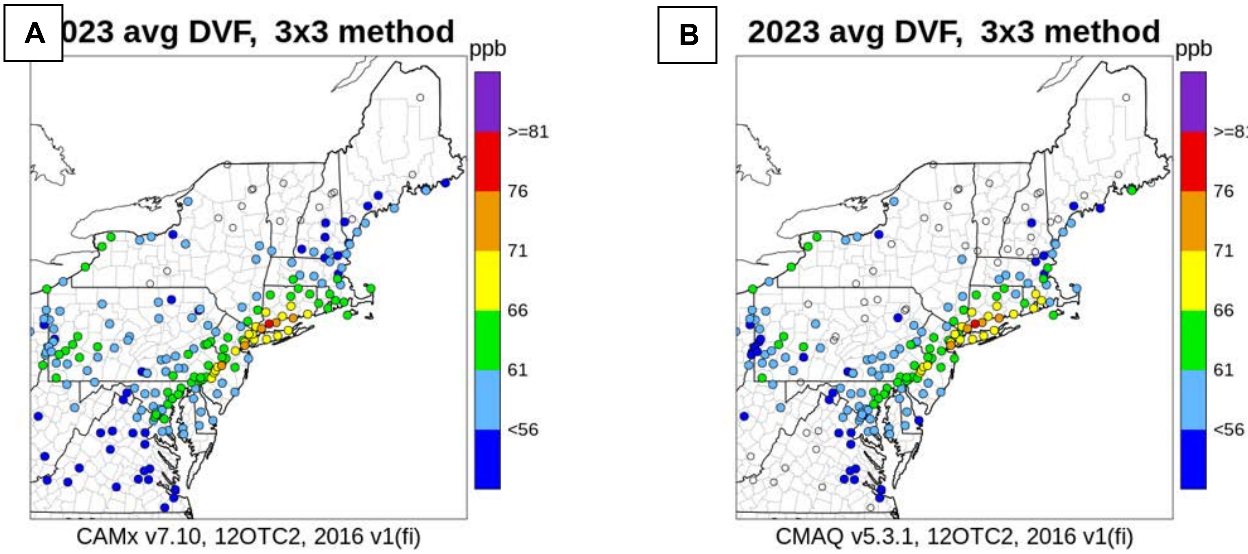



***Figure 9-4*** *OTR projected 2023 V1 (fi) $O_3$ design values across the Northeast region, using the 3x3 No Water 1 method, with A) CAMx (left) and B) CMAQ (right).*

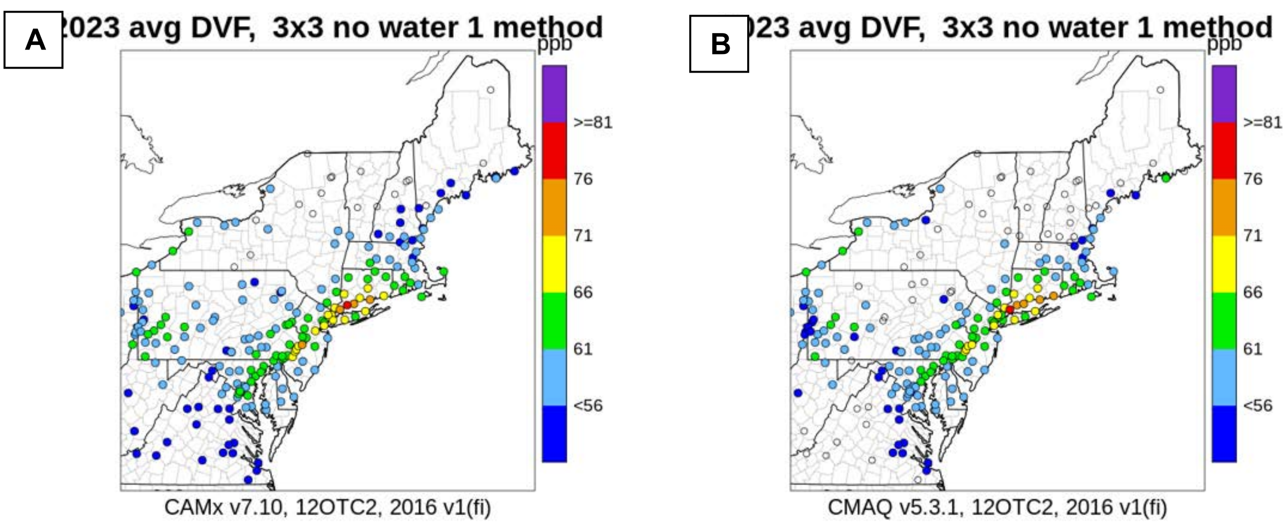


***Table 9-1*** *Top 22 OTR Ozone Monitors - Baseline (2014-2018) and projected 2023 $O_3$ design values from CAMx and CMAQ, using the standard 3x3 method and the 3x3 No Water 1 method. Future design values that exceed 65 ppb are highlighted in yellow, values that exceed 70 ppb are highlighted in orange, and values that exceed 75 ppb are highlighted in dark red.*

| | | | 2014-2018 DVB | | CAMx v7.10 | | | | CMAQ v5.3.1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3x3 | | 3x3 No Water 1 | | 3x3 | | 3x3 No Water 1 | |
| **Site ID** | **State** | **County** | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 90019003 | CT | Fairfield | 82.7 | 83 | 78 | 78 | 76 | 76 | 80 | 80 | 75 | 75 |
| 90013007 | CT | Fairfield | 82 | 83 | 75 | 76 | 75 | 75 | 74 | 75 | 75 | 76 |
| 90099002 | CT | New Haven | 79.7 | 82 | 71 | 73 | 72 | 74 | 71 | 73 | 71 | 73 |
| 420170012 | PA | Bucks | 79.3 | 81 | 71 | 72 | 71 | 72 | 69 | 70 | 69 | 70 |
| 90010017 | CT | Fairfield | 79.3 | 80 | 74 | 74 | 74 | 75 | 71 | 72 | 78 | 79 |
| 90079007 | CT | Middlesex | 78.7 | 79 | 70 | 70 | 70 | 70 | 69 | 69 | 69 | 69 |
| 90011123 | CT | Fairfield | 77 | 78 | 69 | 70 | 69 | 70 | 69 | 70 | 69 | 70 |
| 421010024 | PA | Philadelphia | 77.7 | 78 | 69 | 69 | 69 | 69 | 68 | 68 | 68 | 68 |
| 90090027 | CT | New Haven | 75.7 | 77 | 69 | 70 | 68 | 69 | 69 | 70 | 68 | 69 |
| 340070002 | NJ | Camden | 75.3 | 77 | 67 | 69 | 67 | 69 | 66 | 67 | 66 | 67 |
| 90110124 | CT | New London | 74.3 | 76 | 67 | 68 | 68 | 69 | 67 | 69 | 71 | 73 |
| 360850067 | NY | Richmond | 76 | 76 | 71 | 71 | 70 | 70 | 74 | 74 | 70 | 70 |
| 361030002 | NY | Suffolk | 74 | 76 | 69 | 71 | 68 | 70 | 68 | 70 | 67 | 69 |
| 361030004 | NY | Suffolk | 74.3 | 76 | 68 | 69 | 67 | 68 | 66 | 67 | 66 | 68 |
| 421010048 | PA | Philadelphia | 75.3 | 76 | 67 | 68 | 67 | 68 | 66 | 66 | 66 | 66 |
| 240251001 | MD | Harford | 74 | 75 | 65 | 66 | 64 | 65 | 63 | 64 | 64 | 64 |
| 340030006 | NJ | Bergen | 74.3 | 75 | 69 | 69 | 69 | 69 | 68 | 68 | 68 | 68 |
| 340230011 | NJ | Middlesex | 74.7 | 75 | 66 | 66 | 66 | 66 | 65 | 66 | 65 | 66 |
| 361192004 | NY | Westchester | 74 | 75 | 70 | 70 | 67 | 68 | 66 | 67 | 68 | 68 |
| 90031003 | CT | Hartford | 71.7 | 74 | 63 | 65 | 63 | 65 | 62 | 64 | 62 | 64 |
| 100031010 | DE | New Castle | 73.7 | 74 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| 240031003 | MD | Anne Arundel | 74 | 74 | 64 | 64 | 64 | 64 | 65 | 65 | 63 | 63 |

*A table complete with modeling results for all OTR ozone monitors is located in **Appendix C**.*

# 10 Tagged Source Apportionment Modeling

## 10.1 Background and Overview

States are required under § 110(a)(2)(D) of the Clean Air Act to submit SIP revisions that prohibit their state's air pollution emissions from contributing to nonattainment or interfering with maintenance of the NAAQS in a downwind state (*Clean Air Act Amendments of 1990 and 86 FR 60602 (November 2021)*). These SIPs, called Good Neighbor SIPs, are due three years after a NAAQS is updated, which for the 70 ppb 2015 Ozone NAAQS is October 1, 2018, prior to the earliest designated attainment date for that standard.

For the 2008 Ozone NAAQS, multiple states failed to submit timely or approvable Good Neighbor SIPs. This prompted EPA to adopt the "CSAPR Update Rule" as a Federal Implementation Plan (FIP) (US EPA 2016). EPA cautioned that the CSAPR Update was only a "partial remedy," meaning there were still unfulfilled Good Neighbor obligations from upwind states beyond meeting the requirements of the CSAPR Update. On December 6, 2018, EPA issued a rule called the "CSAPR Close-out Rule," which concluded that the "CSAPR Update Rule" was in fact a "full remedy". However, the US Court of Appeals for the DC Circuit vacated the "CSAPR Close-out Rule" and remanded the "CSAPR Update Rule" in separate decisions on September 13, 2019 resulting in the need for EPA to issue a "full remedy" for 2008 Ozone NAAQS Good Neighbor obligations (summary and history available online[52]). This course of events led to EPA issuing the "Revised CSAPR Update Rule"[53] on March 15, 2021, which EPA concludes will resolve transport obligations under the 2008 Ozone NAAQS.

However, states were obligated to submit in parallel sufficient Good Neighbor SIPs under the 2015 Ozone NAAQS by August 3, 2018. EPA is required to submit a completeness finding between 60 days and six months by the due date of a SIP (CAA § 110(k)(1)(B)) and either approve, partially approve, or disprove plans within 12 months of submission of a plan (CAA § 110(k)(2)). Additionally, CAA § 110(c)(1) directs the EPA to promulgate a Federal Implementation Plan (FIP) ''at any time within two years'' of its disapproval or finding of failure to submit." This set of timelines establishes FIP deadline dates for EPA for 2015 ozone NAAQS Good Neighbor obligations as February 3, 2021 for any states with unsubmitted SIPs, and August 3 2021 for any states with disapproved plans. On April 6, 2022, EPA issued a proposed FIP [87 FR 20036] which as of this writing has not been issued as final rule.[54]

To determine contributions from upwind states, regions and individual emission sectors to $O_3$ formation in the OTR, OTC conducted tagged in-house modeling simulations. OTC sees value in

[52] US EPA Final Cross-State Air Pollution Rule Close-Out Rule History. https://www.epa.gov/airmarkets/final-csapr-close-out#rule-history.
[53] US EPA Revised Cross-State Air Pollution Rule Update. https://www.epa.gov/csapr/revised-cross-state-air-pollution-rule-update.
[54] See https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs for updates to the 2015 Good Neighbor FIP.

examining different contribution metrics for assessing contribution bfrom upwind states, given that the current EPA routine can average-out large state contributions over a relatively large number of days. OTC notes that ozone attainment is based on 4th highest values, not ozone season averages. Additionally, OTC sees value in having in-house tagged emission contribution modeling using ERTAC EGU for EGU projections and a more robust tagging schema for emission sectors. As a result, the OTC Modeling Committee (MC) has developed an alternate assessment of state contribution based on the 2023 modeling to inform work related to reducing upwind transport.

## 10.2 Tagging Methodology

Source category emissions were tagged to allow comparisons at both the state and emission sector level. It is acknowledged that an emission sector in a state that is further away might have a minimal contribution, however having the ability to aggregate sectors to assess different contributions is important when considering the value of a sector-wide emission control strategies.

Selected emission tags were informed from analysis of previous OTC and EPA tagged emission modeling for 2023 (2011-based platform), as well as EPA's preliminary source sector 2023 contribution modeling (2016-based platform). These modeling efforts found results similar to those identified in OTC Section 176A petition (September 10, 2015), helping OTC identify significant contributors to $O_3$ nonattainment in the OTR. Ultimately, the OTC Modeling Committee applied emission tags to individual and groupings of states for 23 emission source sectors.

Since the OTC modeling includes individual states and sets of emission sectors within most states, a large number of emission tags were initially proposed, potentially as many as 736. Such a large number of emission tags places a strain on modeling and emission preparation resources, so efforts were made to identify efficient ways to group emissions in ways that meaningful information is not sacrificed. According to EPA's NEI emission trend data, the ten highest $NO_X$ and VOC emitting states within the 12OTC2 modeling domain are shown in **Table 10-1**.

***Table 10-1.*** *2017 NEI emissions data by state within the 12OTC2 modeling domain*

| Rank | 2017 Tons NOx | | 2017 Tons VOC | |
|---|---|---|---|---|
| 1 | TX | 1,129,738 | TX | 1,801,251 |
| 2 | FL | 478,680 | FL | 735,085 |
| 3 | IL | 379,787 | ND | 547,427 |
| 4 | PA | 352,942 | PA | 457,928 |
| 5 | OH | 349,639 | LA | 432,955 |
| 6 | LA | 327,562 | OK | 421,383 |
| 7 | MI | 313,695 | NY | 382,651 |
| 8 | GA | 310,653 | AL | 367,945 |
| 9 | IN | 306,800 | MI | 367,848 |
| 10 | OK | 302,185 | IL | 365,314 |

Of the highest $NO_X$ emitting states within the 12OTC2 modeling domain, only one is an OTC state (Pennsylvania) and four others are section 176A states (Illinois, Indiana, Michigan, Ohio). Of the remaining top emitting states, Florida, Louisiana, Oklahoma and Texas are included in the top ten for both NOx and anthropogenic VOC emissions. Florida onroad emissions are comparable to those of California (not shown), and Louisiana, Oklahoma and Texas all have oil and gas related emissions that are comparable, or higher than, their onroad emissions. Texas, Florida, Louisiana, and Oklahoma were included in the OTC tagged emission contribution modeling as high emitting states.

***Figure 10-1*** *12OTC2 modeling domain for projected 2023 emission tagging.*

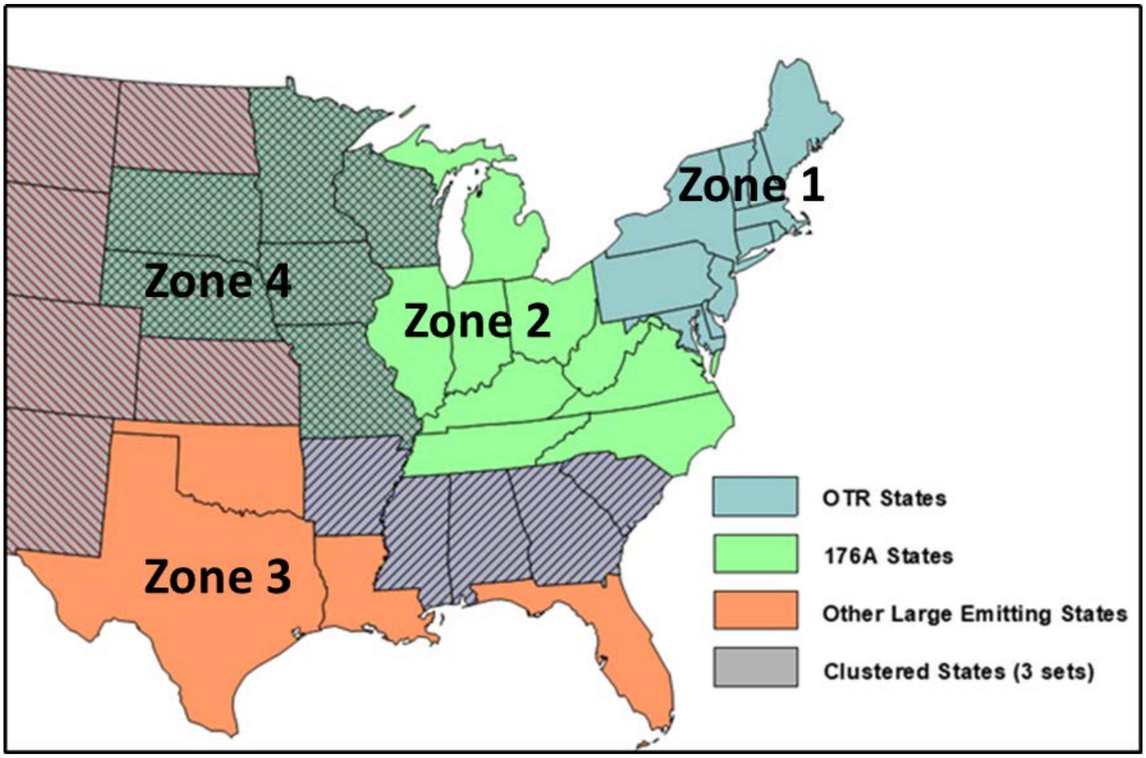



***Table 10-2.*** *Emission sectors for the tagged contribution modeling*

| State Emission Sectors | Domain-wide Sectors: |
|---|---|
| • Area-nonpoint<br>• EGU-ERTAC<br>• EGU-Peaking<br>• NonEGU<br>• NonRoad-diesel<br>• NonRoad-nondiesel<br>• OnRoad-diesel<br>• OnRoad-nondiesel<br>• Oil & Gas-point<br>• Oil & Gas-nonpoint | • Commercial Marine Vehicles<br>• Rail<br>• Airport/Airplane up to 3000’ (Corrected)<br>• Agriculture<br>• Offshore CMV<br>• Offshore rigs<br>• Prescribed fire<br>• Biogenic<br>• Canada<br>• Mexico<br>• Boundary conditions<br>• Initial conditions<br>• Other |

***Table 10-3.*** *Emission tag summary.*

| Sector | Zone 1 MANE-VU + VA | Zone 2 176A states excluding VA | Zone 3 4 large emitting states | Zone 4 Other states by subzone | Zone 5 Canada and Mexico |
|---|---|---|---|---|---|
| **Area (Nonpoint)** | X | X | X | Multi-state | Single tag for each country for all emission sectors |
| **CMV (c1c2c3)** | X | X | X | Multi-state | |
| **EGU-ERTAC** | X | X | X | Multi-state | |
| **Non-EGU** | X | X | X | Multi-state | |
| **Nonroad - Diesel** | X | X | X | Multi-state | |
| **Nonroad - Non-diesel** | X | X | X | Multi-state | |
| **Oil & gas - Nonpoint** | X | Point + NonPoint | Point + NonPoint | Multi-state Point + NonPoint | |
| **Oil & gas - Point** | X | | | | |
| **Onroad - Diesel** | X | X | X | Multi-state | |
| **Onroad -Non-diesel** | X | X | X | Multi-state | |
| **Airport-up to 3000'** | X | Multi-state (All Zone 2 Combined) | Multi-state (All Zone 3 and Zone 4 Combined) | | |
| **Rail** | X | Multi-state (All Zone 2 Combined) | Multi-state (All Zone 3 and Zone 4 Combined) | | |
| **EGU - Peakers** | X | Multi-state (All Zone 2 Combined) | Multi-state (All Zone 3 and Zone 4 Combined) | | |
| **Agriculture** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Offshore CMV** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Offshore Rigs** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Residential Wood** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Ag Fire** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Prescribed/Wildfire** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Other** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Biogenic** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Boundary Condition** | Multi-state (Zones 1 - 4 Combined) | | | | |
| **Initial Condition** | Multi-state (Zones 1 - 4 Combined) | | | | |

The OTC MC proposed doing a full set of emission tags for all states in the OTR and the District of Columbia, all nine Section 176A Petition states, and the four largest $NO_X$ emitting states in the 12OTC2 modeling domain. The remainder of the states were grouped geographically and/or emission sectors were grouped based on commonality. State groupings cover seventeen states and partial states, plus parts of Canada and Mexico that are included in the newly expanded OTC modeling domain (see **Figure 10-1**). The emission sectors selected by OTC for tagging are presented in **Table 10-2**, emission tag aggregation is presented in **Table 10-3** and a summary of $NO_X$ emissions by tag is presented in **Table 10-4**.

***Table 10-4.*** *Total Ozone Season $NO_X$ Emissions by Emission Tag (tons $NO_X$) for A) OTR + VA and B) Full Domain*

## Part A - OTR + VA Detail

| Total Projected 2023 Ozone Season NOx Emissions | CT | DE | DC | ME | MD | MA | NH | NJ | NY | PA | RI | VT | VA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onroad-diesel | 1,286 | 763 | 232 | 2,218 | 6,087 | 4,490 | 1,220 | 6,454 | 13,016 | 15,668 | 1,084 | 571 | 8,846 |
| Onroad-nondiesel | 2,897 | 1,275 | 600 | 1,656 | 4,919 | 5,161 | 1,593 | 6,522 | 13,291 | 13,389 | 790 | 769 | 12,106 |
| Nonroad-diesel | 1,875 | 774 | 150 | 1,268 | 2,459 | 3,442 | 1,053 | 5,375 | 10,089 | 8,670 | 530 | 1,560 | 5,056 |
| Nonroad-nondiesel | 1,259 | 1,293 | 60 | 1,994 | 2,260 | 2,886 | 915 | 3,280 | 7,290 | 3,878 | 381 | 346 | 3,295 |
| EGU-ertac | 2,471 | 718 | 1 | 1,588 | 4,552 | 2,792 | 279 | 4,278 | 10,770 | 23,434 | 489 | 10 | 7,962 |
| Peakers | 14 | 1 | 0 | 14 | 935 | 97 | 51 | 182 | 2,453 | 652 | 1 | 0 | 110 |
| NonEGU | 397 | 984 | 191 | 2,368 | 3,842 | 5,971 | 454 | 2,352 | 7,914 | 17,770 | 469 | 137 | 8,038 |
| Area-nonpoint | 3,491 | 1,228 | 586 | 2,227 | 3,683 | 8,068 | 3,291 | 6,211 | 17,073 | 20,950 | 931 | 1,045 | 6,941 |
| CMV_C1C2C3 | 807 | 1,320 | 64 | 1,267 | 3,749 | 2,246 | 108 | 5,657 | 3,416 | 1,023 | 773 | 0 | 5,357 |
| Oil&gas-nonpoint | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 257 | 21,286 | 0 | 0 | 4,362 |
| Oil&gas-point | 118 | 9 | 0 | 13 | 103 | 127 | 0 | 149 | 825 | 3,329 | 44 | 0 | 1,449 |
| Airport | 193 | 121 | 0 | 160 | 1,166 | 1,281 | 182 | 2,044 | 3,370 | 1,589 | 137 | 76 | 2,513 |
| Rail | 510 | 108 | 89 | 510 | 1,195 | 1,893 | 158 | 2,468 | 5,471 | 6,090 | 27 | 295 | 4,120 |

*Note: Emissions for all other sectors included in Part B table below.*

## Part B - Full Domain Detail

| Total Projected 2023 Ozone Season NOx Emissions | OTR+VA | IL | IN | KY | MI | NC | OH | TN | WV | FL | LA | OK | TX | AL, AR, GA, MS, SC | IA, MN, MO, NE, SD, WI | CO, KS, MT, NM, ND, WY | Canada | Mexico |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onroad-diesel | 61,934 | 15,224 | 12,846 | 9,403 | 8,027 | 9,296 | 11,158 | 12,646 | 3,721 | 20,838 | 10,318 | 10,676 | 42,603 | 51,775 | 45,610 | 29,320 | 245,467 | 305,365 |
| Onroad-nondiesel | 64,967 | 13,063 | 12,521 | 8,774 | 14,443 | 20,915 | 17,409 | 12,708 | 3,257 | 24,207 | 6,993 | 9,449 | 22,293 | 52,311 | 43,501 | 23,767 | | |
| Nonroad-diesel | 42,301 | 13,253 | 10,146 | 3,177 | 6,080 | 6,826 | 10,844 | 4,709 | 982 | 16,503 | 2,742 | 3,398 | 26,157 | 21,705 | 52,661 | 27,065 | | |
| Nonroad-nondiesel | 29,137 | 4,339 | 2,514 | 1,721 | 4,497 | 5,012 | 5,329 | 2,838 | 556 | 11,356 | 2,435 | 1,862 | 6,863 | 11,943 | 13,972 | 4,112 | | |
| EGU-ertac | 59,344 | 17,895 | 22,389 | 23,397 | 13,730 | 7,743 | 17,679 | 7,087 | 20,374 | 27,364 | 24,875 | 12,056 | 48,877 | 38,528 | 53,760 | 47,042 | | |
| Peakers | 4,508 | 5,242 | | | | | | | | 7,733 | | | | | | | | |
| NonEGU | 50,887 | 16,595 | 24,280 | 9,889 | 20,877 | 14,931 | 18,222 | 13,312 | 4,947 | 11,919 | 32,778 | 17,356 | 47,335 | 64,823 | 47,489 | 25,201 | | |
| Area-nonpoint | 75,725 | 15,720 | 3,815 | 2,096 | 12,567 | 6,571 | 11,705 | 7,078 | 1,966 | 8,836 | 3,177 | 2,844 | 18,951 | 19,911 | 24,059 | 7,842 | | |
| CMV_C1C2C3 | 25,787 | 2,196 | 734 | 1,712 | 5,669 | 1,644 | 1,327 | 935 | 617 | 6,102 | 19,694 | 132 | 14,658 | 7,185 | 2,989 | 0 | | |
| Oil&gas-nonpoint | 25,906 | 11,546 | 5,372 | 9,352 | 11,169 | 351 | 7,904 | 2,889 | 25,257 | 3,654 | 31,149 | 55,590 | 115,110 | 22,715 | 8,532 | 90,057 | | |
| Oil&gas-point | 6,166 | | | | | | | | | | | | | | | | | |
| Airport | 12,832 | 11,954 | | | | | | | | 36,728 | | | | | | | | |
| Rail | 22,934 | 44,900 | | | | | | | | 123,723 | | | | | | | | |
| AllOthers | 7,460,033 | | | | | | | | | | | | | | | | | |
| Biogenic | 1,015,910 | | | | | | | | | | | | | | | | | |
| Offshore-CMV | 149,007 | | | | | | | | | | | | | | | | | |
| Offshore-Rigs | 24,465 | | | | | | | | | | | | | | | | | |
| RWC | 4,521 | | | | | | | | | | | | | | | | | |
| Agriculture | 0 | | | | | | | | | | | | | | | | | |
| Agricultural burnning | 2,880 | | | | | | | | | | | | | | | | | |
| Wildfire and prescribed fire | 54,800 | | | | | | | | | | | | | | | | | |

## 10.3 Ozone Source Apportionment Modeling

OTC 2023 ozone source apportionment modeling was performed on OTC 2016 SIP modeling platform which was adapted from EPA's 2016v1 modeling platform and described in **Sections 2, 5, and 6**. OTC conducted CAMx v7.10 with APCA (Anthropogenic Precursor Culpability Assessment) model runs on 12OTC2 domain driven by EPA's WRF generated 2016 meteorological field and 2023 emissions projected from EPA's 2016fh emission inventories. CAMx-APCA is one of the ozone source apportionment techniques featured in the CAMx model. While CAMx-APCA tracks tagged ozone precursors and ozone formed via physical and chemical processes, the model re-allocates ozone production to anthropogenic precursors rather than to uncontrollable biogenic source. This enables modeling results to be more relevant to emission control policy making. Additionally, each tag has a $NO_X$ and VOC component. The peer-reviewed CAMx model and its source apportionment technology tool have been extensively used by academic institutions and government agencies for atmospheric research, air quality rule making, and emission control strategy development, and EPA's CSAPR and Revised CSAPR Update were developed based on CAMx-APCA modeling. OTC performed ozone source apportionment modeling on the 2016 modeling platform is consistent with EPA's source apportionment modeling works. OTC modeling centers worked together to complete 2023 ozone source apportionment modeling with 2016 ozone season meteorology (from April 1 to September 30 of 2016). NYDEC performed SMOKE runs, NJDEP prepared tagged emissions, and UMD conducted CAMx-APCA runs.

OTC tagged a total of 320 emission sources plus concentrations from boundary conditions and initial conditions. To accommodate memory resource constraints, OTC divided 320 emission tags into 3 CAMx-APCA runs with 114, 108, and 103 emission tags, respectively. The detail tag list for 3 runs is shown in **Table 10-5**. OTC 12km domain includes 42 US states, Canada, and Mexico. For all 3 runs, biogenic emissions were always grouped as tag #1. Run 1 tagged onroad and nonroad mobile sectors for 42 states with 112 emission tags, with the rest of emissions lumped into tag #114. Run 2 tagged area, cmv, oil & gas, offshore-cmv, offshore-rig, rwc, agriculture, agriculture burning, wildfire and prescribed fire, others (i.e., afdust_adj and seasalt), Canada, and Mexico with 106 emission tags, with the rest of emissions lumped into tag #108. Run 3 tagged ERTAC EGU, nonERTAC EGU, airport, rail, and peakers with 101 emission tags, with the rest of emissions lumped into tag #103. The final two tags for each of the three runs were for boundary and initial condition concentrations, respectively.

OTC's CAMx-APCA runs were conducted with the point source override option, which looks for emission tags in the KCELL variable of point source emission file. The KCELL value is a negative integer, with the negative sign as the override flag and integer is the tag number. Source region map was overridden and set to be one source region for the whole domain. All sectors—except the ocean sea spray file extracted from EPA's 12US1 domain—were converted into one Fortran binary format point source emission file input for each CAMx-APCA run. This approach enables all nonpoint emission sources to be accurately allocated geographically. To run CAMx-APCA correctly, it's critical to set the flags SA_Use_APCA, SA_PT_Override, and most importantly SA_Use_APCA_PTOverride for each simulation.

OTC prepared tagged emissions with 3 different approaches to generate point source emissions depending on emission sectors: running SMOKE, modifying existing inline emission files, and converting 2D emission. For emission sectors tagged by state (area, onroad mobile, nonroad mobile, EGU, NONEGU, peaking units, nonpoint oil & gas, point oil & gas, airports, rail), OTC conducted SMOKE runs over EPA's 12US2 domain for each sector with SMK_SRCGROUP_OUTPUT_YN flag turned on which creates SGINLNTS and SRCGROUPS emission outputs in point source inline mode. The SOURCE_GROUPS file for SMOKE listed state code and corresponding group number for all OTC SMOKE runs. The state group number was assigned to IGROUP variable in the SRCGROUP output file. The SGINLNTS and SRCGROUPS combo outputs were cropped from 12US2 domain to 12OTC2 domain. Next, the sector specific SRCGROUPS file was processed to reset the IGROUP variable value from source state group number to state tag number in Table A. Finally SGINLNTS and SRCGROUPS are merged using CMAQ2UAM to generate Fortran binary format point source emission with KCELL value set as –(tag number).

For emission sectors with EPA's premerged INLN and STACK_GROUPS emission files available (cmv_c1c2 and cmv_c3, point source fire, and point sources in Canada and Mexico), OTC modified in-line emissions to add emission tag number for CAMx_APCA runs. INLN and STACK_GROUPS files were first cropped from 12US2 domain to 12OTC2 domain. The IFIPS variable in STACK_GROUPS has the state and county FIPS code for each point source stack. The 2 digits state code in FIPS was used to locate the source state and corresponding tag number. The variable ISTACK in STACK_GROUPS file was set as the tag number. Then INLN and STACK_GROUPS were merged using CMAQ2UAM to generate Fortran binary format point source emission file with KCELL value set as –(tag number).

For emission sectors with single tag throughout modeling domain (biogenic, residential wood combustion, agriculture, agriculture burning, wildfire and prescribed fire, fugitive dust, seasalt, nonpoint source in Canada and Mexico), OTC used EPA's premerged netCDF 2D emission files to convert ground level nonpoint emission to first layer point source emission using center of emission source residing grid cell for longitude and latitude of point source stack. The process included domain cropping from 12US2 to 12OTC2, and conversion to Fortran binary format point source emission file using CMAQ2UAM.

The final step of OTC tagged emission preparation was to merge all point source files from 23 sectors to generate one Fortran binary format point source emission file for each CAMx-APCA run using PTSMRG. The merge program provides the option to either keep KCELL values of input point source file unchanged or have KCELL value of input point source file assigned to a new value to accommodate emission tagging need for different CAMx-APCA run.

Note that some sectors only need to be SMOKE processed on certain representative days because of representative temporal profiles. Othar, onroad_can, and onroad_mex were processed for 7 days in each month. Airport sector was processed for 7 days each month plus holidays. Othpt was processed for 2 weekdays and 2 weekend days each month. ptnonertac and ptoilgas were processed for 2 weekdays and 2 weekend days plus holidays each month. All other sectors were processed daily throughout modeling period from April 1 to September 30.

## 10.4 Selection of EGU Peaking Units

The OTC MC modeling includes emission tags for EGUs whose operations can be variable and infrequent. Some of these units are older generating units that produce high rates of NOx emissions per MWh of electricity produced. There is considerable interest in understanding the role that these units play in $O_3$ production during high $O_3$ periods in the OTR. Many states have identified these units based on their own methodology, however, for this modeling effort, peaking units must be identified in a uniform way across the modeling domain for consistency in interpretation of proposed modeling. As such, the OTC MC worked with the OTC Stationary and Area Sources (SAS) Committee to develop a standard definition for unit identification for modeling purposes. These include units for electricity generation, heat and electricity cogeneration, and small electric producer units that meet each of the following conditions:

- Operated at least 20% of hours in each 2018 or 2019 $O_3$ season,
- Average total heat input 2018 or 2019 $O_3$ seasons was 10% or less the unit's maximum heat input capacity,
- Started operation prior to 1996,
- Unit retirement, if planned, is scheduled to be after the 2023 $O_3$ season, and
- An operational exception for the unit was not presented.

A full list of Part-75 "Peaking Units" operational during the 2018/19 period throughout the OTC12 modeling domain is included in **Appendix F**. Total emissions from these units are reported and gathered via the Continuous Emissions Monitoring Systems (CEMS) database. **Appendix G** contains non-Part-75 peaking units previously identified for modeling purposes.

Non-Part-75 units were identified through a previous collaborative process including EPA and states located in other regions. The non-Part-75 units were extracted from a modeling file called "*egunoncems_2016version1_ERTAC_Platform_POINT_27oct2019*." Operational information for these units is considerably more complicated to assess because these units do not report CEMS data and they are not regulated by large federal trading programs. The units identified as "peakers" are known to generally respond on peak energy demand days, but inventories carry insufficient information as to the exact days, hours, or magnitude of $NO_X$ is emitted by individual units on peak energy demand days. While these units are tagged for this modeling effort, uncertainty exists regarding their true operations and impacts. Like with the Part-75 CEMS peaking list, non-Part-75 peaking unit list also excludes known unit shutdowns through 2023.

***Table 10-5.*** *Detail list of emission tags for 3 CAMx-APCA runs.*

| ST | FIPS | STATE | Biogenic | Onroad-diesel | Onroad-nondiesel | Nonroad-diesel | Nonroad-nondiesel | Area-nonpoint | CMV_C1C2C3 | Oil&gas-nonpoint | Oil&gas-point | Offshore-CMV | Offshore-Rigs | RWC | Agriculture | Agricultural burning | wildfire and prescribed fire | Others | EGU-ertac | NonEGU | Airport | Rail | Peakers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CT | 9 | Connecticut | 1 | 2 | 30 | 58 | 86 | 2 | 30 | 58 | 86 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 2 | 30 | 58 | 73 | 88 |
| DE | 10 | Delaware | | 3 | 31 | 59 | 87 | 3 | 31 | 59 | 87 | | | | | | | | 3 | 31 | 59 | 74 | 89 |
| DC | 11 | District of Columbia | | 4 | 32 | 60 | 88 | 4 | 32 | 60 | 88 | | | | | | | | 4 | 32 | 60 | 75 | 90 |
| ME | 23 | Maine | | 5 | 33 | 61 | 89 | 5 | 33 | 61 | 89 | | | | | | | | 5 | 33 | 61 | 76 | 91 |
| MD | 24 | Maryland | | 6 | 34 | 62 | 90 | 6 | 34 | 62 | 90 | | | | | | | | 6 | 34 | 62 | 77 | 92 |
| MA | 25 | Massachusetts | | 7 | 35 | 63 | 91 | 7 | 35 | 63 | 91 | | | | | | | | 7 | 35 | 63 | 78 | 93 |
| NH | 33 | New Hampshire | | 8 | 36 | 64 | 92 | 8 | 36 | 64 | 92 | | | | | | | | 8 | 36 | 64 | 79 | 94 |
| NJ | 34 | New Jersey | | 9 | 37 | 65 | 93 | 9 | 37 | 65 | 93 | | | | | | i | | 9 | 37 | 65 | 80 | 95 |
| NY | 36 | New York | | 10 | 38 | 66 | 94 | 10 | 38 | 66 | 94 | | | | | | | | 10 | 38 | 66 | 81 | 96 |
| PA | 42 | Pennsylvania | | 11 | 39 | 67 | 95 | 11 | 39 | 67 | 95 | | | | | | | | 11 | 39 | 67 | 82 | 97 |
| RI | 44 | Rhode Island | | 12 | 40 | 68 | 96 | 12 | 40 | 68 | 96 | | | | | | | | 12 | 40 | 68 | 83 | 98 |
| VT | 50 | Vermont | | 13 | 41 | 69 | 97 | 13 | 41 | 69 | 97 | | | | | | | | 13 | 41 | 69 | 84 | 99 |
| VA | 51 | Virginia | | 14 | 42 | 70 | 98 | 14 | 42 | 70 | 98 | | | | | | | | 14 | 42 | 70 | 85 | 100 |
| IL | 17 | Illinois | | 15 | 43 | 71 | 99 | 15 | 43 | 71 | 71 | | | | | | | | 15 | 43 | 71 | 86 | 101 |
| IN | 18 | Indiana | | 16 | 44 | 72 | 100 | 16 | 44 | 72 | 72 | | | | | | | | 16 | 44 | 71 | 86 | 101 |
| KY | 21 | Kentucky | | 17 | 45 | 73 | 101 | 17 | 45 | 73 | 73 | | | | | | | | 17 | 45 | 71 | 86 | 101 |
| MI | 26 | Michigan | | 18 | 46 | 74 | 102 | 18 | 46 | 74 | 74 | | | | | | | | 18 | 46 | 71 | 86 | 101 |
| NC | 37 | North Carolina | | 19 | 47 | 75 | 103 | 19 | 47 | 75 | 75 | | | | | | | | 19 | 47 | 71 | 86 | 101 |
| OH | 39 | Ohio | | 20 | 48 | 76 | 104 | 20 | 48 | 76 | 76 | | | | | | | | 20 | 48 | 71 | 86 | 101 |
| TN | 47 | Tennessee | | 21 | 49 | 77 | 105 | 21 | 49 | 77 | 77 | | | | | | | | 21 | 49 | 71 | 86 | 101 |
| WV | 54 | West Virginia | | 22 | 50 | 78 | 106 | 22 | 50 | 78 | 78 | | | | | | | | 22 | 50 | 71 | 86 | 101 |
| FL | 12 | Florida | | 23 | 51 | 79 | 107 | 23 | 51 | 79 | 79 | | | | | | | | 23 | 51 | 72 | 87 | 102 |
| LA | 22 | Louisiana | | 24 | 52 | 80 | 108 | 24 | 52 | 80 | 80 | | | | | | | | 24 | 52 | 72 | 87 | 102 |
| OK | 40 | Oklahoma | | 25 | 53 | 81 | 109 | 25 | 53 | 81 | 81 | | | | | | | | 25 | 53 | 72 | 87 | 102 |
| TX | 48 | Texas | | 26 | 54 | 82 | 110 | 26 | 54 | 82 | 82 | | | | | | | | 26 | 54 | 72 | 87 | 102 |
| GA | 13 | Georgia | | 27 | 55 | 83 | 111 | 27 | 55 | 83 | 83 | | | | | | | | 27 | 55 | 72 | 87 | 102 |
| SC | 45 | South Carolina | | 27 | 55 | 83 | 111 | 27 | 55 | 83 | 83 | | | | | | | | 27 | 55 | 72 | 87 | 102 |
| AL | 1 | Alabama | | 27 | 55 | 83 | 111 | 27 | 55 | 83 | 83 | | | | | | | | 27 | 55 | 72 | 87 | 102 |
| AR | 5 | Arkansas | | 27 | 55 | 83 | 111 | 27 | 55 | 83 | 83 | | | | | | | | 27 | 55 | 72 | 87 | 102 |
| MS | 28 | Mississippi | | 27 | 55 | 83 | 111 | 27 | 55 | 83 | 83 | | | | | | | | 27 | 55 | 72 | 87 | 102 |
| IA | 19 | Iowa | | 28 | 56 | 84 | 112 | 28 | 56 | 84 | 84 | | | | | | | | 28 | 56 | 72 | 87 | 102 |
| MN | 27 | Minnesota | | 28 | 56 | 84 | 112 | 28 | 56 | 84 | 84 | | | | | | | | 28 | 56 | 72 | 87 | 102 |
| MO | 29 | Missouri | | 28 | 56 | 84 | 112 | 28 | 56 | 84 | 84 | | | | | | | | 28 | 56 | 72 | 87 | 102 |
| NE | 31 | Nebraska | | 28 | 56 | 84 | 112 | 28 | 56 | 84 | 84 | | | | | | | | 28 | 56 | 72 | 87 | 102 |
| SD | 46 | South Dakota | | 28 | 56 | 84 | 112 | 28 | 56 | 84 | 84 | | | | | | | | 28 | 56 | 72 | 87 | 102 |
| WI | 55 | Wisconsin | | 28 | 56 | 84 | 112 | 28 | 56 | 84 | 84 | | | | | | | | 28 | 56 | 72 | 87 | 102 |
| CO | 8 | Colorado | | 29 | 57 | 85 | 113 | 29 | 57 | 85 | 85 | | | | | | | | 29 | 57 | 72 | 87 | 102 |
| KS | 20 | Kansas | | 29 | 57 | 85 | 113 | 29 | 57 | 85 | 85 | | | | | | | | 29 | 57 | 72 | 87 | 102 |
| MT | 30 | Montana | | 29 | 57 | 85 | 113 | 29 | 57 | 85 | 85 | | | | | | | | 29 | 57 | 72 | 87 | 102 |
| ND | 38 | North Dakota | | 29 | 57 | 85 | 113 | 29 | 57 | 85 | 85 | | | | | | | | 29 | 57 | 72 | 87 | 102 |
| NM | 35 | New Mexico | | 29 | 57 | 85 | 113 | 29 | 57 | 85 | 85 | | | | | | | | 29 | 57 | 72 | 87 | 102 |
| WY | 56 | Wyoming | | 29 | 57 | 85 | 113 | 29 | 57 | 85 | 85 | | | | | | | | 29 | 57 | 72 | 87 | 102 |
| | | Canada | | 106 | | | | | | | | | | | | | | | | | | | |
| | | Mexico | | 107 | | | | | | | | | | | | | | | | | | | |

## 10.5 2023 Design Value Results

After applying the relative reduction process and the standard 3x3 grid cell technique, between five and six OTR monitors had modeled projected $O_3$ design values exceeding the 2015 $O_3$ NAAQS and one exceeded the 2008 $O_3$ NAAQS. **Tables 10-6** and **10-7** present monitors in the OTR failing to attain/maintain the $O_3$ NAAQS. Monitor specific data for other monitors located throughout the 12OTC2 modeling domain is available upon request.

***Table 10-6*** *OTC 2023 Modeled Violations of the 2008 and 2015 Ozone NAAQS.*

| Site ID | State | Location | 2019-21 Design Value | 2023 CAMx | 2023 CMAQ |
|---|---|---|---|---|---|
| 90010017 | CT | Greenwich | 79 | 74.1 | 71.7 |
| 90013007 | CT | Stratford | 81 | 75.8 | 74.6 |
| 90019003 | CT | Westport Sherwood | 80 | 78.3 | 80.5 |
| 90099002 | CT | Madison Hammonasset | 82 | 71.6 | 71.9 |
| 360850067 | NY | Susan Wagner H.S. | -- | 71.3 | 74.4 |
| 420170012 | PA | Bristol | 71 | 71.1 | 68.8 |

***Table 10-7*** *OTC 2023 Modeled Failure to Maintain the Ozone NAAQS*

| Site ID | State | Location | 2019-21 Design Value | 2023 CAMx | 2023 CMAQ |
|---|---|---|---|---|---|
| 361030002 | NY | Babylon | 73 | 71.6 | 69.5 |
| 361192004 | NY | White Plains | 69 | 71.1 | 67.8 |
| 090110124 | CT | Groton | 73 | 67 | 67.9 |

## 10.6 Contribution Assessment Results

The following section provides some of the contribution assessment results obtained from the 2023 projections. Because of the large volume of data, only a small portion of it is summarized in this document. Other products are available upon request to the OTC.

This summary focuses on the nine monitors listed in **Tables 10-6 and 10-7** that were found to be projected to violate or not maintain the 2015 NAAQS in 2023. For brevity, graphics for only three of these monitoring locations are included in the main text—Greenwich, CT, Babylon, NY, and Bristol, PA. Additional monitors are included in **Appendix H**.

This section will walk through the first two steps of the four-step process EPA has outlined in previous transport rules to determine which states are projected to contribute to nonattainment or interfere with maintenance using the OTC 2023 CAMx modeling.

### 10.6.1 Step 1: Identify Downwind Air Quality Problems

The 2023 CAMx modeling identified the nine monitors in the OTR listed in **Tables 10-6** and **Table 10-7** as being projected to be in nonattainment (an average design value greater than or equal to

71 ppb) or maintenance (a maximum design value greater than or equal to 71 ppb) of the 2015 $O_3$ NAAQS in 2023. Four estimates were used in making this determination, whether CMAQ or CAMx modeled them as being in nonattainment or maintenance and both using and excluding water grid cells from the calculations (see **Section 9** for calculation methods). Using these approaches nine monitors were found to be projected to be in nonattainment or face challenges with maintaining the 2015 $O_3$ NAAQS in 2023 and will be the primary focus in this CAMx contribution modeling summary. Modeled attainment prediction for these nine monitors is located in **Table 10-8A**.

### 10.6.2 Step 2: Identify Upwind States

When examining monitoring in this modeling summary, ozone contribution from upwind states was calculated two ways. The first approach uses all days modeled to be an exceedance at each monitor and then averages the contribution from each state across all of those days ("DVF Adjusted Exceedance Average"). The contributions were then adjusted by the ratio of the DVF at the monitor to the MDA8 $O_3$ modeled by CAMx. The second approach averages the four highest state contribution at each monitor ("DVF Adjusted Four Highest Average"). This value is then adjusted by the ratio of the DVF to the MDA8 $O_3$ modeled by CAMx. The intention of this second approach is to capture contributions by states that contribute significantly to at least four exceedance days but may not contribute significantly to every exceedance. A summary of state contribution linkages is in **Table 10-8B.** Differences in the two techniques are shown in red.

***Table 10-8 (A and B).*** *1% State Linkages for Monitors Projected to not Attain and Maintain the 2015 NAAQS*

| (A) Monitor Name | Monitor ID | CMAQ | CMAQ less Water | CAMx | CAMx less Water |
|---|---|---|---|---|---|
| **Babylon** | 361030002 | Maintenance | Attainment | Attainment | Attainment |
| **Bristol** | 420170012 | Nonattainment | Nonattainment | Attainment | Attainment |
| **Fort Griswold Park** | 090110124 | Attainment | Attainment | Attainment | Nonattainment |
| **Greenwich Point Park** | 090010017 | Nonattainment | Nonattainment | Nonattainment | Nonattainment |
| **Hammonasset S.P.** | 090099002 | Nonattainment | Nonattainment | Nonattainment | Maintenance |
| **Sherwood Island** | 090019003 | Nonattainment | Nonattainment | Nonattainment | Nonattainment |
| **Stratford** | 090013007 | Nonattainment | Nonattainment | Nonattainment | Nonattainment |
| **Susan Wagner H.S.** | 360850067 | Nonattainment | Attainment | Nonattainment | Attainment |
| **White Plains** | 361192004 | Maintenance | Attainment | Attainment | Attainment |

| (B) Monitor Name | Monitor ID | Linkages Using All High Ozone Days | Linkages Using Top 4 High Average |
|---|---|---|---|
| **Babylon** | 361030002 | IN,MD,MI,NJ,NY,OH,PA,VA,WV (9 states) | IN,**KY**,MD,MI,NJ,NY,OH,PA,VA,WV (10 states) |
| **Bristol** | 420170012 | DE,IN,KY,MD,**MI**,NJ,NY,OH,PA,VA,WV (11 states) | DE,IN,KY,MD,NJ,NY,OH,PA,VA,WV (10 states) |
| **Fort Griswold Park** | 090110124 | CT,**MD**,MI,NJ,NY,OH,PA,VA,WV (9 states) | CT,MI,NJ,NY,OH,PA,VA,WV (8 states) |
| **Greenwich Point Park** | 090010017 | CT,MD,MI,NJ,NY,OH,PA,VA,WV (9 states) | CT,**IN**,MD,MI,NJ,NY,OH,PA,VA,WV (9 states) |
| **Hammonasset S.P.** | 090099002 | CT,IL,IN,KY,MD,MI,NJ,NY,OH,PA,VA,WV (12 states) | CT,IL,IN,KY,MD,MI,NJ,NY,OH,PA,VA,WV (12 states) |
| **Sherwood Island** | 090019003 | CT,IN,MD,**MI**,NJ,NY,OH,PA,VA,WV | CT,**IL**,IN,**KY**,MD,NJ,NY,OH,PA,VA,WV |

| | | | |
|---|---|---|---|
| | | (10 states) | (11 states) |
| **Stratford** | 090013007 | CT,IN,KY,MD,MI,NJ,NY,OH,PA,VA,WV (11 states) | CT,**IL**,IN,KY,MD,MI,NJ,NY,OH,PA,**TX**,VA,WV (13 states) |
| **Susan Wagner H.S.** | 360850067 | MD,**MI**,NJ,NY,OH,PA,VA,WV (8 states) | **KY**,MD,NJ,NY,OH,PA,VA,WV (8 states) |
| **White Plains** | 361192004 | **CT**,**MA**,MD,NJ,NY,PA,VA (7 states) | MD,NJ,NY,**OH**,PA,VA,**WV** (7 states) |

## 10.7 Emission Sector Analysis

**Figure 10-2** through **Figure 10-4** examine each modeled exceedance day at three of the monitors of interest (Greenwich, CT, Babylon, NY, and Bristol, PA) and the extent that each sector contributes on each day. Exceedance days are ranked highest concentration to smallest according to total future DVF, with contributions from biogenic and international emissions and boundary conditions making up the remaining $O_3$ not shown.

Percentage contributions from sectors vary across exceedance days, however nonpoint, onroad non-diesel, EGUs, onroad diesel, nonroad diesel and non-diesel, non-EGUs, and oil and gas are consistently the highest contributors.

***Figure 10-2.*** *Emission Sector Contribution on Modeled Ozone Exceedance Day at Greenwich, CT*

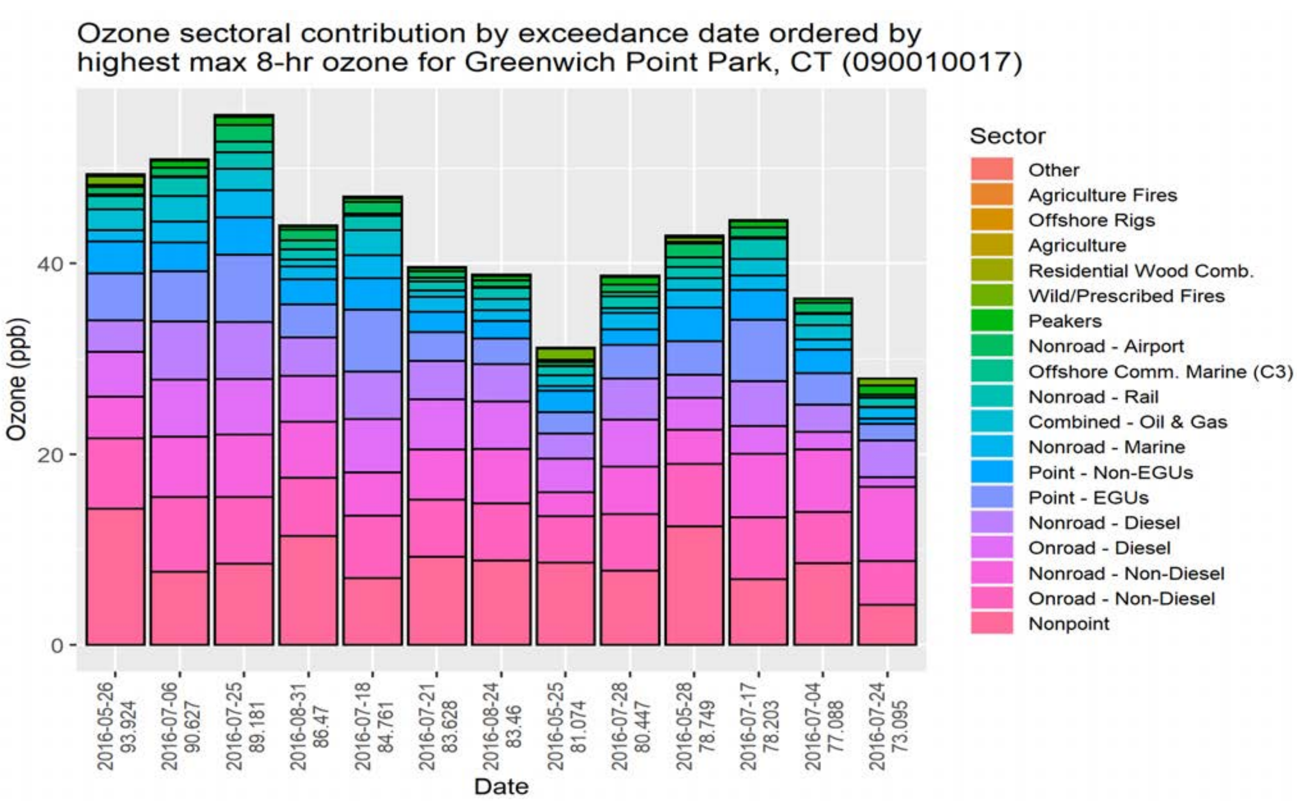


***Figure 10-3.*** *Emission Sector Contribution on Modeled Ozone Exceedance Day at Babylon, NY*

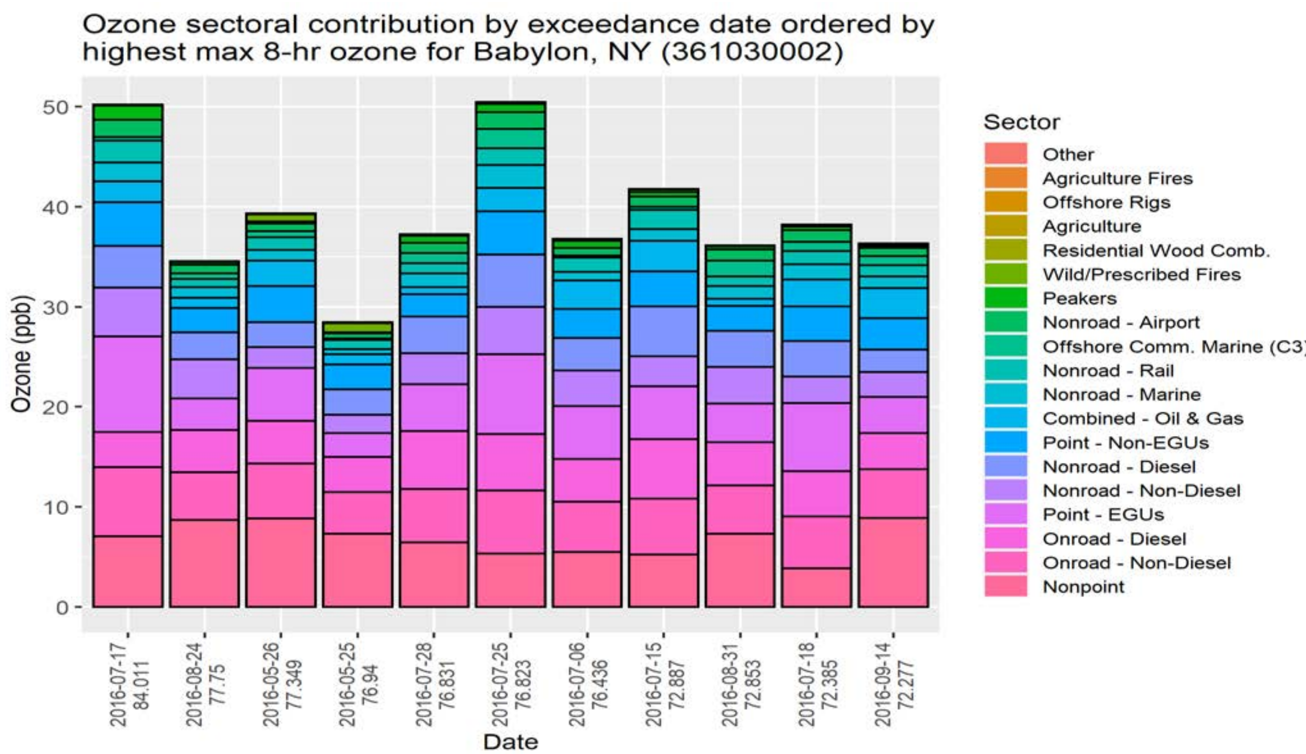



**Figure 10-4.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Bristol, PA

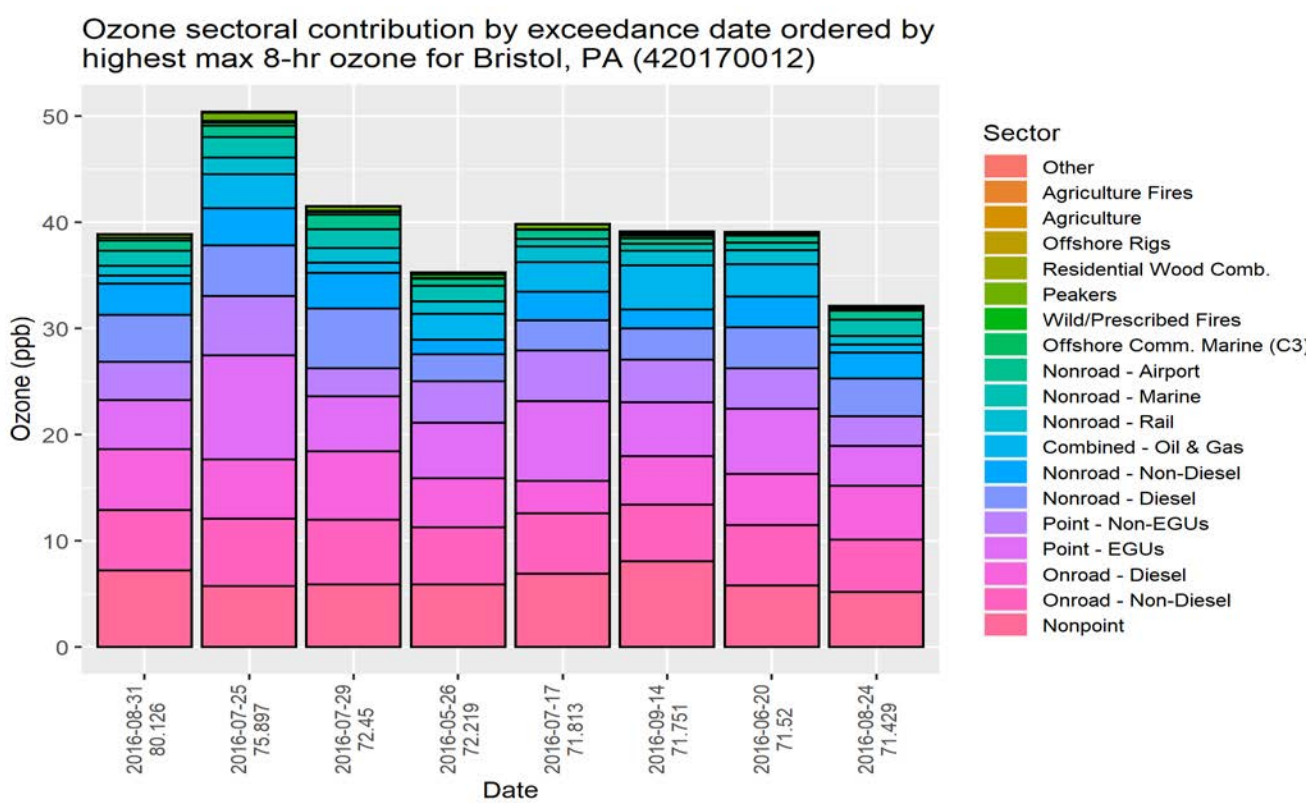


**Figure 10-5** though **Figure 10-7** examine the range of contribution for sectors on all exceedance days at three of the monitors of concern (Greenwich, CT, Babylon, NY, and Bristol, PA). Each sector is ordered by the total contribution, the eight most important sectors are displayed for each monitor location followed by the remining sector contributions aggregated as “Other”, and the contribution from biogenic emissions, international emissions, and boundary conditions are excluded from display. The boxes are centered on the median, the bottoms and tops of the boxes are the 25th and 75th percentiles respectively, the whiskers are at ±1.5 times the inter-quartile range, and the points are outside that range of the whiskers. Again, there is variation in the percentage contribution from various sectors with nonroad, onroad diesel, ERTAC EGU, and non-point being the highest contributors.

***Figure 10-5.*** *Emission Sector Contribution on 13 Highest Modeled Ozone Days at Greenwich, CT*

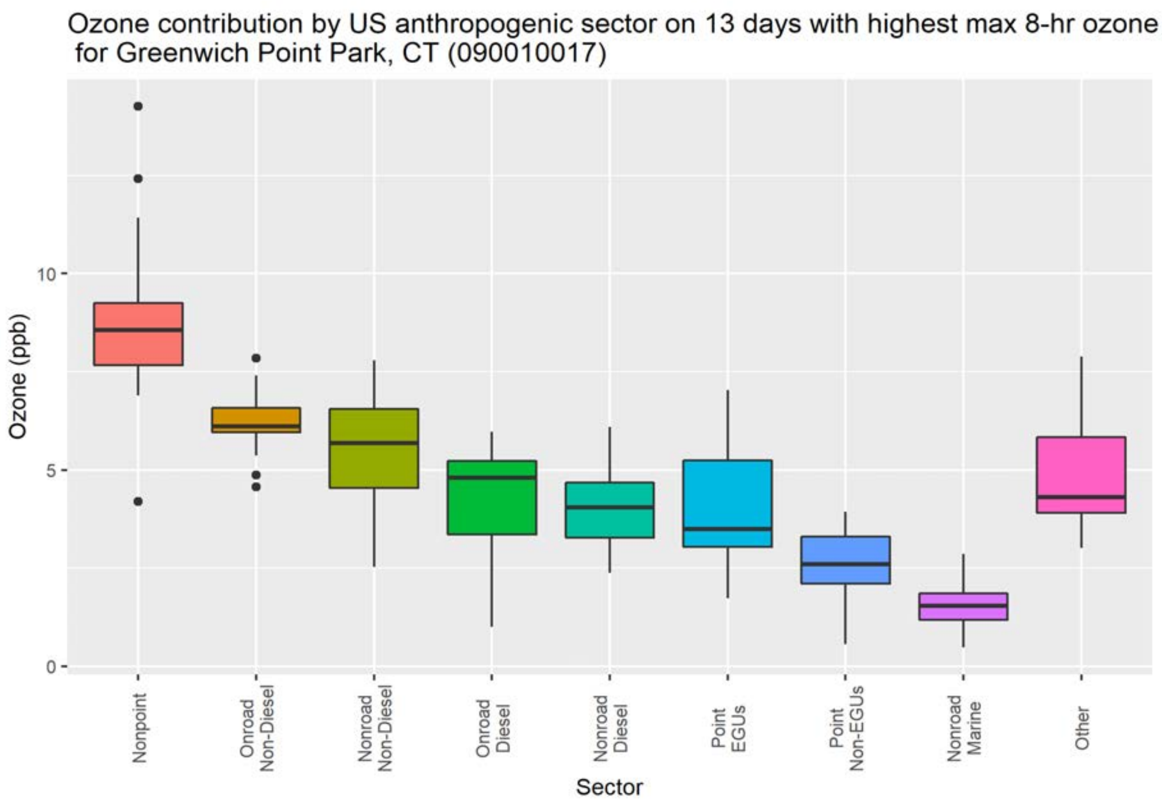


***Figure 10-6.*** *Emission Sector Contribution on 11 Highest Modeled Ozone Days at Babylon, NY*

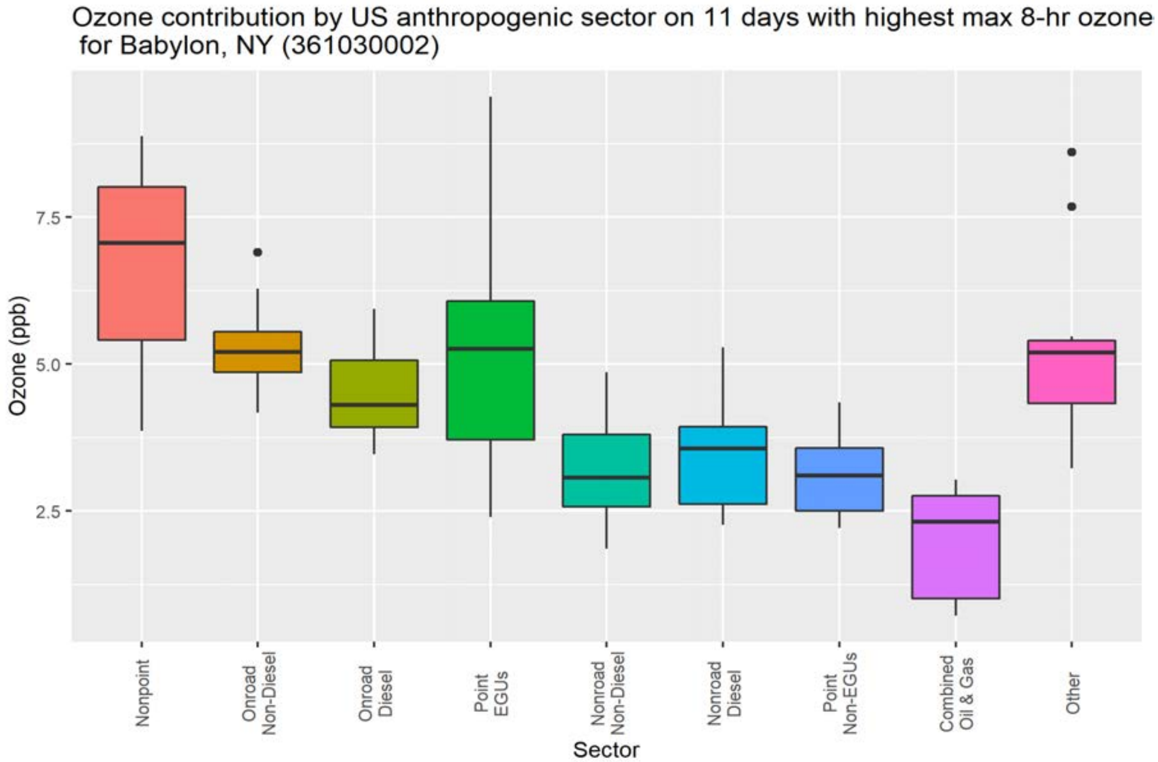
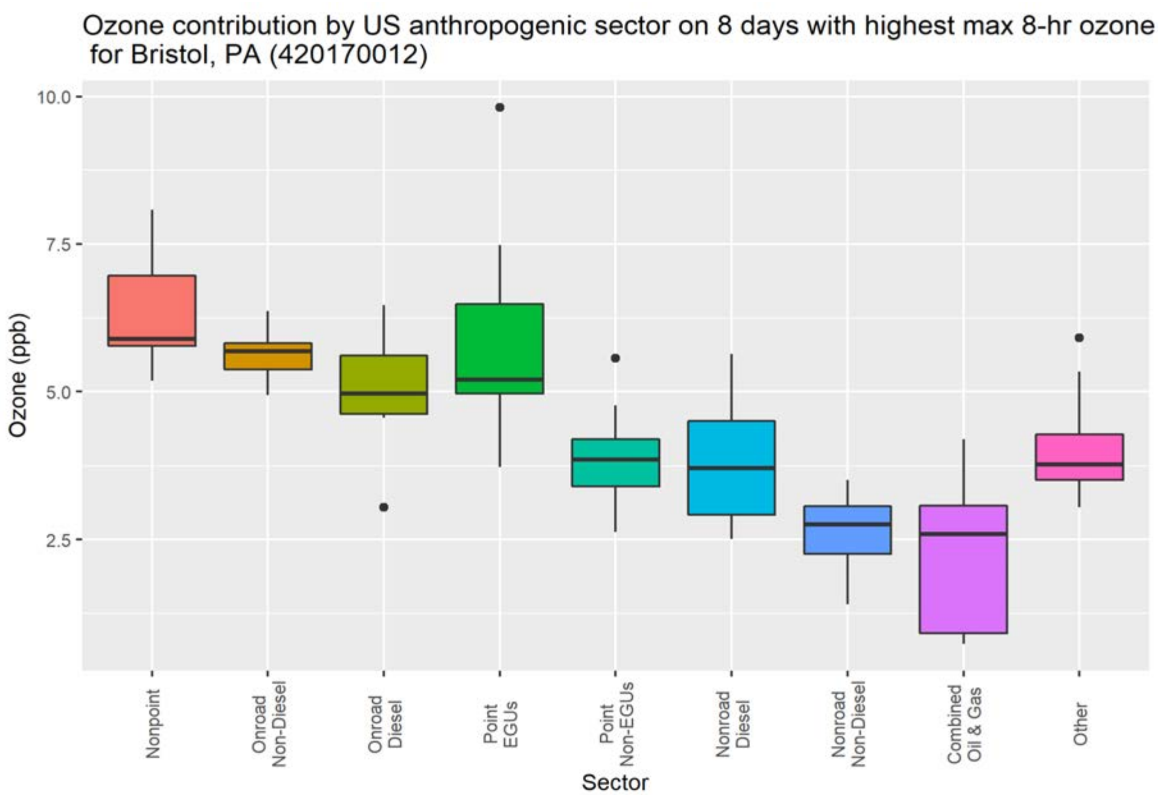



**Figure 10-7.** Emission Sector Contribution on 8 Highest Modeled Ozone Days at Bristol, PA



## 10.8 State Analysis

**Figures 10-8** through **10-10** examine the range of contribution for each state on all exceedance days at three of the monitors of interest (Greenwich, CT, Babylon, NY, and Bristol, PA). Each state is in order by the total contribution. The contribution from biogenic emissions, international emissions, and boundary conditions are not included. The black bar indicates the 1% threshold for contribution (EPA 40 CFR Parts 52, 75, 78, 97.

For all of the monitors of concern in Connecticut, New York is consistently the most prominent contributor on high $O_3$ days. At both Sherwood Island and Stratford, CT, New Jersey and Pennsylvania were also consistently high contributors on exceedances days. At those two monitors, even though Connecticut was often the second highest contributor to itself, it typically did not contribute at the same levels as New Jersey and Pennsylvania. At Hammonasset and Greenwich Point, CT, the range of contribution on exceedance days was similar between Connecticut, New Jersey, and Pennsylvania. Fort Griswold Park was the only monitor in Connecticut where New Jersey and Pennsylvania did not play as prominent of a role.

Of the three monitors of concern in New York, Babylon and White Plains were most influenced by New York's own emissions exceedance days. For Susan Wagner, it was more consistently New Jersey. The range of contribution of New York itself to Susan Wagner was stronger or weaker than New Jersey depending on the day. New Jersey also was an important contributor to Babylon and White Plains, and Pennsylvania was an important contributor to all three monitors.

For Bristol, the only monitor in Pennsylvania monitor summarized here, the contribution of Pennsylvania's own emissions dwarfed the contributions from any other states.

***Figure 10-8.*** *State Contribution on 13 Highest Modeled Ozone Days at Greenwich, CT*

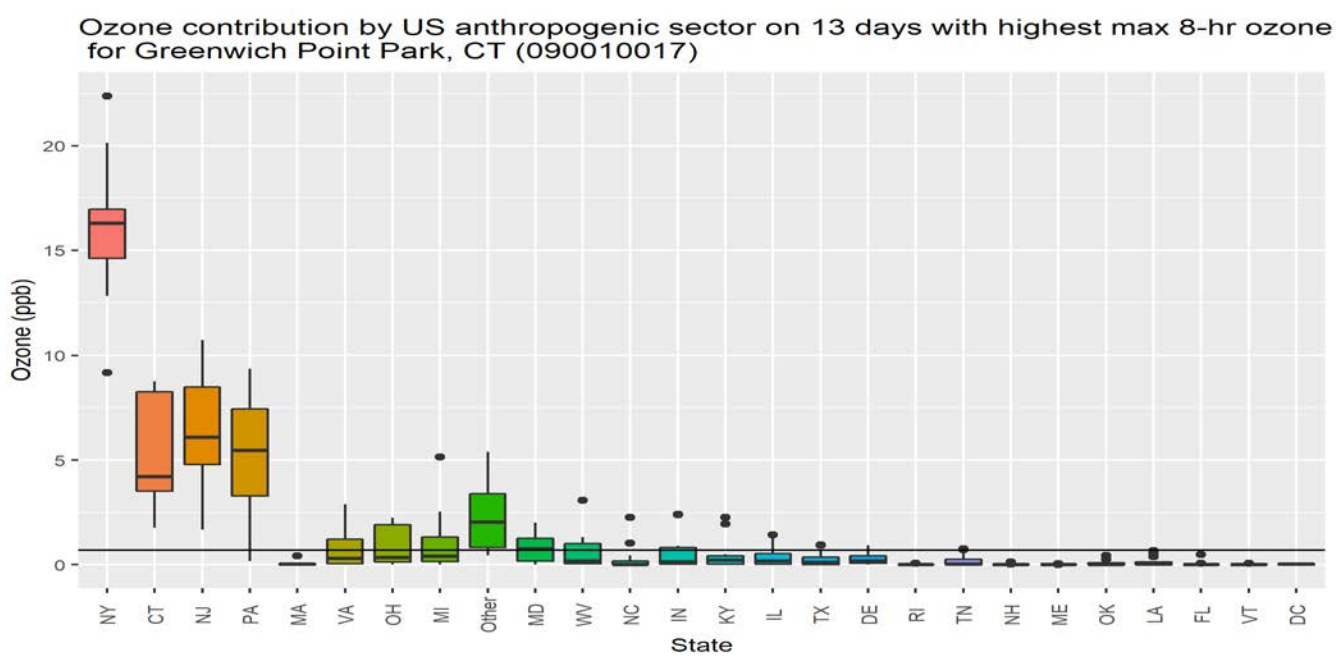


***Figure 10-9*** *State Contribution on 11 Highest Modeled Ozone Days at Babylon, NY*

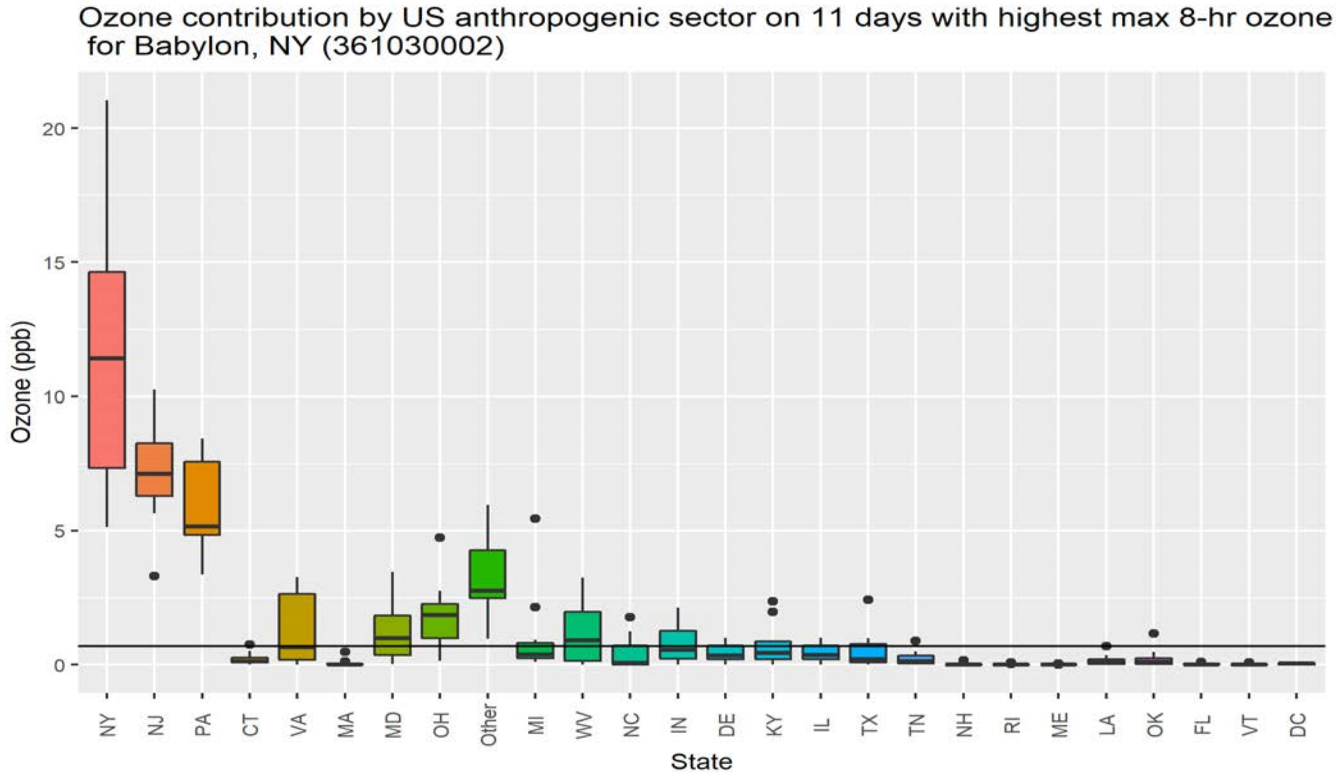
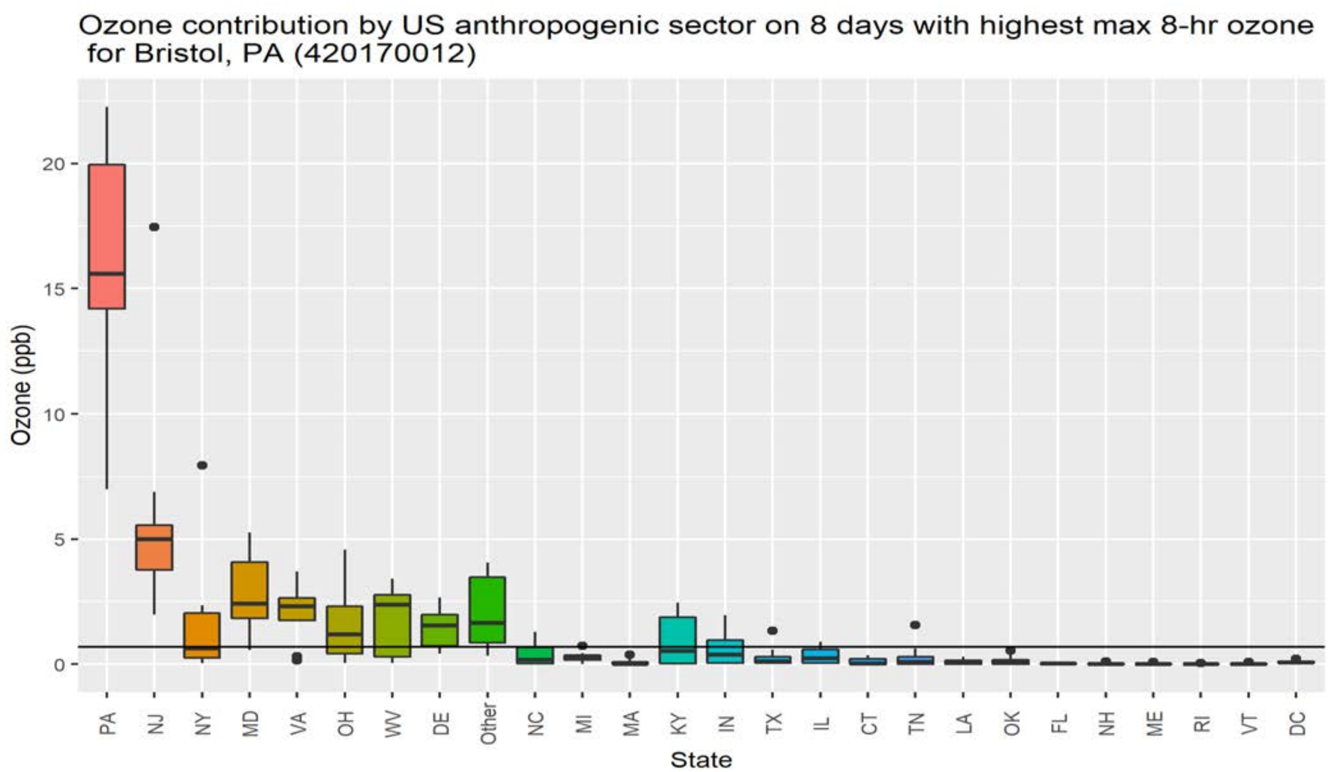



***Figure 10-10.*** *State Contribution on 8 Highest Modeled Ozone Days at Bristol, PA*



The states listed in **Tables 10-8** through **10-16** are projected to contribute at least 1% to each of the nonattainment and maintenance monitors in 2023 and the top three source categories that make up that contribution. It should be noted that the contribution summary in **Table 10-8** separates diesel and nondiesel for onroad and nonroad emission sources into separate categories, consistent with how they were tagged in the modeling.

Nonroad emissions and the combined diesel and nondiesel onroad emissions are the two top contributing emission sectors for most monitors in the OTR. Nonpoint (i.e. area sources) and EGUs are also important and can dominate some regions. Specifically, area sources are often a primary contributor to $O_3$ exceedances in the northern portion of the OTR, due largely to emissions from Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Virginia.

EGUs are often the top contributor and nearly always one of the top three contributors from states that are not adjacent to the state in which the monitor is located. Every instance of Indiana and Kentucky being a 1% contributor at a monitor lists EGUs as the top contributing category from those states. Most instances of Ohio being a top contributor also have EGU as the top contributor, though two instances have EGU as the second highest contributor. Unexpectedly, EGUs are the third most important contributor from Michigan and Illinois at all monitors of interest. With West Virginia, EGUs are often the most important contributor, though for some monitors the oil & gas sector is the highest and EGUs second (West Virginia is the only state in which oil & gas is consistently a top three contributor). For sector contributions from Maryland, New York, Pennsylvania, and Virginia, EGUs often are a top three contributor. Non-EGU point emissions are often a top three contributor from states outside of the OTR (Indiana, Kentucky, Michigan, Ohio, West Virginia) as well as Pennsylvania.

***Table 10-9.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Greenwich Point Park, CT (090010017)*

| Rank | CT | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Point - EGUs | Nonpoint | Nonpoint | Nonpoint | Point - EGUs | Nonpoint | Onroad - Non-Diesel | Point - EGUs |
| 2 | Nonroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Nonpoint | Combined - Oil & Gas |
| 3 | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Point - Non-EGUs | Point - EGUs | Point - Non-EGUs |

***Table 10-10.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Stratford, CT (090013007)*

| Rank | CT | IN | KY | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Point - EGUs | Point - EGUs | Point - EGUs | Point - EGUs | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Point - EGUs | Point - Non-EGUs | Point - Non-EGUs | Onroad - Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Combined - Oil & Gas |
| 3 | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Nonroad - Diesel | Point - EGUs | Point - Non-EGUs | Point - Non-EGUs | Nonpoint | Point - Non-EGUs |

***Table 10-11.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Sherwood Island, CT (090019003)*

| Rank | CT | IN | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Diesel | Nonpoint | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Combined - Oil & Gas |
| 3 | Nonroad - Non-Diesel | Point - Non-EGUs | Onroad - Non-Diesel | Point - EGUs | Nonroad - Diesel | Onroad - Diesel | Point - Non-EGUs | Onroad - Diesel | Nonpoint | Point - Non-EGUs |

***Table 10-12.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Hammonasset S.P., CT (090099002)*

| Rank | CT | IL | IN | KY | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Nonroad - Diesel | Point - EGUs | Point - EGUs | Point - EGUs | Nonpoint | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Combined - Oil & Gas |
| 2 | Onroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Point - Non-EGUs | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Point - EGUs |
| 3 | Nonroad - Diesel | Point - EGUs | Point - Non-EGUs | Onroad - Non-Diesel | Onroad - Diesel | Point - EGUs | Onroad - Diesel | Onroad - Diesel | Point - Non-EGUs | Point - Non-EGUs | Onroad - Diesel | Point - Non-EGUs |

***Table 10-13.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Fort Griswold Park, CT (090110124)*

| Rank | CT | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonroad - Marine | Nonroad - Non-Diesel | Nonpoint | Nonpoint | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Nonroad - Non-Diesel | Point - EGUs | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonroad - Diesel | Point - EGUs | Nonpoint | Point - EGUs | Combined - Oil & Gas |
| 3 | Nonpoint | Onroad - Non-Diesel | Point - EGUs | Nonroad - Marine | Nonroad - Marine | Point - Non-EGUs | Point - Non-EGUs | Nonroad - Non-Diesel | Point - Non-EGUs |

***Table 10-14.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Susan Wagner H.S., NY (360850067)*

| Rank | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|
| 1 | Point – EGUs | Point - Non-EGUs | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Onroad – Diesel | Combined - Oil & Gas | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Onroad - Diesel | Combined - Oil & Gas |
| 3 | Onroad - Non-Diesel | Point - EGUs | Onroad - Diesel | Nonroad - Non-Diesel | Point - Non-EGUs | Point - Non-EGUs | Nonpoint | Point - Non-EGUs |

***Table 10-15.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Babylon, NY (361030002)*

| Rank | IN | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Point - EGUs | Point - EGUs | Nonpoint | Nonpoint | Nonpoint | Onroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Combined - Oil & Gas |
| 2 | Point - Non-EGUs | Onroad - Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Point - EGUs | Point - EGUs | Point - EGUs |
| 3 | Onroad - Non-Diesel | Onroad - Non-Diesel | Point – EGUs | Onroad - Diesel | Onroad - Diesel | Point - Non-EGUs | Point - Non-EGUs | Nonpoint | Point - Non-EGUs |

***Table 10-16.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at White Plains, NY (361192004)*

| Rank | CT | MA | MD | NJ | NY | PA | VA |
|---|---|---|---|---|---|---|---|
| 1 | Onroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Nonpoint | Nonpoint | Nonpoint | Onroad - Non-Diesel |
| 2 | Nonpoint | Nonroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Nonpoint |
| 3 | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Nonroad - Non-Diesel | Nonroad - Non-Diesel | Point - Non-EGUs | Onroad - Diesel |

***Table 10-17.*** *Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Bristol, PA (420170012)*

| Rank | DE | IN | KY | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Onroad - Non-Diesel | Point - EGUs | Point - EGUs | Onroad - Diesel | Nonpoint | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Nonpoint | Onroad - Non-Diesel | Point - EGUs |
| 2 | Point - EGUs | Onroad - Non-Diesel | Point - Non-EGUs | Point - EGUs | Onroad - Non-Diesel | Onroad - Diesel | Onroad - Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Combined - Oil & Gas |
| 3 | Point - Non-EGUs | Point - Non-EGUs | Onroad - Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Nonroad - Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Onroad - Diesel | Onroad - Diesel | Point - Non-EGUs |

Emissions from the Nonpoint and EGUs sectors are often the top contributor on an exceedance day where a state contributed at the 1% level. In the cases of Sherwood Island, Stratford, and Hammonasset they are there only two emission sectors displayed from all states excepting Virginia and West Virginia. White Plains is often dominated by nonpoint sources. Several other monitors (Bristol, Susan Wagner, and Babylon) have a handful of days where states have the most contribution from onroad diesel emissions. Greenwich also has mostly a contribution from nonpoint emissions, with a few instances of both onroad and nonroad non-diesel. Fort Griswold Park is the most varied with Nonpoint, Nonroad - Marine, Nonroad Diesel, and Nonroad Non-Diesel all being the top contributor from different 1% contributing states during exceedance days.

Another way to examine which sectors from each state are projected to contribute to modeled $O_3$ nonattainment in 2023 is to look individually at each exceedance day. **Figures 10-11** through **10-13** simply count the number of times an emission sector from a particular state contributes greater than one percent of the NAAQS on days modeled as greater than 70 ppb. It should be noted that these charts do include all modeled states even if they did not contribute on any exceedance days.

## *10.1 Hourly Change to Ozone Contribution*

Emissions and meteorology are constantly changing, and this is reflected in state and emission sector contribution. Most summary contribution modeling averages data from shorter periods. For example, hourly data is averaged into a daily 8-hour average, and then those averages can be further averaged into a seasonal or annual summary. When $O_3$ contribution modeling is presented in annual or season summary formats, detail in hourly and daily variation is heavily muted. Typically, data might only be averaged over a certain number of high ozone days. This section provides some examples of hourly variation that is contained within the averaged data.

**Figure 10-14** shows sample back trajectories on four high $O_3$ days at Edgewood, MD. Trajectories for July 22 and 25 are similar with winds from the southwest, but trajectories for July 29 and September 23 are completely different with winds generally from the north and east, respectively.

**Figure 10-15** presents the top contributing states for those four high $O_3$ days at Edgewood, MD. As the trajectories suggest, the state contributions are similar for July 22 and 25. Ozone contribution for Virginia, West Virginia, Ohio, Indiana, North Carolina, and Texas are much less important on July 29 and September 23, and instead contributions from Pennsylvania, Virginia, and New York are much more prominent. Depending on how the averaging is done for seasonal or annual summaries, locations with larger numbers of high $O_3$ days could find that states near the edge of significance that contribute significantly on several days could be lost in the summary due to the averaging.

***Figure 10-11.*** *Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Greenwich*

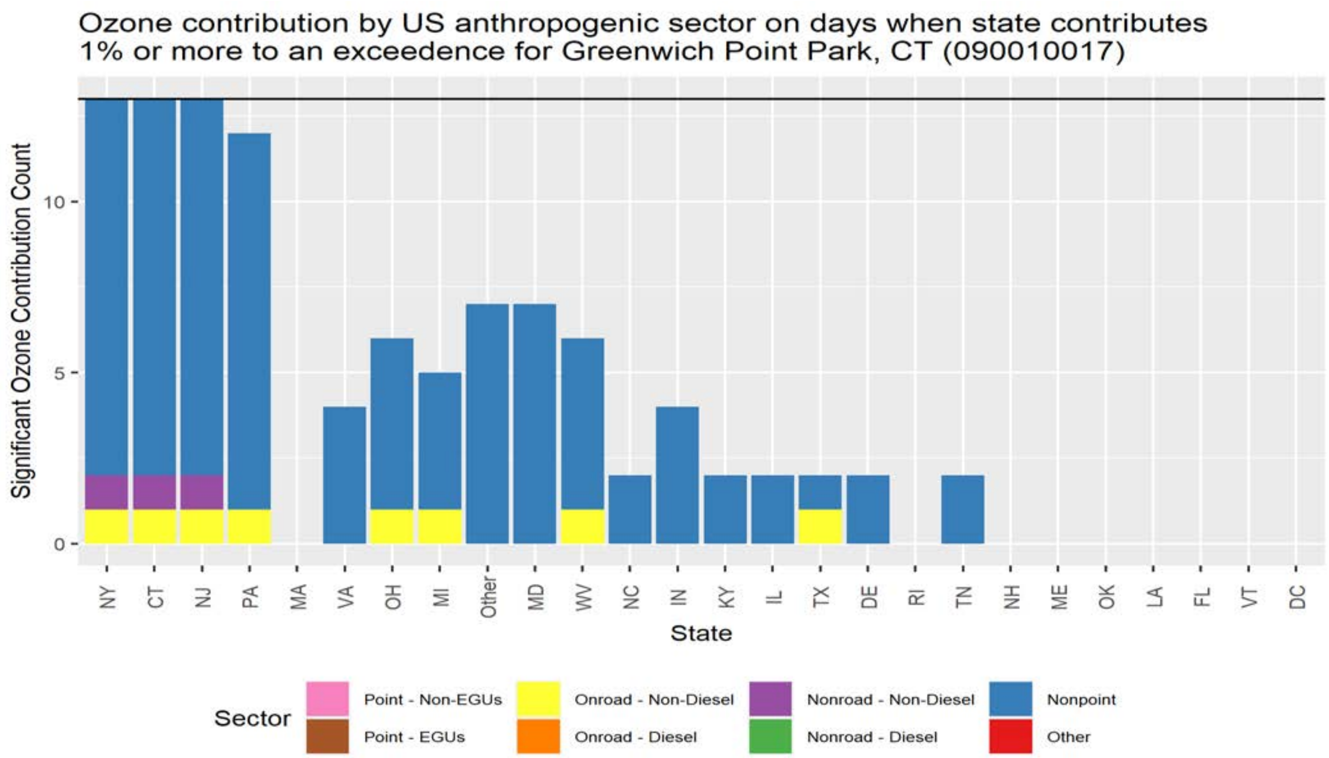


**Figure 10-12.** Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Babylon

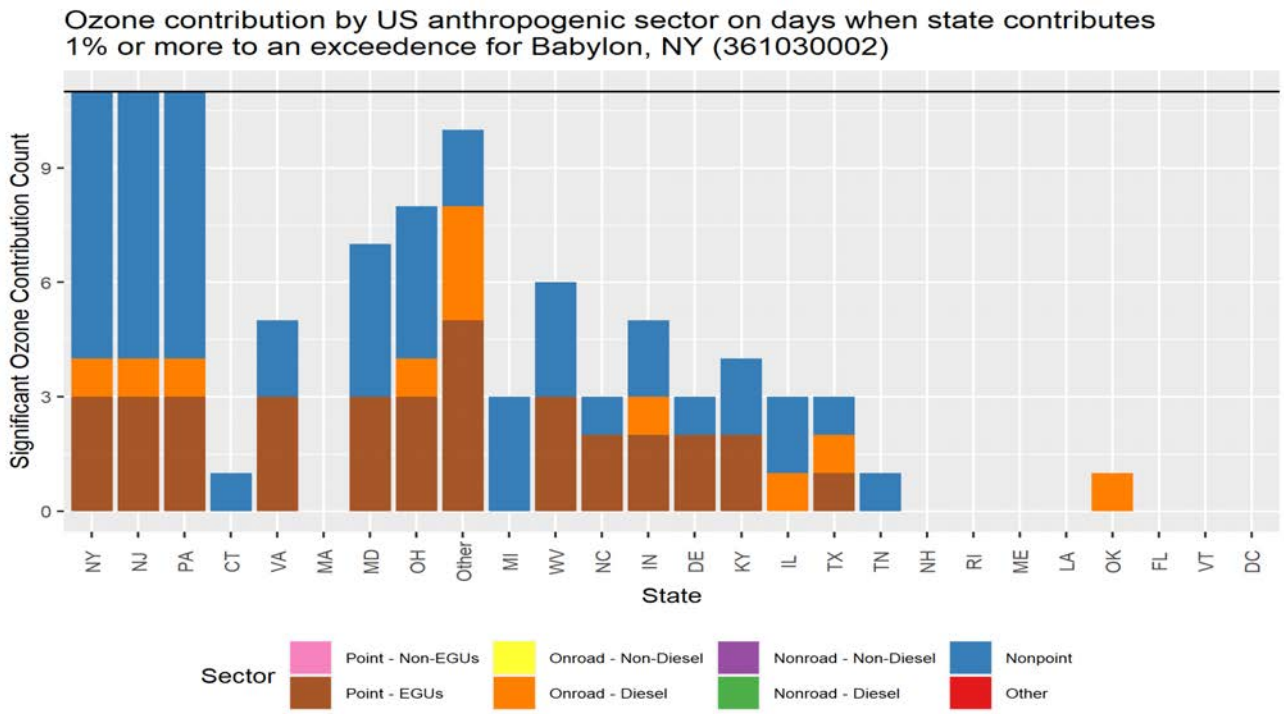



**Figure 10-13.** Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Bristol, PA

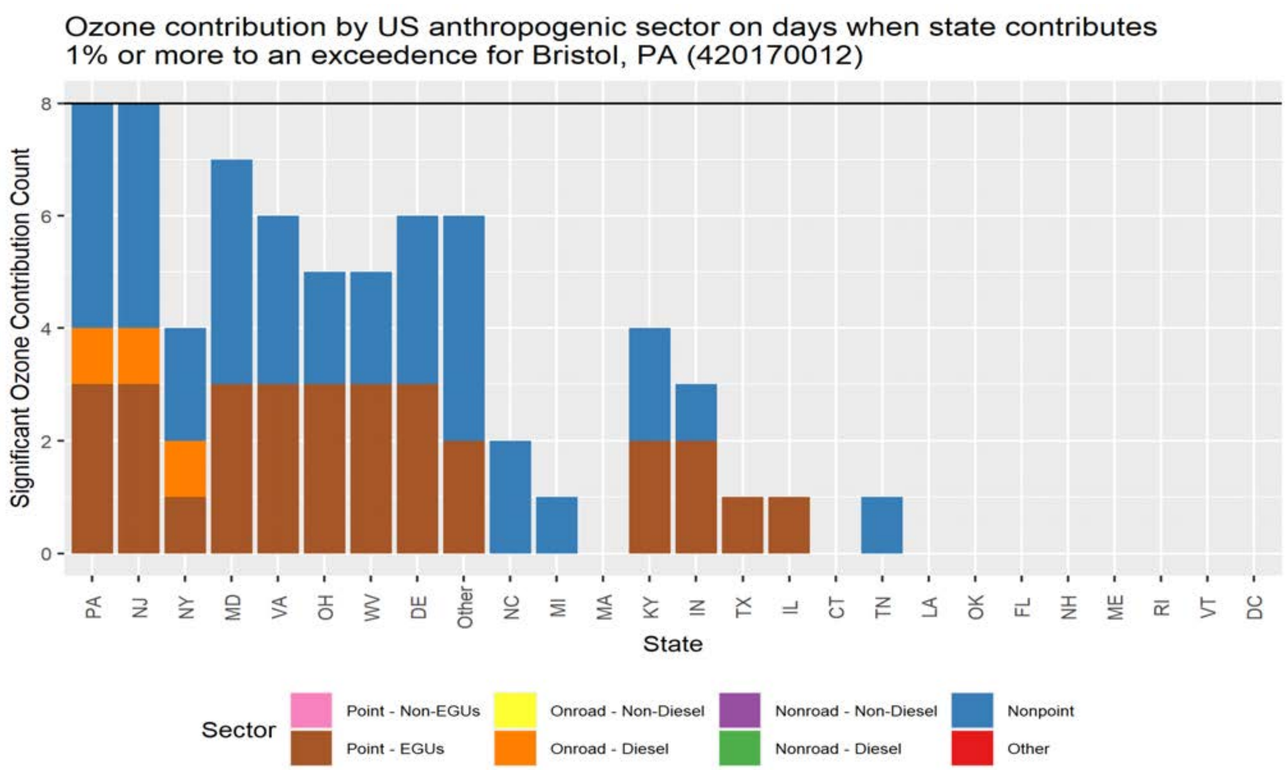


***Figure 10-14.*** *Back Trajectories for Four High $O_3$ Days at Edgewood, MD*

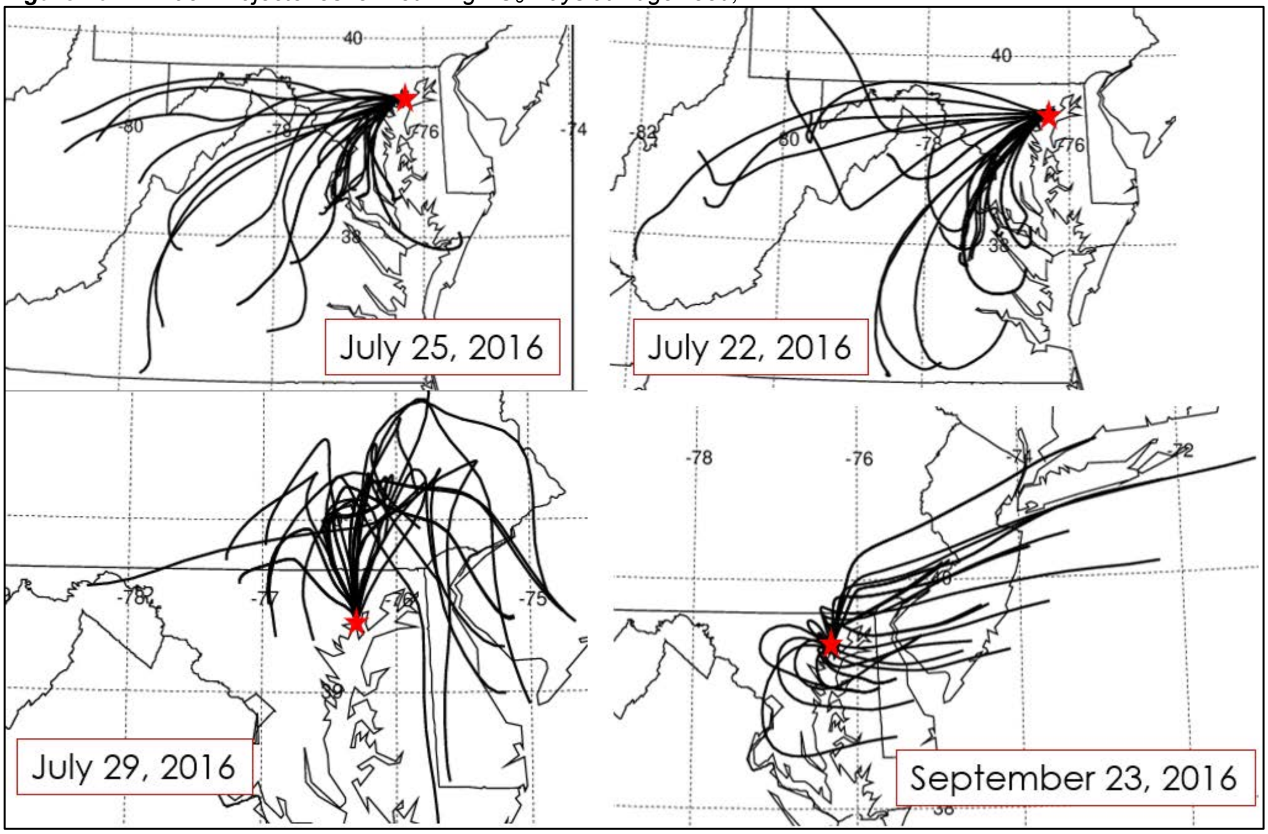
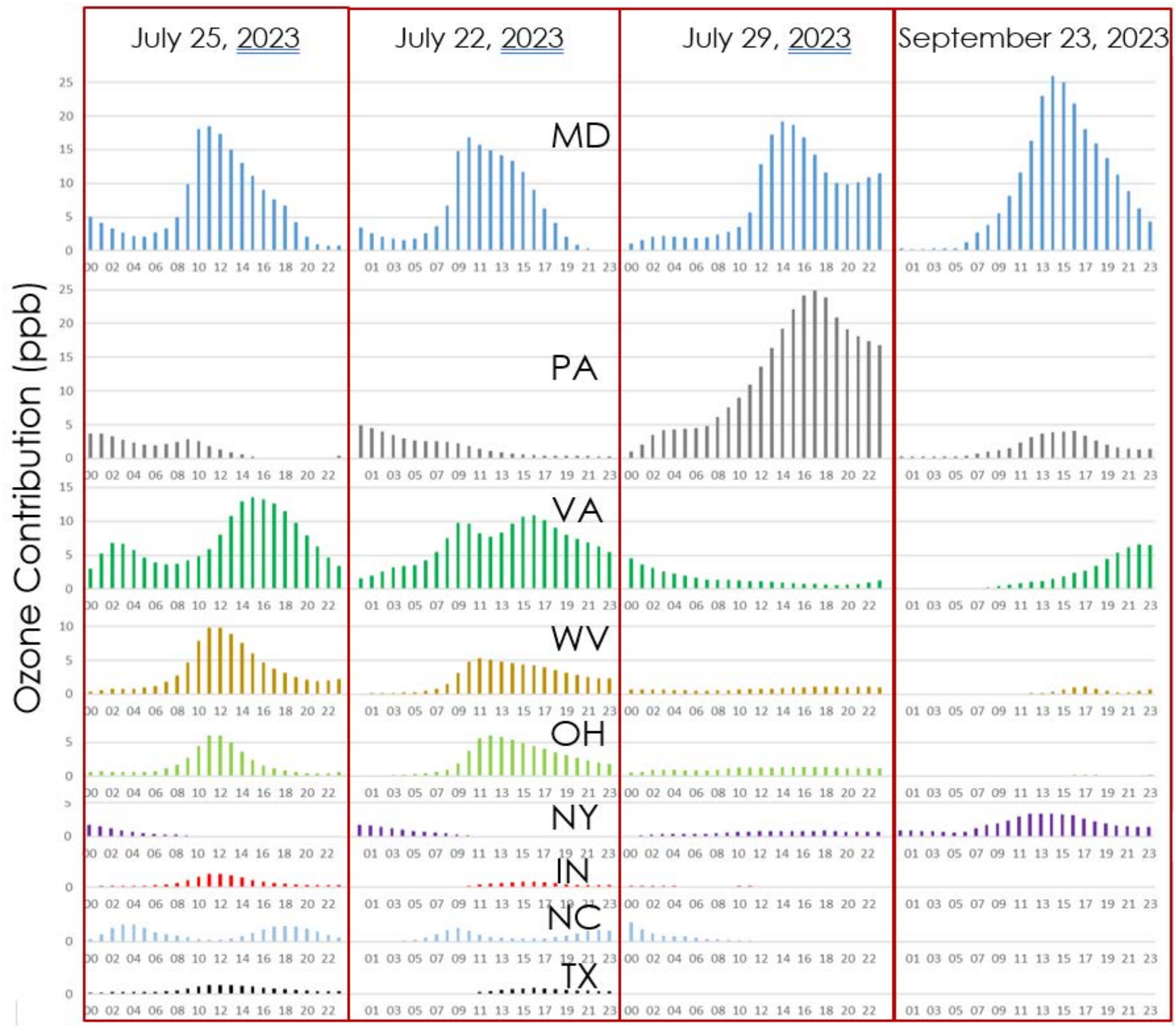


***Figure 10-15.*** *Hourly State Contribution to Modeled $O_3$ at Edgewood on 4 High Ozone Days*




Similarly, emission sector contribution can show large hourly variations. **Figure 10-16** provides several emission sector ozone contributions to the same four high ozone days at Edgewood, MD. As a function of having different states contributing, emission sector contributions for September 23 are distinctly different from the other three days presented.

***Figure 10-16.*** *Hourly Emission Sector Contribution to Ozone at Edgewood on 4 High Ozone Days*

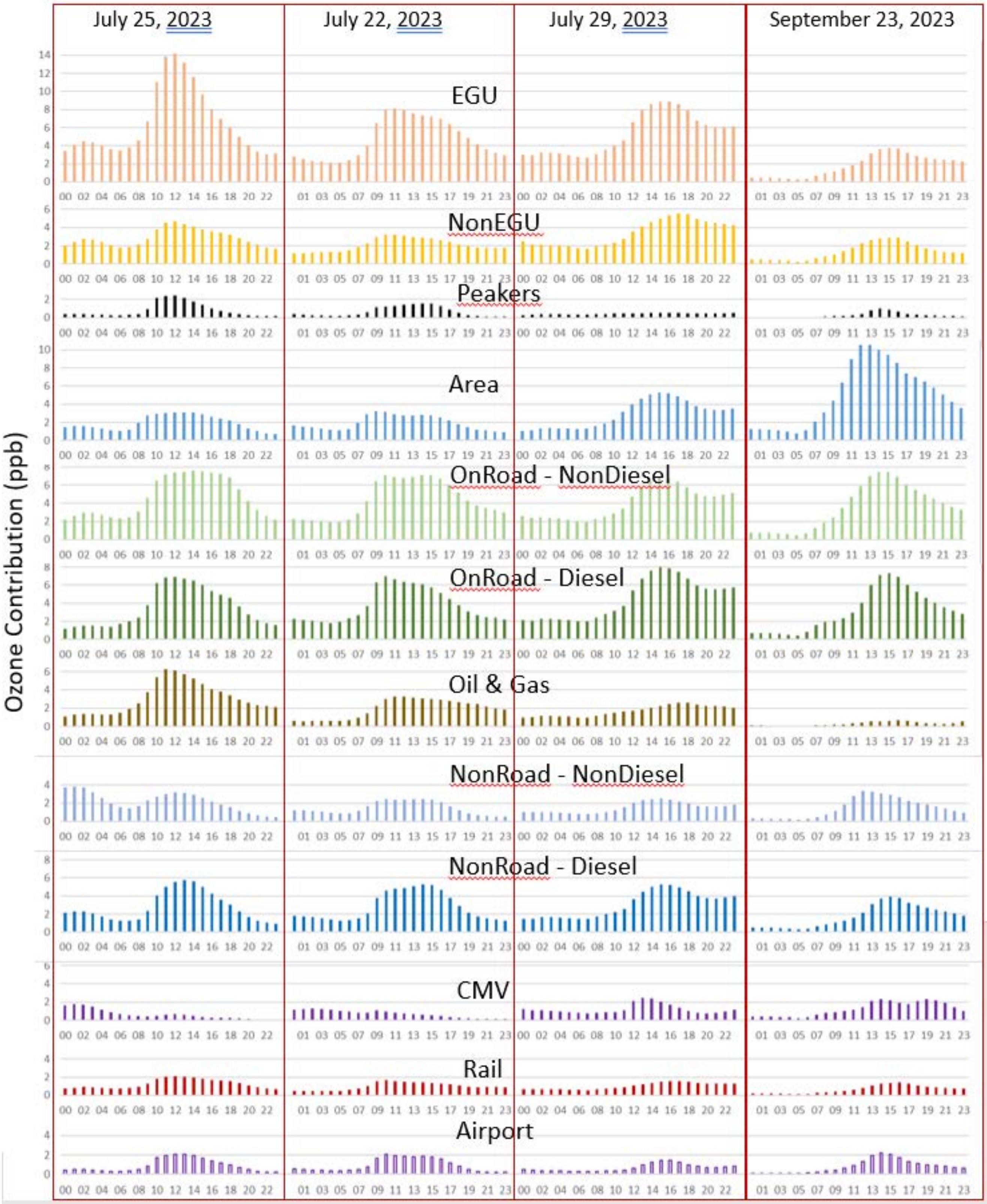
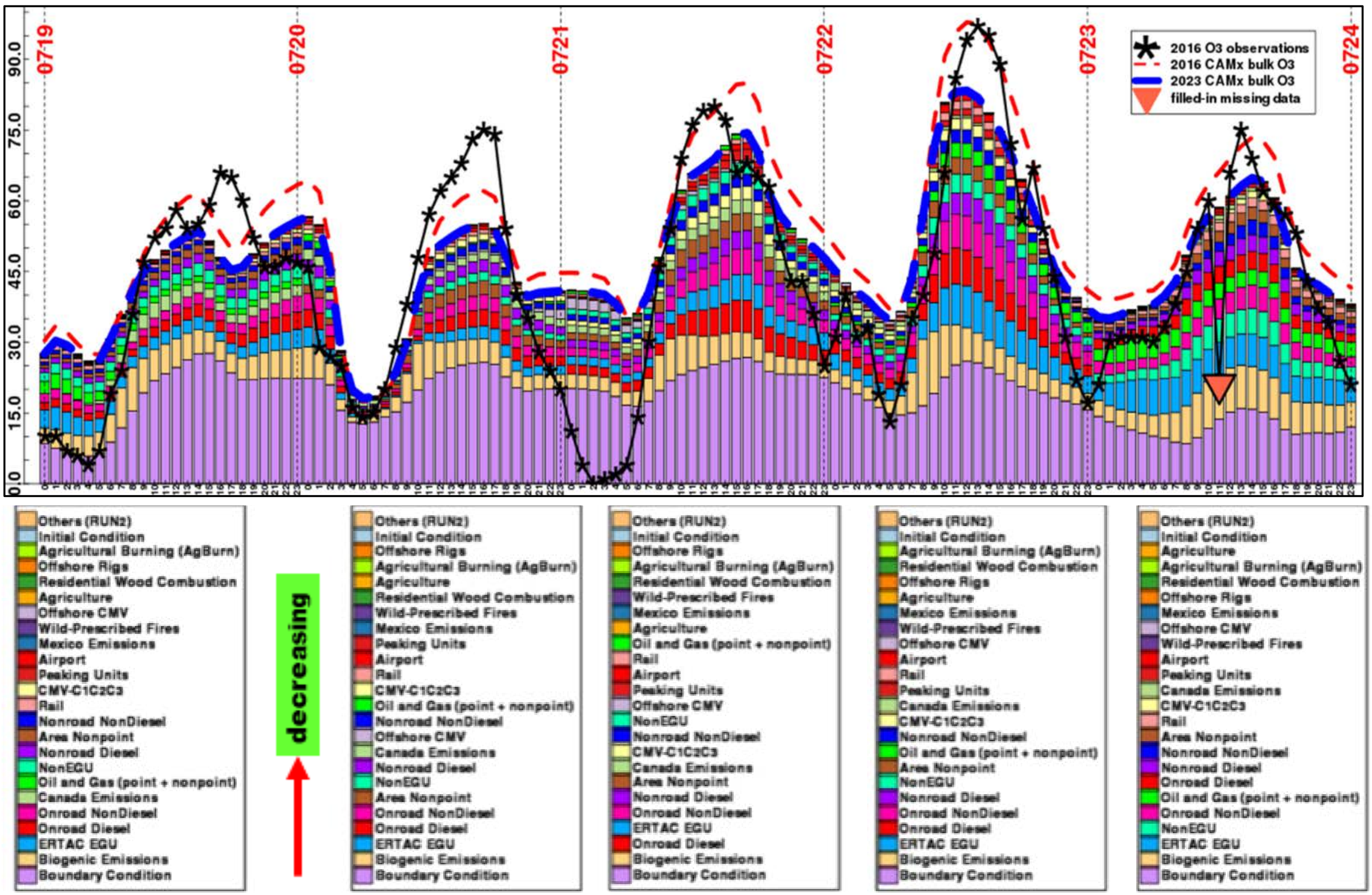


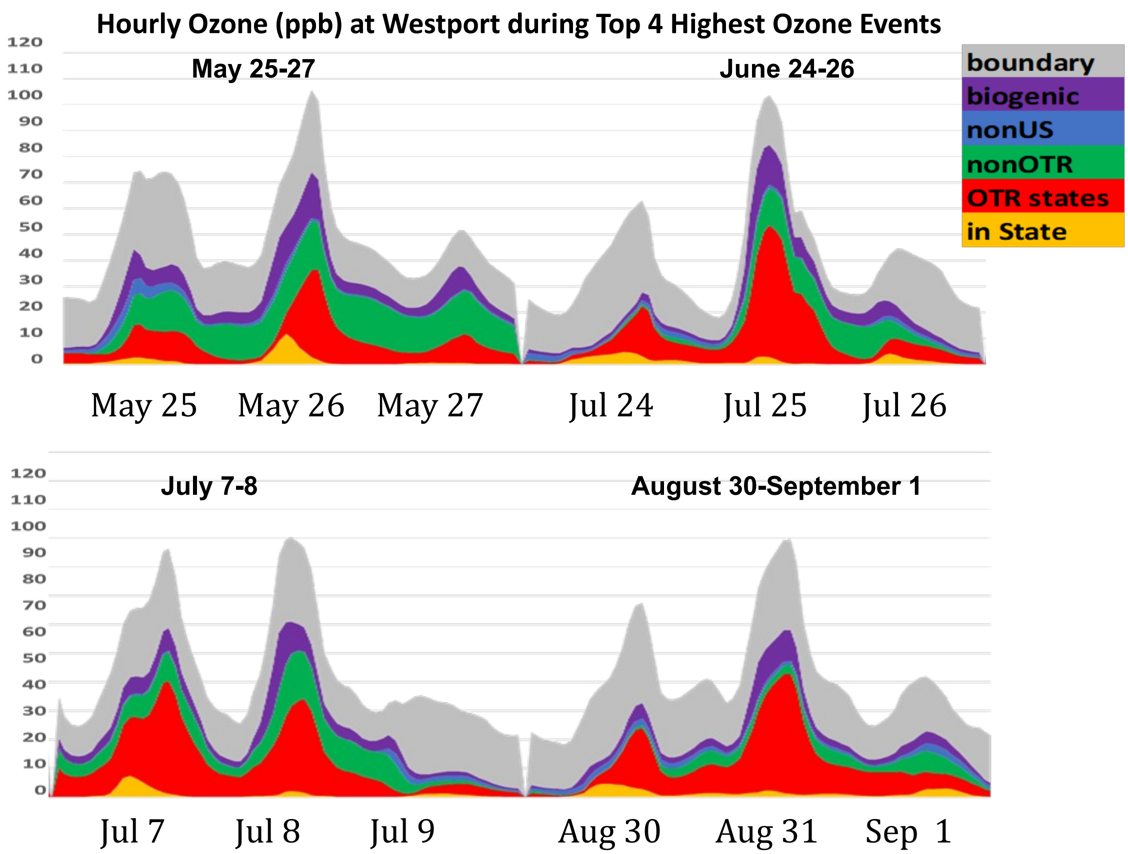
**Figure 10-17** looks at hourly contribution in a period of five consecutive days. The different colors show different emission sector contributions. The black line represents monitored data for Edgewood, MD and the light purple bars at the bottom of the chart represents background contribution. Hourly contributions are indicated by individual bars. The five-day period allows for examination of transitions occurring within emission and meteorology changes.

***Figure 10-17.*** *Example of Hourly Changes to Ozone Contribution over Five Consecutive Days (Edgewood, MD July 19-24, 2023)*




This last chart (**Figure 10-18**) simplifies some of the complexities presented in the figures above, showing only general information on geographic contributions to the four highest ozone days at Westport, CT. Each day shows multiple ozone concentration peaks along with constantly changing contributing ozone regions.

***Figure 10-18.*** *Hourly Contribution to Ozone at Westport, CT on the 4 highest Modeled Ozone Days (2023)*



# 11 Episodic Modeling

Episodic Modeling refers to a modeling technique that focuses on shorter periods of time rather than full ozone seasons or entire years. This is applied by the OTC Modeling Committee on a screening basis to expedite model throughput while minimizing the staff and computer resources invested. Deploying this method allows for more efficient analysis of multiple modeling scenarios.

This section describes methodology the OTC is currently using for episodic model runs with the CMAQ modeling platform. The same methodology can be applied to other photochemical models such as CAMx or with different emission inventory platforms. Episodic modeling conducted by the OTC Modeling Committee provides analyses to assess “what-if” scenarios to guide SIP development for the 8-hour ozone standard. The OTC Commissioners and Air Directors requested that the OTC Modeling Committee apply this tool to produce sensitivity and screening modeling with greater ease and speed than occurred with full ozone season or year photochemical runs.

This portion of the TSD describes how the period was selected, how well it represents the ozone events occurring during the entire ozone season including transport patterns, and how well the modeling results compare between the episodic period and the entire ozone season. **Section 12** describes one application of the episodic modeling tool on high electricity generation demand time periods.

## *11.1 Selection of Episode*

Episodic Modeling serves to reduce the number of days modeled from about 183 to approximately 30-60, saving the associated computer and staff resources. For this tool to be a reliable indicator for full-season modeling, it is important to select an episode with a robust number of representative high ozone areas and transport patterns in a shorter time-period. The OTC Modeling Committee wanted to choose an episode that complies with the primary criteria set forth in EPA’s 8-hour ozone modeling guidance for selecting time periods for attainment demonstration modeling, including:

A. Select periods, preferably during NEI years, for which extensive air quality/meteorological databases exist.
B. Model a sufficient number of days so that the modeled attainment test can be applied at all of the ozone monitoring sites that are in violation of the NAAQS.
C. Model time periods that include pollution concentration episodes to ensure the modeling system appropriately include a mix of high and low periods, and.
D. Selects a mix of episodes reflecting a variety of meteorological conditions that frequently correspond with observed 8-hour daily maximum ozone concentrations greater than the level of the NAAQS at different monitoring sites (US EPA 2014).

### 11.1.1 Available Data Sets

The summer of 2016 was the primary focus for episodic modeling due to the modeling platform developed and tested by the national collaborative. **Figures 11-1 and 11-2** show a graphic summary of the full 2016 ozone season in the OTR. There was a total of 164 different monitors exceeding 70 ppb within the OTR among 62 days.

Within the 2016 ozone season, two periods were reviewed for episodic modeling including 1) May 22-June 25 (green box) and 2) July 1-August 31 (red box) (**Figure 11-1**). The black line represents the highest 8-hour ozone concentration anywhere in the OTR, the orange bars represent the number of monitors exceeding the 2015 ozone NAAQS of 70 ppb, and the colored shading represents Air Quality Index categories for the concentrations shown by the black line. **Figure 11-2** presents a similar chart that in addition to the maximum concentration in the OTR (black line), the maximum 8-hour ozone concentration for each of the five 2015 ozone NAAQS nonattainment areas are shown by other colored lines. The New York City, Philadelphia, and Baltimore nonattainment areas most frequently track near the OTR maximum, while Greater Connecticut and the District of Columbia track lower.

Each episode includes a period where 8-hour ozone concentrations reached above 90 ppb. A period in late May was particularly strong and widespread, with many monitors throughout most of the OTR exceeding 70 ppb. There were six other periods in the first episode that exceeded 70 ppb somewhere in the OTR. The second episode features two events where 8-hour ozone exceeded 90 ppb and 13 other events that exceeded 70 ppb. Originally the period of July 10 to August 14th was proposed for Episode 2, which would have contained the same two events exceeding 90 ppb along with six other events exceeding 70 ppb. The episode was extended from July 1 to August 31 to contain more events once Episode 2 was selected as the episodic period of choice for the OTC Modeling Committee. A detailed comparison of the two episodes and additional justification for choosing to work with Episode 2 follows.

***Figure 11-1.** 2016 Ozone Season Summary for the OTR with Monitored Exceedance Counts*

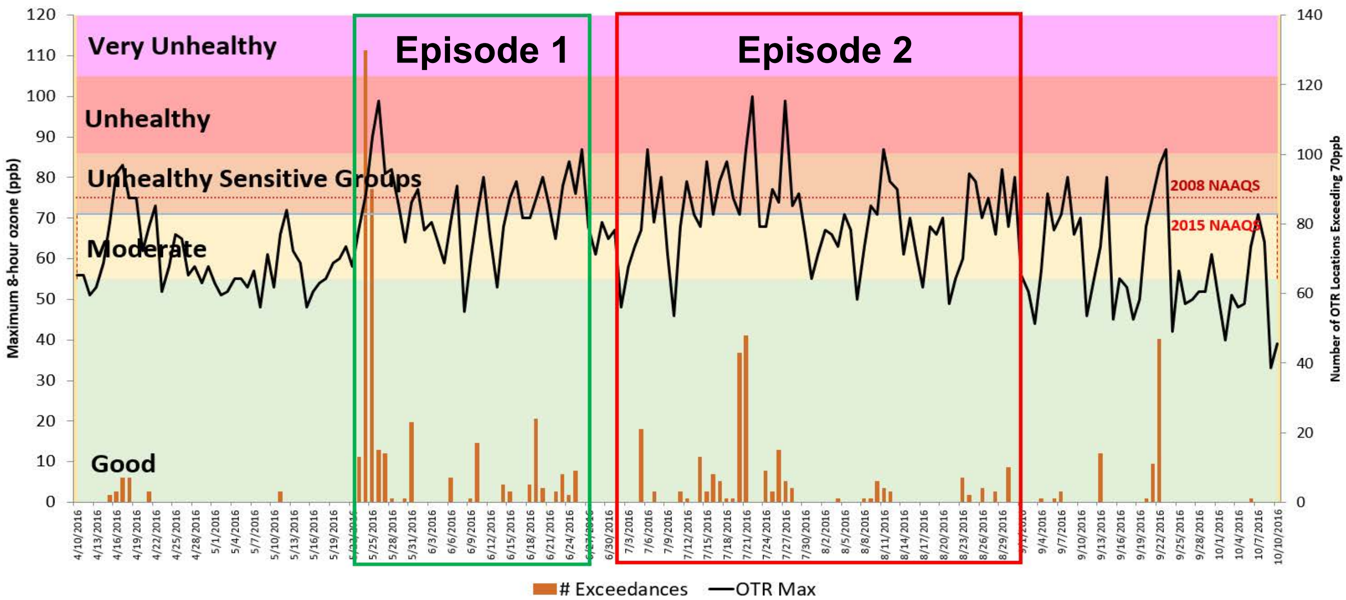
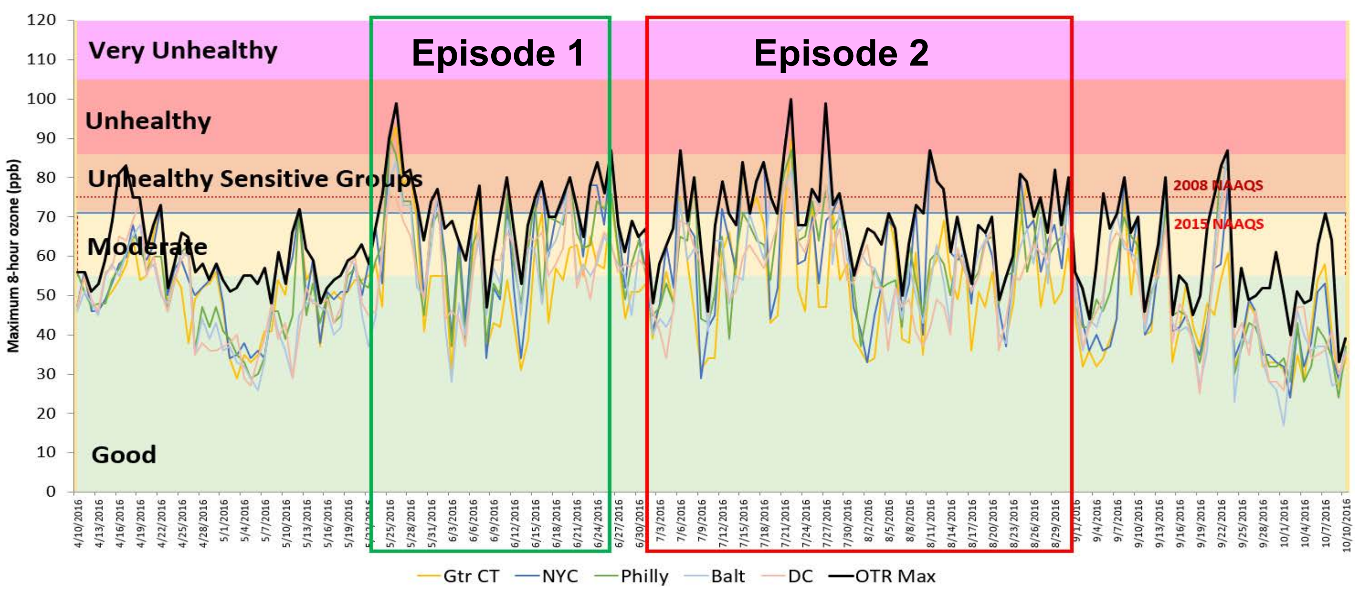



***Figure 11-2**. 2016 Ozone Season Summary for the OTR with Nonattainment Area Data*



## 11.1.2 Discussion of Episode 1 (May 22-June 25, 2016)

### 11.1.2.1 Analysis of Episode 1

Episode 1 comprises a 28-day period from May 22 to June 25, 2016. This period contains 19 days where the maximum 8-hour ozone concentration in the OTR exceeded 70 ppb, five days of which exceeded 75 ppb, and three days exceeding 80 ppb. The period spanning from May 25 to May 28 was particularly severe with widespread 8-hour concentrations exceeding 80 ppb in the OTR. The most severe day was May 25 where 8-hour concentrations reached 89 ppb at multiple locations and 130 different monitors exceeded 70 ppb in the OTR. The following day, 91 locations exceeded 70 ppb and two locations reached 90 ppb. Additional days exceeding 70 ppb in the OTR were more dispersed throughout June.

***Table 11-1.*** *Episode 1: Number of Days Exceeding High Ozone Thresholds at Key Monitors in the OTR (May 22 – June 25, 2016 vs Entire 2016 Ozone Season)*

| | | 2016 | May June | 2016 | May June | 2016 | May June | 2016 | May June | 2016 | May June |
|---|---|---|---|---|---|---|---|---|---|---|---|
| State | Site Name | #>64 | #>64 | #>70 | #>70 | #>75 | #>75 | #>84 | #>84 | #>90 | #>90 |
| CT | Greenwich | 31 | 9 | 14 | 4 | 12 | 3 | 4 | 2 | 1 | 1 |
| CT | Stratford | 25 | 6 | 14 | 3 | 10 | 2 | 2 | 1 | 1 | 0 |
| CT | Westport | 29 | 8 | 16 | 4 | 11 | 3 | 5 | 2 | 1 | 0 |
| CT | New Haven | 19 | 4 | 10 | 3 | 3 | 1 | 1 | 0 | 1 | 0 |
| CT | Madison | 20 | 6 | 10 | 4 | 7 | 3 | 2 | 2 | 0 | 0 |
| DE | BELLFNT2 | 12 | 4 | 9 | 3 | 3 | 1 | 0 | 0 | 0 | 0 |
| MD | Essex | 31 | 7 | 18 | 4 | 6 | 2 | 1 | 0 | 1 | 0 |
| MD | Fair Hill | 19 | 8 | 10 | 4 | 6 | 3 | 1 | 0 | 0 | 0 |
| MD | Edgewood | 22 | 7 | 9 | 3 | 8 | 3 | 0 | 0 | 0 | 0 |
| MD | Millington | 18 | 7 | 4 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| NJ | Clarksboro | 11 | 2 | 6 | 2 | 3 | 1 | 0 | 0 | 0 | 0 |
| NY | NYC-Queens | 16 | 5 | 6 | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| NY | NYC-Susan Wagner | 24 | 9 | 10 | 4 | 4 | 2 | 1 | 1 | 0 | 0 |
| NY | Babylon | 11 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 0 | 0 |
| NY | Riverhead | 15 | 6 | 7 | 5 | 4 | 3 | 1 | 1 | 0 | 0 |

**Table 11-1** counts the number of days select high ozone monitors in OTR nonattainment areas exceeded the concentration thresholds of 64, 70, 75, 84, and 90 ppb. Of these monitors, Greenwich, CT and Essex, MD exceeded 64 ppb the most frequently during the 2016 ozone season (31 times), and Westport was close behind with 29 exceedances above 64 ppb (blue columns). These three locations also had some of the highest number of days exceeding 64 ppb during Episode 1 (orange columns).

**Table 11-2** presents maximum 8-hour ozone concentrations on high ozone days for several key monitors located in the five nonattainment areas in the OTR. **Table 11-3** totals the number of monitors exceeding 70 ppb in each state of the OTR during the same high ozone days.

***Table 11-2.*** *Episode 1: 8-Hour Ozone by Monitor (May/June Highest Ozone Days)*

| State | Site Name | 5/24 | 5/25 | 5/26 | 5/27 | 5/28 | 5/29 | 5/31 | 6/1 | 6/7 | 6/10 | 6/11 | 6/15 | 6/16 | 6/19 | 6/20 | 6/21 | 6/23 | 6/24 | 6/25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CT | Greenwich | 48 | 89 | 91 | 63 | 82 | 59 | 67 | 55 | 73 | 49 | 69 | 64 | 47 | 51 | 52 | 60 | 64 | 58 | 55 |
| CT | Stratford | 42 | 89 | 76 | 59 | 70 | 47 | 58 | 50 | 73 | 43 | 55 | 63 | 55 | 49 | 51 | 62 | 64 | 58 | 57 |
| CT | Westport | 28 | 87 | 90 | 61 | 81 | 58 | 64 | 48 | 72 | 44 | 53 | 67 | 51 | 52 | 50 | 58 | 65 | 55 | 52 |
| CT | New Haven | 29 | 63 | 84 | 65 | 73 | 54 | 51 | | 55 | 39 | 51 | 58 | 63 | 52 | 43 | 48 | 75 | 54 | 51 |
| CT | Madison | 30 | 89 | 86 | 56 | 63 | 48 | 50 | 48 | 78 | 36 | 46 | 62 | 68 | 53 | 41 | 71 | 65 | 52 | 50 |
| DE | BELLFNT2 | 59 | 84 | 68 | 54 | 54 | 36 | 61 | | 57 | 46 | 74 | 58 | 30 | 59 | 72 | 54 | 57 | 45 | 60 |
| MD | Essex | 59 | 78 | 81 | 67 | 61 | 35 | 48 | 61 | 64 | 53 | 69 | 62 | 43 | 57 | 73 | 54 | 51 | 58 | 60 |
| MD | Fair Hill | 58 | 83 | 76 | 69 | 60 | 40 | 44 | 62 | 56 | 46 | 71 | 57 | 33 | 58 | 80 | 48 | 59 | 50 | 70 |
| MD | Edgewood | 56 | 79 | 80 | 70 | 60 | 36 | 58 | 68 | 60 | 50 | 65 | 55 | 40 | 70 | 79 | 50 | 55 | 53 | 60 |
| MD | Millington | 59 | 85 | 76 | 63 | 59 | 35 | 67 | 67 | 68 | 52 | 72 | 51 | 44 | 60 | 70 | 62 | 61 | 53 | |
| NJ | Clarksboro | 55 | 83 | | | | 36 | | 61 | 57 | 46 | 74 | | 30 | | | 60 | 62 | 51 | 55 |
| NY | NYC-Queens | 35 | 83 | 71 | 51 | 60 | 37 | 50 | 56 | | 41 | 67 | 53 | 38 | 60 | 48 | 66 | 53 | 65 | 61 |
| NY | NYC-Susan Wagner | 41 | 86 | 78 | 58 | 74 | 47 | 54 | 55 | 61 | 45 | 71 | 66 | 48 | 65 | 59 | 67 | 59 | 66 | 57 |
| NY | Babylon | 42 | 85 | 73 | 54 | 57 | 40 | 46 | 49 | 63 | 43 | 62 | 60 | 48 | 49 | 52 | 73 | 58 | 56 | 54 |
| NY | Riverhead | 30 | 85 | 79 | 56 | 57 | 44 | 51 | 45 | 75 | 43 | 55 | 57 | 79 | 49 | 47 | 71 | 67 | 54 | 47 |

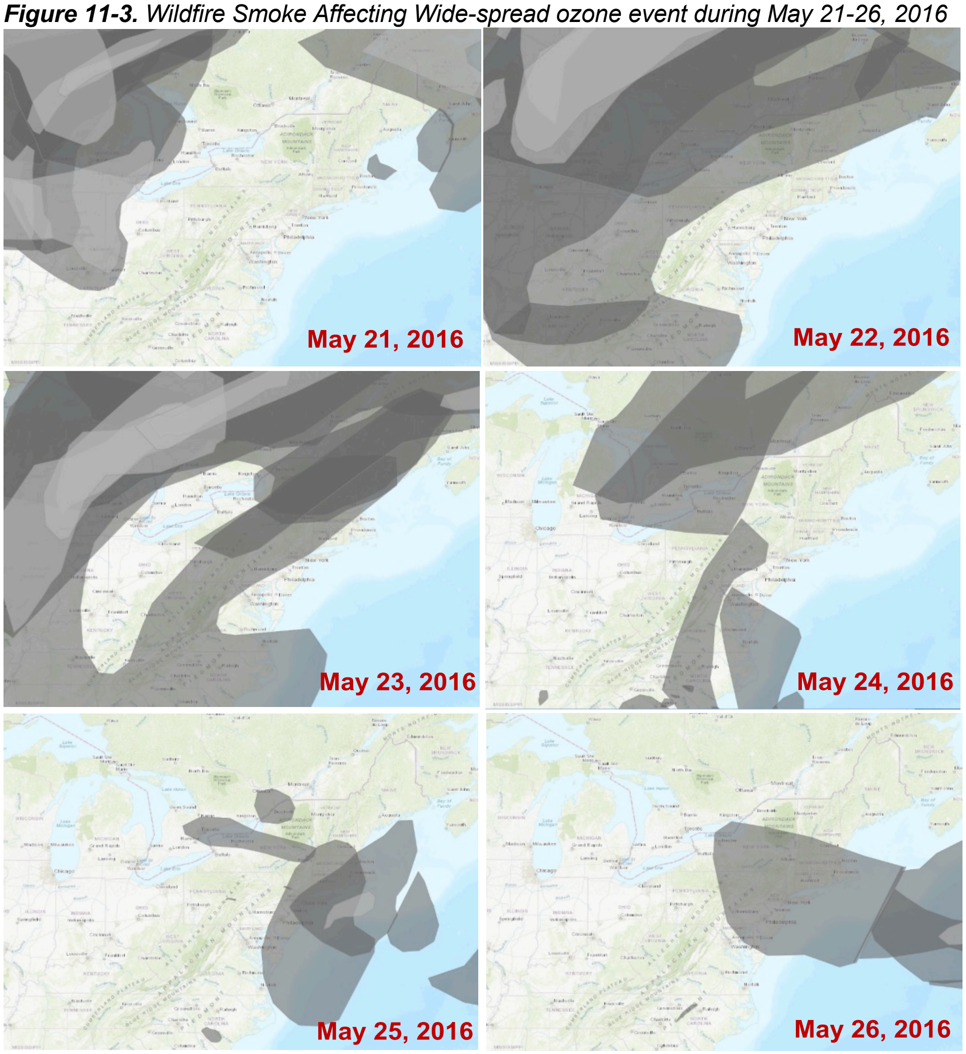
***Table 11-3.*** *Episode 1: Number of Monitors Exceeding 70 ppb by OTR State (May/June Highest Ozone Days)*

| | 5/24 | 5/25 | 5/26 | 5/27 | 5/28 | 5/29 | 5/31 | 6/1 | 6/7 | 6/10 | 6/11 | 6/15 | 6/16 | 6/19 | 6/20 | 6/21 | 6/23 | 6/24 | 6/25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTR | 13 | 130 | 90 | 15 | 14 | 1 | 1 | 23 | 7 | 1 | 17 | 5 | 3 | 5 | 24 | 4 | 3 | 8 | 2 |
| CT | 0 | 11 | 12 | 2 | 7 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 0 | 0 |
| DE | 0 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| DC | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ME | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MD | 0 | 13 | 15 | 1 | 1 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| MA | 0 | 9 | 10 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NH | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NJ | 0 | 16 | 10 | 3 | 3 | 0 | 0 | 5 | 0 | 0 | 5 | 3 | 0 | 2 | 5 | 0 | 0 | 2 | 0 |
| NY | 7 | 29 | 16 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 3 | 4 | 3 | 0 | 0 | 0 |
| PA | 6 | 37 | 15 | 0 | 0 | 0 | 1 | 11 | 0 | 1 | 4 | 2 | 0 | 0 | 8 | 0 | 0 | 6 | 2 |
| RI | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VT | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VA-OTC | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

#### 11.1.2.2 Episode 1 Meteorological Conditions

From a high concentration and widespread impact perspective, the May 22-June 25, 2016, period would be a good period to use for episodic modeling purposes, however, one overriding factor is that the most severe period, May 24-26 may have been boosted by smoke from western forest fires. While wildfires produce a significant amount of particle smoke, they are also a massive fuel (wood) burning emission source that produces huge amounts of VOC, NOx, and CO, which can further contribute to ozone production. Often if the smoke is too thick, solar radiation necessary for ozone formation is reduced, and ozone production is low, but thinner layers of particles in the plume can allow UV to penetrate, allowing for large amounts of ozone production. When this happens, agencies can consider the ozone event as exceptional, thus not factoring towards official counts affecting ozone attainment determinations. It is also possible that some wildfires burn lower nitrogen fuels, resulting in a smoke plume with a mix of VOCs and NOx to form large amounts of ozone.

***Figure 11-3.*** *Wildfire Smoke Affecting Wide-spread ozone event during May 21-26, 2016*




*Source: AirNow Tech Navigator*

**Figure 11-3** shows a six-day period from May 21 to May 26, 2016. The smoke aerosol maps for the period show a build-up of wildfire smoke worked into the area from the west/northwest over a period of a couple of days. A large number of monitors in CT, DE, MA, NJ, NY, PA, and RI exceeded the 2015 ozone NAAQS, and many of them also exceeded the 2008 NAAQS on May 25 and 26. A fairly concentrated smoke plume covered this area on May 25$^{th}$, the more severe day of the episode, and persisted to a lesser degree during the 26$^{th}$. Since the premier ozone period during Episode 1 is the May 24-28 period and it is clearly affected by wildfire smoke, the OTC Modeling Committee concluded this would not be a desirable episode to model.

Several major transport patterns can play an important role in creating the conditions for ozone exceedances to occur in the OTR; 1) over mountain interregional transport from sources in the Midwest, 2) multi-state transport from the nocturnal low level jet (NLLJ), and 3) local stagnation (Hudson et al. October 2006). Ideally the episodic period selected should contain key transport patterns on high ozone days. In this case, since 2016 was selected for modeling in the eastern United States, it is important that the transport regimes included in the episodic period are reflective of those during the full 2016 ozone season. Selection of an episode that was not representative could have the effect of causing strategies needed to reduce ozone originating from a particular region going unrealized or not being sufficient to overcome situations where all three transport patterns are acting in tandem.

In Episode 1, there were nine days exceeding 70ppb 8-hour ozone at an OTR monitor. **Table 11-4** provides a brief summary of the meteorology for those days.

***Table 11-4.*** *Episode 1: Synoptic weather description and maximum ozone concentration for nine days exceeding 70 ppb 8-hour ozone in the OTR.*

| Date | Maximum Ozone (ppb) | Synoptic Weather Description Surface | Aloft (850mb) |
|---|---|---|---|
| **May 25** | 89 | SW flow | High pressure ridge over Southeast, NW flow |
| **May 26** | 91 | SW flow | High pressure over NC, W to SW flow |
| **May 28** | 82 | SW flow | High pressure off New England coast, WSW flow |
| **June 7** | 78 | S to WNW flow | Low pressure near Hudson Bay, CN, W flow |
| **June 11** | 74 | SW flow, Warm Front near | High pressure over Southeast, W flow |
| **June 16** | 79 | E flow, Low pressure approaching southern OTR | Low pressure over PA, SE flow in northern OTR, NW flow |
| **June 20** | 80 | SSW flow, Low pressure trough | Strong Low pressure over central Canada, NW to W flow |
| **June 21** | 73 | SW flow, Cold front approaching | Strong Low over Quebec, WNW flow |
| **June 23** | 75 | SW flow, Stationary front near Canada, W flow | High Pressure to south, Low over Eastern |

To determine the appropriateness of the episodes regarding transport patterns, the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model was employed to conduct back trajectory analyses for four high ozone monitors: Greenwich and Madison, CT; Bristol, PA; and Essex, MD. The trajectory analyses were conducted at 10m height level to account for the Air/Sea interface airflows. **Figures 11-4** and **11-5** show the trajectory analyses for the four monitors for Episode 1 and the entire ozone season excluding Episode 1 respectively. When compared to the entire ozone season, Episode 1 lacks the volume of high ozone days with trajectories from the west, southwest, and south. Further, some of the highest ozone days are related to days also effected by western wildfires.

***Figure 11-4. (A-D).*** *Wind trajectories of ozone (ppb) for Madison, CT A) during Episode 1 (May 22-June 25, 2016), B) during all 2016 except Episode 1 (April 1 - May 21 & June 26 – October 31, 2016), and for Greenwich, CT C) during Episode 1 (May 22-June 25, 2016), and D) during all 2016 except Episode 1 (April 1 - May 21 & June 26 – October 31, 2016).*

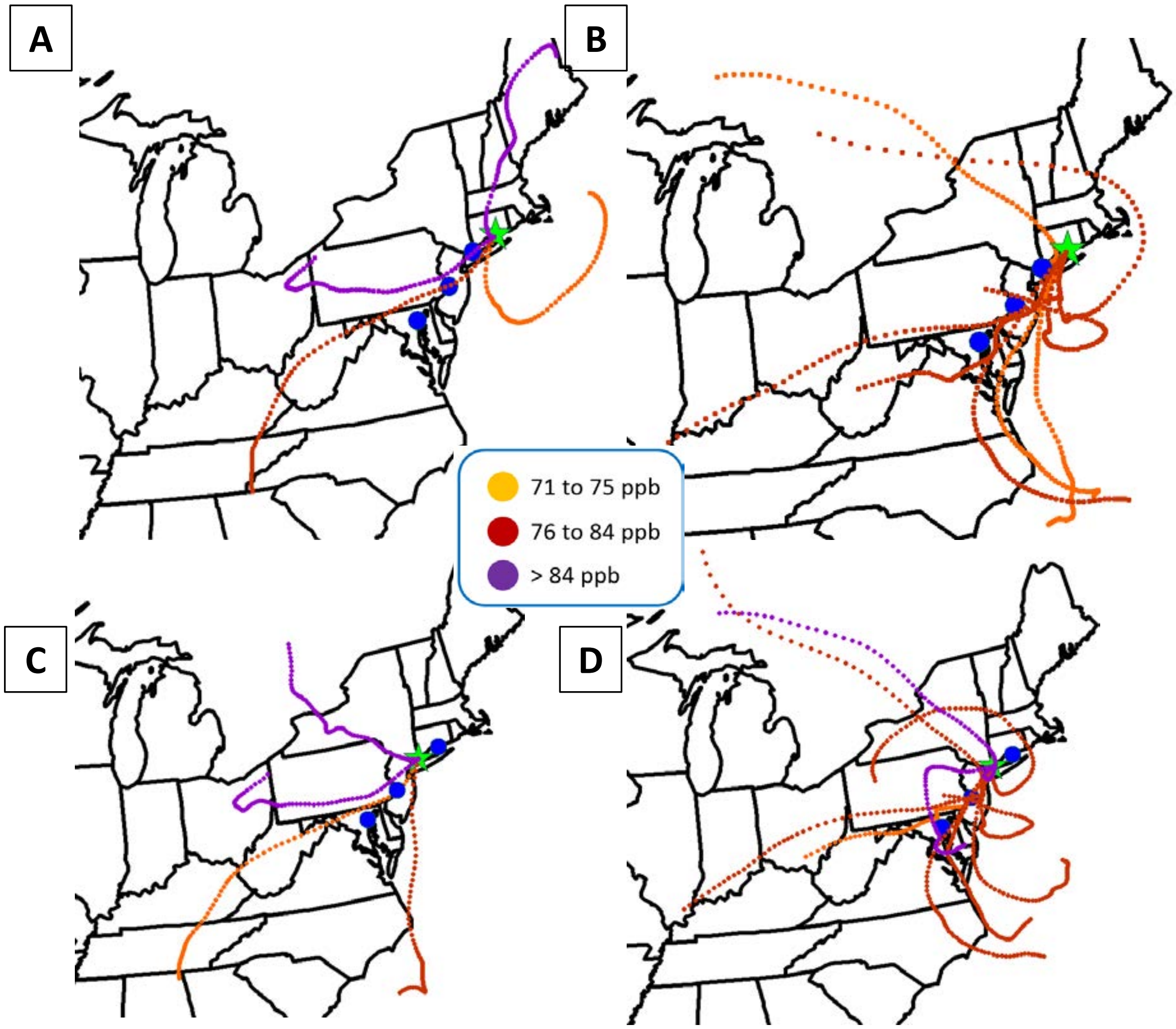
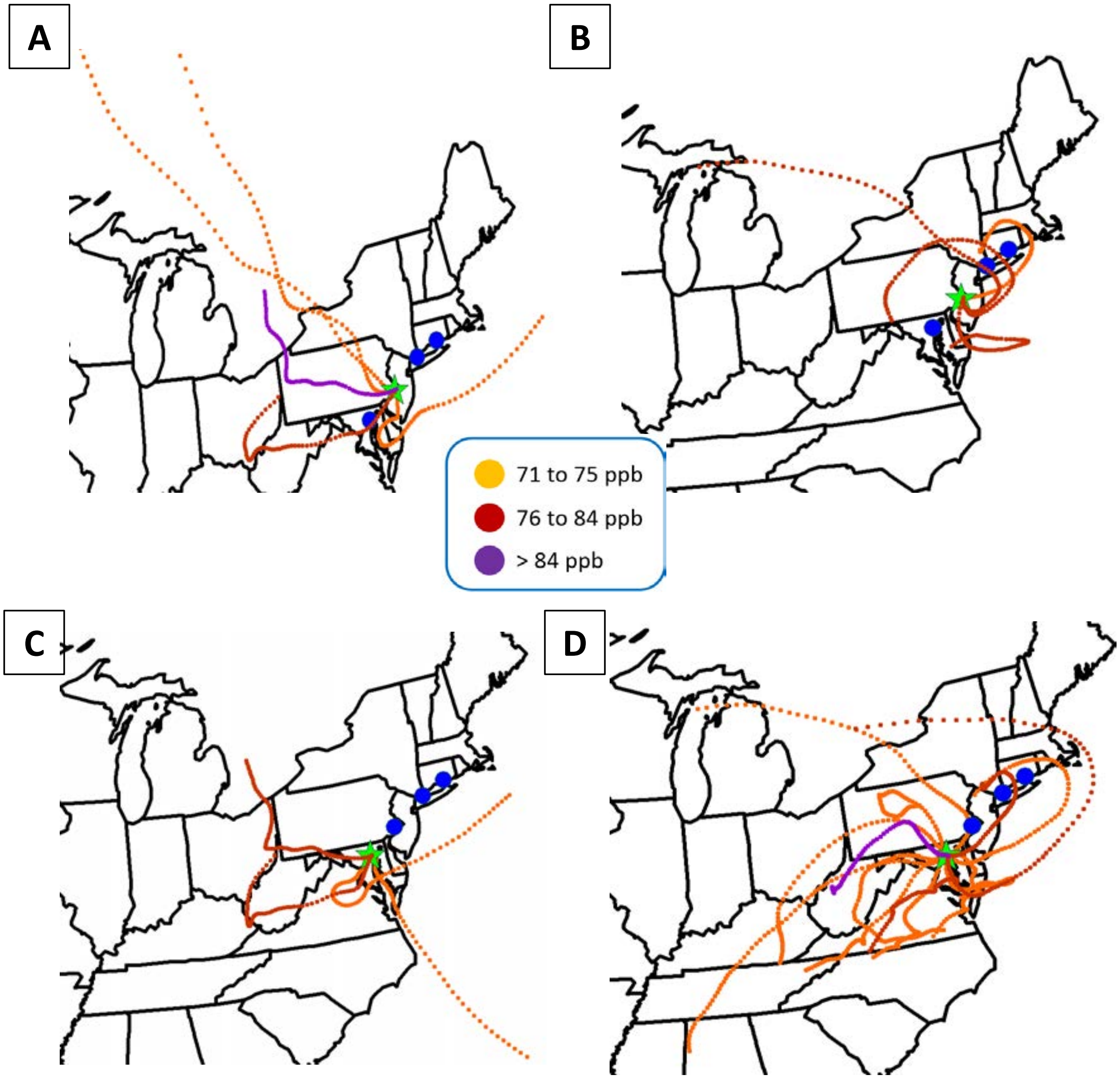


***Figure 11-5***. *Same as Figure 11-4 for (A-B) Bristol, PA and (C-D) Essex, MD.*




### 11.1.3 Discussion of Episode 2 (July 1-August 31, 2016)

#### 11.1.3.1 Analysis of Episode 2

Episode 2 comprises a 62-day period from July 1 to August 31, 2016 and contains 27 days where the maximum 8-hour ozone concentration within the OTR exceeded 70 ppb. In addition, 18 days exceeded 75 ppb and nine days exceeded 80 ppb. Episode 2 was originally intended to span a 30-day period from July 15 through August 13, which included two fairly severe ozone events (July 15-27 and August 11-13), but after Episode 2 was selected for modeling, the episode was lengthened to include additional ozone events in early July and late August. Episode 2 includes a particularly severe period during July 21 and 22 where 74 different monitors exceeded 70 ppb in the OTR and a maximum 8-hour ozone concentration of 100 ppb was recorded at Middletown, CT.

**Table 11-5** counts the number of days select high ozone monitors in OTR nonattainment areas exceed the thresholds of 64, 70, 75, 84, and 90 ppb. Of these monitors, those that exceeded 64 ppb at least 20 times during the full 2016 ozone season, each exceeded 64 ppb at least ten times during Episode 2 (10 times in Episode/20 times in 2016). Similarly, of the monitors exceeding 70 ppb at least 14 times in the 2016 ozone season, they exceeded 70 ppb ten times in Episode 2. Of the monitors exceeding 75 ppb seven or more times during the 2016 ozone season, three or more days were above 75 ppb during Episode 2.

***Table 11-5.** Episode 2: Number of days exceeding high ozone thresholds by OTR state (July 1 – August 31, 2016 vs entire 2016 ozone season)*

| | | 2016 | July Aug | 2016 | July Aug | 2016 | July Aug | 2016 | July Aug | 2016 | July Aug |
|---|---|---|---|---|---|---|---|---|---|---|---|
| State | Site Name | #>64 | #>64 | #>70 | #>70 | #>75 | #>75 | #>84 | #>84 | #>90 | #>90 |
| CT | Greenwich | 31 | 15 | 14 | 10 | 12 | 9 | 4 | 2 | 1 | 0 |
| CT | Stratford | 25 | 16 | 14 | 10 | 10 | 8 | 2 | 1 | 1 | 1 |
| CT | Westport | 29 | 16 | 16 | 10 | 11 | 8 | 5 | 3 | 1 | 1 |
| CT | New Haven | 19 | 13 | 10 | 6 | 3 | 2 | 1 | 1 | 1 | 1 |
| CT | Madison | 20 | 12 | 10 | 5 | 7 | 3 | 2 | 0 | 0 | 0 |
| DE | BELLFNT2 | 12 | 4 | 9 | 3 | 3 | 1 | 0 | 0 | 0 | 0 |
| MD | Essex | 31 | 17 | 18 | 11 | 6 | 2 | 1 | 1 | 1 | 1 |
| MD | Fair Hill | 19 | 7 | 10 | 3 | 6 | 1 | 1 | 1 | 0 | 0 |
| MD | Edgewood | 22 | 10 | 9 | 4 | 8 | 3 | 0 | 0 | 0 | 0 |
| MD | Millington | 18 | 5 | 4 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| NJ | Clarksboro | 11 | 6 | 6 | 2 | 3 | 1 | 0 | 0 | 0 | 0 |
| NY | NYC-Queens | 16 | 11 | 6 | 4 | 2 | 1 | 0 | 0 | 0 | 0 |
| NY | NYC-Susan Wagner | 24 | 12 | 10 | 6 | 4 | 2 | 1 | 0 | 0 | 0 |
| NY | Babylon | 11 | 7 | 4 | 1 | 2 | 1 | 1 | 0 | 0 | 0 |
| NY | Riverhead | 15 | 6 | 7 | 2 | 4 | 1 | 1 | 0 | 0 | 0 |

**Table 11-6** presents maximum 8-hour ozone concentrations on high ozone days for several key monitors located in the five nonattainment areas in the OTR. **Table 11-7** totals the number of monitors exceeding 70 ppb in each state of the OTR during the same high ozone days.

***Table 11-6.** Episode 2: 8-Hour Ozone by Monitor (July/August Highest Ozone Days)*

| State | Site Name | 7/6 | 7/8 | 7/12 | 7/13 | 7/15 | 7/16 | 7/17 | 7/18 | 7/19 | 7/20 | 7/21 | 7/22 | 7/25 | 7/26 | 7/27 | 7/28 | 7/29 | 8/9 | 8/10 | 8/11 | 8/12 | 8/13 | 8/24 | 8/25 | 8/27 | 8/29 | 8/31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CT | Greenwich | 87 | 44 | 61 | 52 | 76 | 58 | 77 | 73 | 37 | 52 | 85 | 79 | | | 69 | 69 | 63 | 67 | 37 | 76 | 58 | 77 | 81 | 63 | 44 | 49 | 76 |
| CT | Stratford | 75 | | 60 | 59 | 84 | 61 | 79 | 83 | 36 | 46 | 81 | 96 | 67 | 45 | 56 | 69 | 60 | 56 | 35 | 82 | 79 | 69 | 76 | 63 | 48 | 44 | 75 |
| CT | Westport | 80 | 42 | 61 | 58 | 75 | 59 | 76 | 80 | 38 | 45 | 87 | 97 | 69 | 41 | 61 | 67 | 58 | 63 | 36 | 87 | 68 | 72 | 79 | 64 | 47 | 47 | 76 |
| CT | New Haven | 68 | 36 | 62 | 40 | 70 | 56 | 71 | 75 | 33 | 37 | 80 | 91 | 48 | 38 | 39 | 51 | 55 | 49 | 25 | 72 | 73 | 59 | 66 | 45 | 44 | 43 | 64 |
| CT | Madison | 70 | 33 | 62 | 50 | | | | 82 | 37 | 47 | 74 | 78 | 65 | 51 | 49 | 68 | 52 | 58 | 33 | 61 | 75 | 77 | 66 | 62 | 48 | 44 | 66 |
| DE | BELLFNT2 | 57 | 62 | 48 | 29 | 57 | 55 | 60 | 58 | 53 | 62 | 59 | 83 | 64 | | 71 | 58 | 57 | 50 | 34 | 44 | 57 | 40 | 57 | 52 | 71 | 58 | 62 |
| MD | Essex | 74 | 62 | 57 | 41 | 54 | 71 | 64 | 55 | 75 | 71 | 75 | 72 | 77 | 73 | 99 | 56 | 72 | 49 | 39 | 48 | 54 | 53 | 58 | 61 | | 74 | 67 |
| MD | Fair Hill | 56 | 58 | 53 | 37 | 52 | 52 | 61 | 63 | 53 | 65 | 65 | 87 | 74 | 64 | 64 | 58 | 58 | 49 | | 55 | | 27 | 54 | 52 | 75 | 57 | |
| MD | Edgewood | 67 | 59 | 53 | 39 | 46 | 62 | 65 | 59 | 58 | 66 | 72 | 82 | 76 | 68 | 79 | 52 | 58 | 47 | 36 | 50 | 55 | 51 | 54 | 58 | 66 | 62 | 62 |
| MD | Millington | 51 | 61 | 52 | 36 | | | | 46 | 58 | 49 | 62 | 66 | 54 | 62 | 69 | 60 | 61 | 47 | 31 | 34 | 35 | 36 | 51 | 46 | 64 | 57 | 56 |
| NJ | Clarksboro | 65 | 80 | | 32 | 59 | 57 | 64 | 54 | | 52 | 64 | 74 | 37 | 33 | | 61 | 60 | 48 | 29 | 37 | 51 | 39 | 55 | 46 | 55 | 60 | 64 |
| NY | NYC-Queens | 71 | 54 | 50 | 44 | 75 | 64 | 71 | 67 | | 46 | 69 | 82 | 63 | 47 | 62 | 60 | 65 | 56 | | 65 | 61 | 59 | 66 | 54 | 45 | 50 | 62 |
| NY | NYC-Susan Wagner | 75 | 50 | 53 | 45 | 71 | 65 | | 64 | 39 | 45 | 77 | 81 | 62 | | 61 | 71 | 73 | 57 | 39 | 64 | 54 | 60 | 68 | 55 | 48 | 50 | 63 |
| NY | Babylon | 62 | 38 | 42 | 40 | 76 | 70 | 67 | 60 | 39 | 40 | 67 | 70 | 57 | 45 | 55 | 63 | 60 | 52 | 27 | 48 | 56 | 51 | 64 | 54 | 42 | 52 | 60 |
| NY | Riverhead | 72 | 37 | 49 | 43 | 78 | 65 | 69 | 57 | 40 | 35 | 70 | 62 | 57 | 45 | 43 | 60 | 54 | 56 | 29 | 53 | 53 | 54 | 63 | 55 | 43 | 49 | 60 |

***Table 11-7.** Episode 2: Number of Monitors Exceeding 70 ppb by OTR State (July/August Highest Ozone Days)*

| | 7/6 | 7/8 | 7/12 | 7/13 | 7/15 | 7/16 | 7/17 | 7/18 | 7/19 | 7/20 | 7/21 | 7/22 | 7/25 | 7/26 | 7/27 | 7/28 | 7/29 | 8/9 | 8/10 | 8/11 | 8/12 | 8/13 | 8/24 | 8/25 | 8/27 | 8/29 | 8/31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTR | 21 | 3 | 3 | 1 | 13 | 3 | 8 | 6 | 1 | 1 | 43 | 48 | 9 | 3 | 15 | 6 | 4 | 1 | 1 | 6 | 4 | 3 | 7 | 2 | 4 | 3 | 10 |
| CT | 8 | 0 | 1 | 0 | 5 | 1 | 5 | 6 | 0 | 0 | 7 | 9 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 4 | 3 | 4 | 1 | 0 | 0 | 3 |
| DE | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| DC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ME | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| MD | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 10 | 5 | 5 | 3 | 8 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 |
| MA | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NH | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NJ | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 7 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 |
| NY | 4 | 0 | 1 | 0 | 5 | 0 | 3 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PA | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 8 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 |
| RI | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VA-OTC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

#### 11.1.3.2 Meteorological Conditions

During Episode 2, the OTR was not significantly affected by wildfire smoke or other notable exceptional events, but it contains the majority of the high ozone days in the OTR during the 2016 ozone season and was marked by more typical back trajectories during high ozone days (flows from the northwesterly, westerly, southwesterly and southerly directions) and fewer backflow events (from the east, northeast).

In Episode 2, there were 22 days exceeding 70 ppb 8-hour ozone at an OTR monitor. **Table 11-8** provides a brief summary of the meteorology for those days.

***Table 11-8.*** *Episode 2: Synoptic weather description and maximum ozone concentration for 22 days exceeding 70 ppb 8-hour ozone in the OTR.*

| Date | Maximum Ozone (ppb) | Synoptic Weather Description Surface | Aloft (850mb) |
|---|---|---|---|
| **July 6** | 87 | WSW flow | W flow, High pressure over Florida |
| **July 8** | 80 | WNW to S flow Southern OTR | WNW flow, Low pressure over Great Lakes |
| **July 15** | 84 | SW flow, trough of Low pressure | WSW flow, Strong Low pressure over Quebec |
| **July 16** | 71 | SSW flow, Cold front stalled | SW flow, High pressure east of Carolina |
| **July 17** | 79 | SW flow | WSW flow, Bermuda High pressure |
| **July 18** | 83 | SW flow, trough of Low pressure | WSW flow, Low pressure trough passing through OTR |
| **July 19** | 75 | SW to NW flow, front passes | NW flow, High pressure moving in |
| **July 20** | 71 | WNW flow | NW flow, East side of High pressure ridge |
| **July 21** | 87 | W to SW flow | WNW flow, High pressure over Southeast |
| **July 22** | 97 | SW flow, trough of Low pressure | WNW flow, Low pressure trough crossing OTR |
| **July 25** | 77 | SW flow, Atlantic High pressure | W flow, Low pressure trough over OTR |
| **July 26** | 73 | SW on east side of trough | NW flow, Advancing High pressure ridge |
| **July 27** | 99 | Light winds, High pressure | WNW flow, High pressure to the south over Florida |
| **July 28** | 71 | Light SW flow, High pressure | W to SW flow, Low pressure develops over Ohio |
| **July 29** | 73 | NW to SE to NNE flow, Front passes | Variable to NNW flow, Low pressure crosses OTR |
| **August 11** | 87 | SSW flow | WSW flow, High pressure east of Carolina |
| **August 12** | 79 | SW flow | SW flow, High pressure east of Carolina |
| **August 13** | 77 | SW flow, Low over Great Lakes | SW flow, High pressure east of Carolina |
| **August 24** | 81 | SSW flow, High pressure | SW flow, High pressure off Atlantic coast |
| **August 27** | 75 | Light winds, High pressure | Variable to NE flow, High pressure crosses OTR |
| **August 29** | 74 | S flow, Front passes | NNE flow, High pressure over Indiana and Illinois |
| **August 31** | 76 | SSW flow, Tropical depression off coast | W flow, Trough to north, High pressure to south |

This period is not only the longer episode, but it also contains the majority of the high ozone days in the OTR and was marked by more typical back trajectories during high ozone days (flows from the northwesterly, westerly, southwesterly and southerly directions) (**Figures 11-6** to **11-9**). Episode 2 includes a solid collection of westerly, southwesterly, and southerly trajectories. Some of the highest trajectories excluded from Episode 2 are related to the western wildfires.

***Figure 11-6.*** *Wind trajectories of ozone (ppb) for Madison, CT A) during Episode 2 (July 1 – August 31, 2016) and B) during all 2016 except Episode 2 (April 1 – June 30 and September 1 – October 31, 2016)*

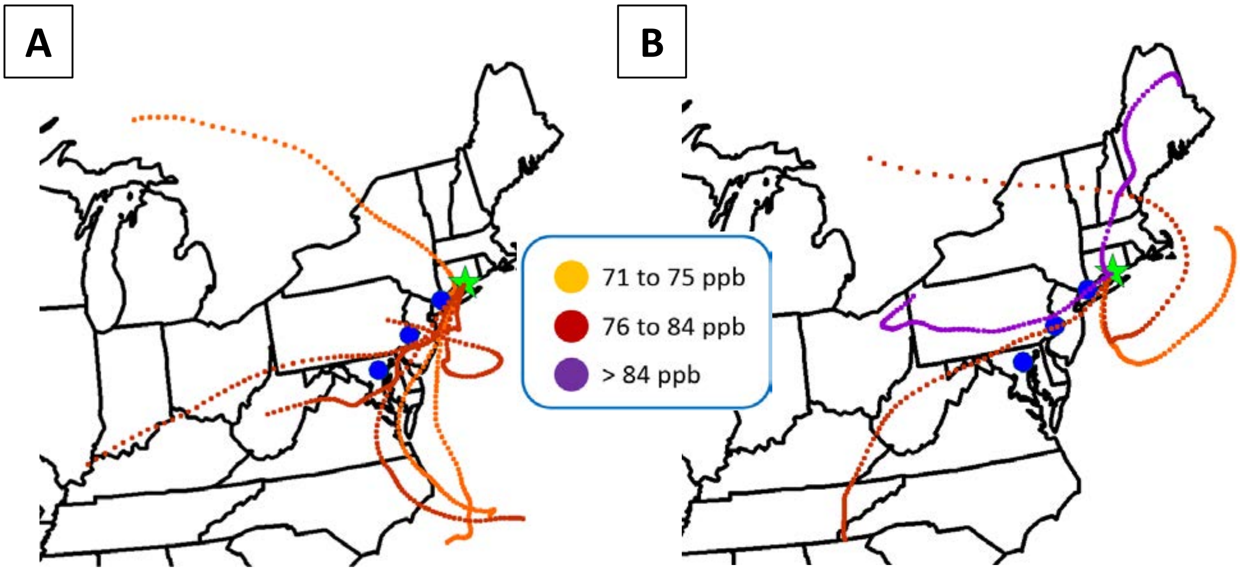



***Figure 11-7****. Same as Figure 11-6 except for Greenwich, CT.*

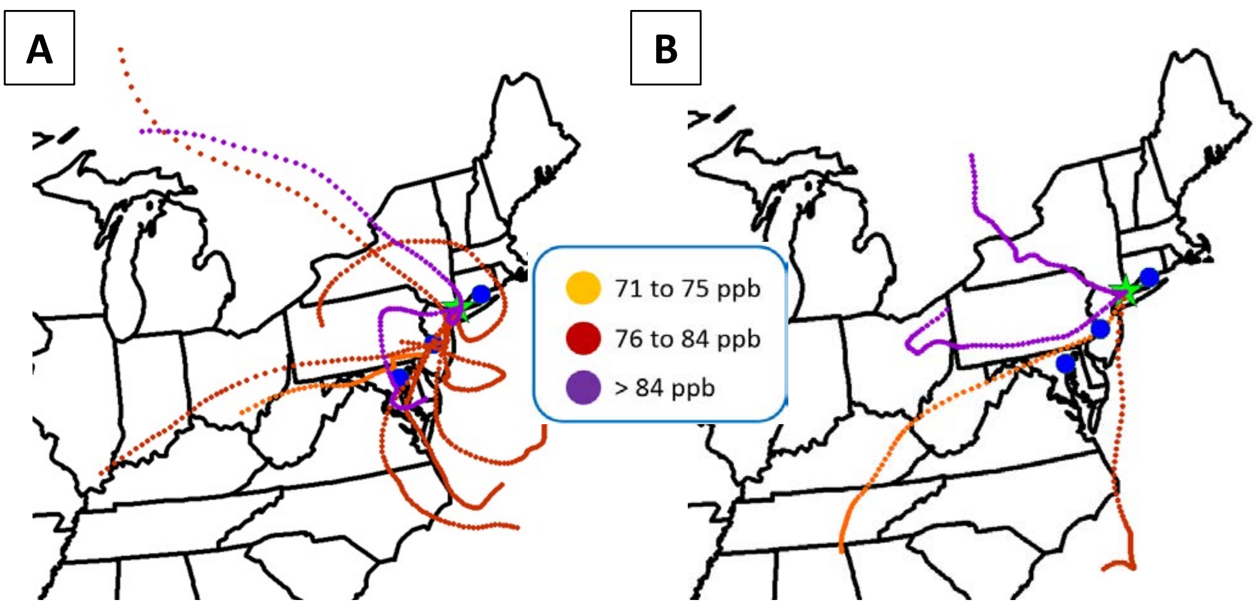


***Figure 11-8.*** *Same as Figure 11-6 except for Bristol, PA.*

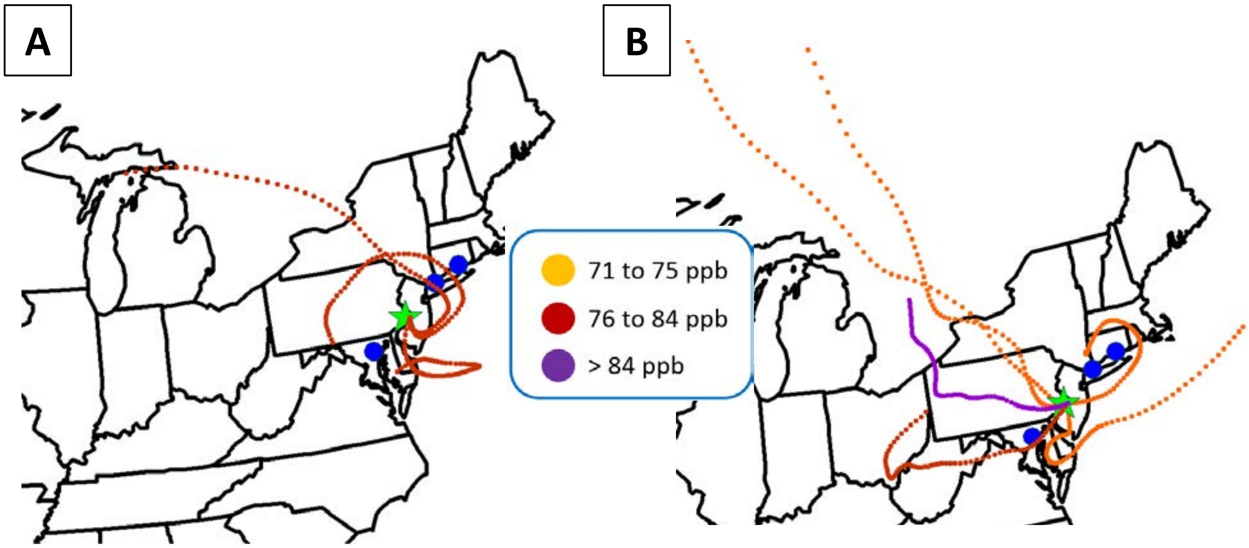
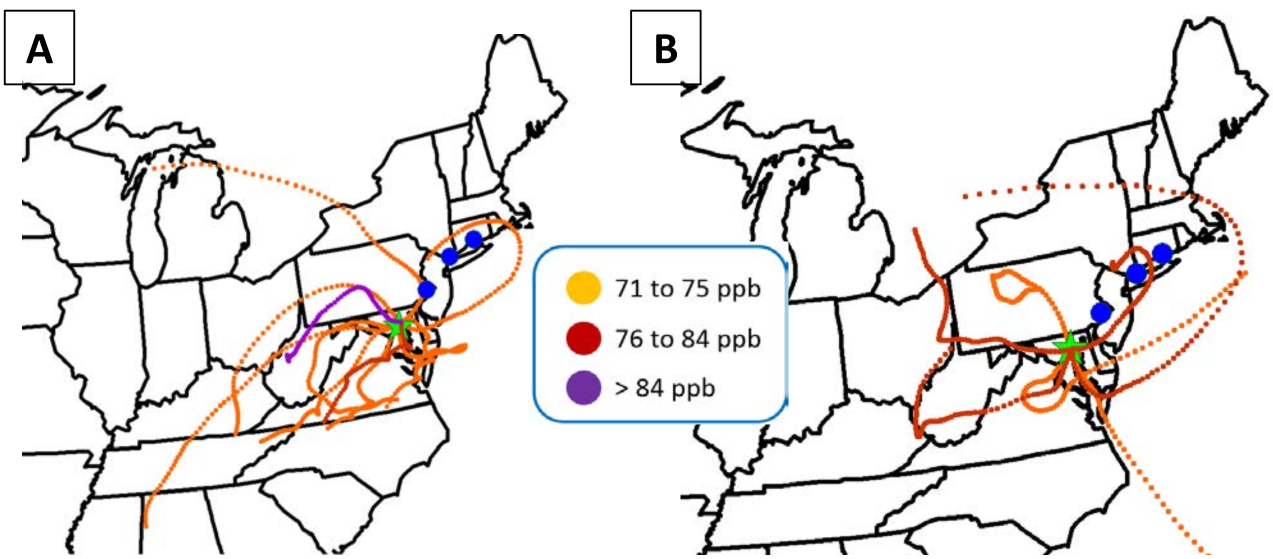



***Figure 11-9.*** *Same as Figure 11-6 but for Essex, MD.*



### 11.1.4 Episode Selection

The episode selected for OTC episodic modeling is Episode 2, extending from July 1 to August 31, 2016, which captures several periods of high ozone concentrations throughout the OTR, but especially along the nonattainment areas extending from Washington DC to the state of Connecticut. The highest periods of ozone without wildfire influence during the entire 2016 ozone season fell within this episode period as well as a considerable number of other high ozone days.

### 11.1.5 Modeling Platform

The OTC Modeling Committee chose to use the CMAQ model 12OTC2 domain for full domain modeling purposes, with the potential to use the 4km OTC modeling domain (4OTC2) in future episodic modeling scenarios. Details of their configuration are described in **Tables 11-9** and **Table 11-10**.

The emission inventory used for OTC episodic modeling is the national collaborative based 2016 inventory and the 2023 projection, adjusted to include ERTAC emissions, consistent with the OTC SIP modeling platform (see **Section 5** for more details). Emissions platforms or sectoral updates, including new projection years, are easy to include in the episodic modeling platform at either domain or resolution.

***Table 11-9.*** *Model versions used in OTC 12 km episodic modeling analyses*

| | **Model and Version** |
|---|---|
| **Photochemical Model** | CMAQ v5.3.1, cb6r3/AERO7 |
| **Meteorological Model** | WRF v3.8 (provided by EPA), MCIP v5.0 (processed by NYSDEC) |
| **Emissions Models** | SMOKE and ERTAC |
| **Domain** | 12OTC2 domain, 273x246 12km grid cells with 35 vertical layers |
| **Modeling period** | 62 days July 1 – August 31, 2016 |
| **Resolution** | 12 km |
| **Boundary conditions** | Extracted from 36 km (36US3) CMAQ v5.3.1 model runs using V1(fh) for 2016, 2023 and 2028 (CMV update, no airport update, IPM) |
| **Emissions** | 2016 V1 (fi) emissions inventory |

***Table 11-10.*** *Model versions used in OTC 4 km episodic modeling analyses*

| | **Model and Version** |
|---|---|
| **Photochemical Model** | CMAQ v5.3.1, cb6r3/AERO7 |
| **Meteorological Model** | WRF v3.8 (provided by EPA), MCIP v5.0 (processed by NYSDEC) |
| **Emissions Models** | SMOKE and ERTAC |
| **Domain** | 4OTC2 domain, 126x156 4km grid cells with 35 vertical layers |
| **Modeling period** | 62 days July 1 – August 31, 2016 |
| **Resolution** | 4 km |
| **Boundary conditions** | Extracted from 12OTC2 CMAQ v5.3.1 model runs using V1(fh) for 2016 and 2023 |
| **Emissions** | 2016 V1 (fi) emissions inventory/2016 V2 (fj) biogenic emissions |

### 11.1.6 Episodic Modeling Result Comparison at High Ozone Locations

When conducting episodic modeling, most modeling and analyses procedures follow standard protocol with few exceptions. Given the shorter “episodic” time period, the recommended method of using the “ten highest modeled 8-hour average daily maximum ozone days” to calculate the RRF (US EPA 2014) may not always be appropriate. Because of this, the OTC Modeling Committee used a modified procedure that required at least six modeled days (as opposed to ten) where 8-hour concentrations were modeled to be greater than or equal to 60 ppb for calculating RRF.

Actual SIP quality modeling covers the entire season, while episodic screening modeling considers a shorter, but representative period. In recognition that episodic modeling evaluates a subset of the entire ozone season, OTC uses episodic modeling as a screening tool. This section compares predicted DVFs for key monitoring locations using the selected episodic period and the entire ozone season. The Modeling Committee found that the projected 2023 modeled ozone concentrations obtained from modeling Episode 2 (July 1 – August 31) compared well to the results from modeling the full 2023 ozone season (**Figure 11-10**).

***Figure 11-10.*** *Correlation of Episode 2 (2-Month) and 7-Month 2023 Ozone DVFs*

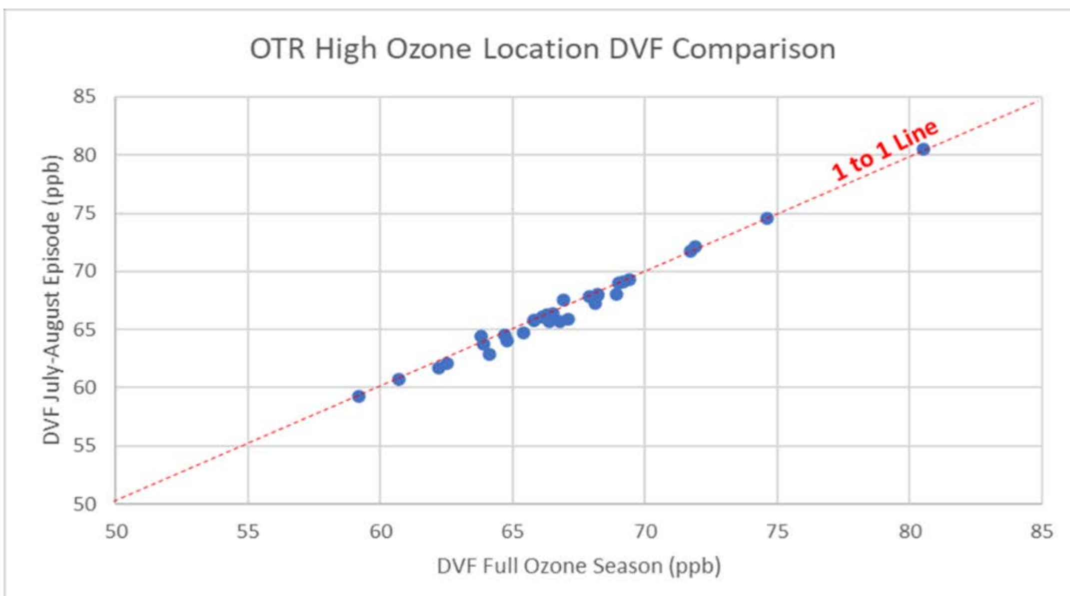



**Table 11-11** summarizes modeling comparisons of the number and percentages of monitor locations in the OTR with valid predicted design values for the episodic period and the full ozone season periods. Episode 2 predicted results compare favorably to those produced by modeling the entire ozone season, including design values, counts, and level of agreement in predicted

concentrations, although the counts are a little lower because of the shorter period. **Table 11-12** compares projected 2023 design values using the 3x3 and 3x3 No Water 1 methods for the full season and during Episode 2. We find that the projected 2023 DVFs during Episode 2 are comparable to those calculated for the full ozone season.

***Table 11-11.*** *Evaluation of monitors in the OTR for the 2-month episode vs the 7-month full ozone season*

| Statistic | Count | Percent |
|---|---|---|
| Number of Monitors in OTR | 212 | 100 |
| Number of Monitors with Future Values - Full Ozone Season | 165 | 78 |
| Number of Monitors with Future Values – Episode 2 | 151 | 71 |
| Monitors with > 1% differential of Design Values between Periods | 41 | 19 |
| Monitors with > 3% differential of Design Values between Periods | 1 | <1 |
| Monitors > 65 ppb with > 1% differential of Design Values between Periods | 7 | 3 |
| Monitors > 65 ppb with > 3% differential of Design Values between Periods | 0 | 0 |

Based on these results, the OTC Modeling Committee determined that modeling of Episode 2 (July 1- August 31, 2016) produces reasonable estimates of full ozone season DVFs and can be used for sensitivity and screening modeling for locations within the OTR. SIP quality modeling will still be conducted using the standard full ozone season modeling period.

***Table 11-12.*** *OTR high ozone monitor projected 2023 design value comparisons to the full ozone season and Episode 2 (ppb).*

| State | Location | AQS ID | 2014-18 DVB | Projected 2023 Design Value(3x3) | | Projected 2023 Design Value (NoWater 1) | |
|---|---|---|---|---|---|---|---|
| | | | | Full Season | Episode 2 | Full Season | Episode 2 |
| CT | Westport | 90019003 | 82.7 | 80.5 | 80.5 | 75.5 | 74.8 |
| CT | Stratford | 90013007 | 82 | 74.6 | 74.6 | 75.1 | 73.7 |
| CT | Madison | 90099002 | 79.7 | 71.9 | 72.1 | 70.9 | 70.8 |
| CT | Greenwich | 90010017 | 79.3 | 71.7 | 71.7 | 78.6 | 78.6 |
| PA | Bristol | 420170012 | 79.3 | 69.2 | 69.1 | 69.2 | 69.1 |
| CT | Middletown | 90079007 | 78.7 | 69.0 | 69.0 | 69.0 | 69.0 |
| PA | North East Airport (NEA) | 421010024 | 77.7 | 68.2 | 68.0 | 68.2 | 68.0 |
| CT | Danbury | 90011123 | 77 | 68.9 | 68.0 | 68.9 | 68.0 |
| NY | NYC-Susan Wagner HS | 360850067 | 76 | 74.2 | 74.4 | 70.2 | 70.4 |
| CT | New Haven | 90090027 | 75.7 | 69.4 | 69.3 | 68.4 | 67.7 |
| PA | North East Waste (NEW) | 421010048 | 75.3 | 66.3 | 66.3 | 66.3 | 66.3 |
| NJ | Camden Spruce Street | 340070002 | 75.3 | 66.1 | 66.1 | 66.1 | 66.1 |
| NJ | Rutgers University | 340230011 | 74.7 | 65.8 | 65.8 | 65.8 | 65.8 |
| CT | Groton | 90110124 | 74.3 | 67.9 | 67.8 | 71.3 | 71.3 |
| NJ | Leonia | 340030006 | 74.3 | 68.1 | 67.3 | 68.1 | 67.3 |
| NY | Riverhead | 361030004 | 74.3 | 66.4 | 65.7 | 66.8 | 65.7 |
| NY | Babylon | 361030002 | 74 | 68.2 | 67.9 | 67.5 | 67.0 |
| NY | White Plains | 361192004 | 74 | 66.9 | 67.5 | 67.8 | 66.9 |
| MD | Glen Burnie | 240031003 | 74 | 65.4 | 64.7 | 63.4 | 64.0 |
| MD | Fair Hill | 240150003 | 74 | 64.0 | 63.6 | 64.0 | 63.6 |
| MD | Edgewood | 240251001 | 74 | 63.8 | 64.4 | 63.9 | 63.8 |
| NJ | Clarksboro | 340150002 | 73.7 | 65.8 | 65.8 | 65.8 | 65.8 |
| DE | BCSP | 100031010 | 73.7 | 65.3 | 64.9 | 65.3 | 64.9 |
| NJ | Wash. Crossing | 340219991 | 73.3 | 64.8 | 64.0 | 64.8 | 64.0 |
| MD | Aldino | 240259001 | 73 | 62.5 | 63.3 | 63.0 | 62.6 |
| PA | NEWG | 420290100 | 72.7 | 63.6 | 63.3 | 63.6 | 63.3 |
| MD | Essex | 240053001 | 72.7 | 64.1 | 62.9 | 62.8 | 62.6 |
| NJ | Colliers Mills | 340290006 | 72.7 | 63.9 | 63.3 | 63.9 | 63.3 |
| NY | NYC-Queens | 360810124 | 72.3 | 66.5 | 66.4 | 65.6 | 65.6 |
| MD | Padonia | 240051007 | 72 | 61.5 | 61.6 | 61.5 | 61.6 |
| MA | Fall River | 250051004 | 71.7 | 68.5 | 67.6 | 63.4 | 63.7 |
| CT | McAuliffe Park | 90031003 | 71.7 | 62.6 | 61.8 | 62.6 | 61.8 |
| CT | Stafford | 90131001 | 71.7 | 62.2 | 61.7 | 62.2 | 61.7 |
| PA | Chester | 420450002 | 71.3 | 63.8 | 63.3 | 63.8 | 63.3 |
| NY | Rockland County | 360870005 | 71.3 | 64.1 | 62.6 | 64.1 | 62.6 |
| PA | Norristown | 420910013 | 71.3 | 63.8 | 63.0 | 63.8 | 63.0 |
| DE | Wilmington-MLK Blvd | 100032004 | 71.3 | 62.9 | 62.7 | 62.9 | 62.7 |
| RI | W Greenwich | 440030002 | 71.3 | 62.9 | 62.6 | 62.9 | 62.6 |
| NJ | Rider University | 340210005 | 71.3 | 62.5 | 62.1 | 62.5 | 62.1 |
| CT | Mohawk Mt-Cornwall | 90050005 | 71.3 | 62.8 | 61.7 | 62.8 | 61.7 |
| NJ | Flemington | 340190001 | 71.3 | 62.5 | 61.5 | 62.5 | 61.5 |
| NJ | Bayonne | 340170006 | 71 | 68.1 | 68.3 | 64.7 | 64.9 |
| NY | Suffolk County | 361030009 | 71 | 66.8 | 65.7 | 64.3 | 63.6 |
| DE | BELLFNT2 | 100031013 | 71 | 62.6 | 62.5 | 62.6 | 62.5 |
| DC | McMillan | 110010043 | 71 | 60.7 | 60.7 | 60.7 | 60.7 |
| VA | Aurora Hills | 510130020 | 71 | 60.2 | 60.3 | 60.2 | 60.3 |

# 12 Peak Electricity Demand Episodic Sensitivity Modeling

OTC performed High Energy Demand Day (HEDD) episodic modeling for a 62-day period covering meteorology from July 1 through August 31. Emission inventories used were based off the projected 2023 V1 fi with ERTAC and MEGAN. More information on the episodic modeling platform can be found in **Section 11** of this TSD. Part-75 electricity producing unit emissions were modified to actual hourly 2018/19 levels to reflect recent actual hourly emissions reflective of real-world operating scenarios and matched to existing 2016 meteorology. This modeling was performed at the request of the OTC Stationary and Area Sources (SAS) Committee to quantify the differences in HEDD demand due to regulatory influences and greater uptake of natural gas since 2016. Detail on emissions substitution and model scenario development can be found in the sections below. Peaking units were defined in the same fashion as described in **Section 10.4**. In this modeling package for HEDD analysis, several “what-if” scenarios have been identified as part of an information matrix where select parameters are varied with each successive run.

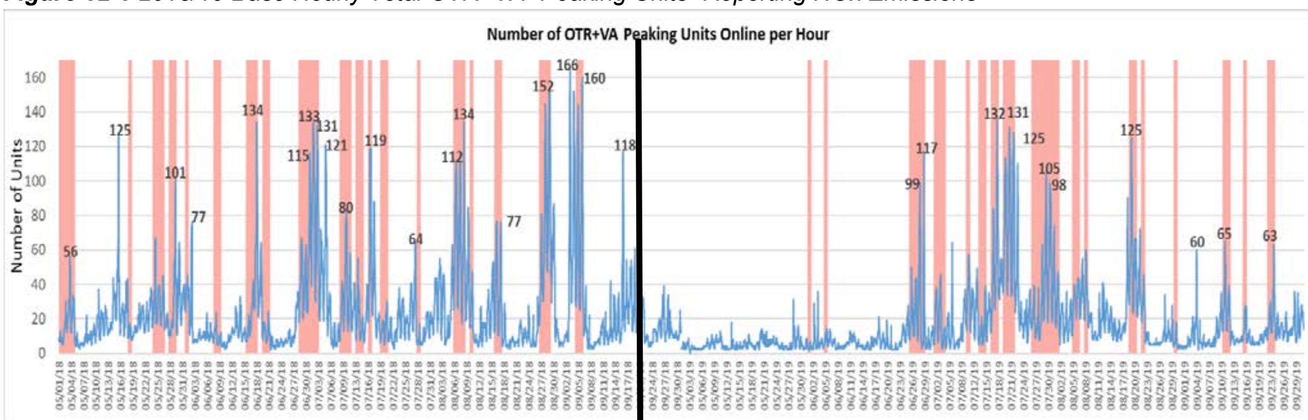
## *12.1 Base Scenario Data Review*

A total of 1,049 Part-75 units from the OTR plus VA were included in this HEDD analysis, with hourly data accessed from the EPA Air Markets Program Data portal (**Appendix F**). 947 of these units were categorized as electric providers and 407 of those were classified by OTC as being Peaking Units using the definition above. The remainder of the units were non-electric generating facilities. Actual operations for Part-75 units were derived from the ozone seasons of 2018 and 2019 (spanning 306 cumulative days). The number of electricity generating facilities with measurable NOx emissions during any given hour ranged between 101 and 601 with an average of about 256 (**Figure 12-1**).

The number of peaking units with measurable NOx emissions during any given hour ranged between 0 and 166 with an average of about 20 (represented by the blue line). The areas shaded in pink represent periods when ozone concentrations for at least one monitor in the OTR exceeded 71 ppb. Non-Part-75 peaking units are not included in these unit counts since they do not have actual hourly operation and emission data available. They also do not undergo hourly adjustments in this study at present. The Non-Part-75 peaking units included in this category from the OTR+VA are listed in **Appendix G**.

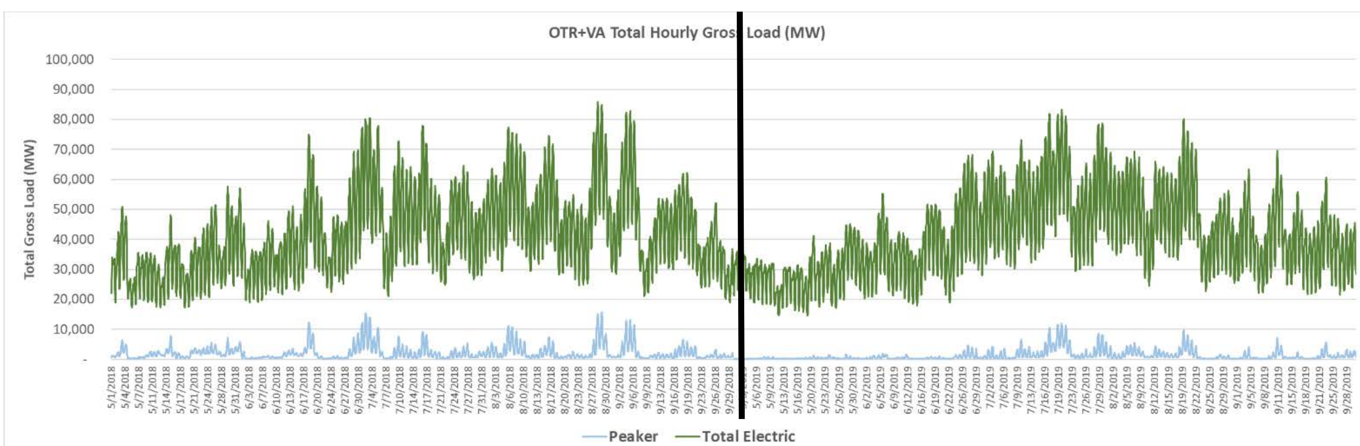
It is important to understand the actual operational nature of units being identified as peaking units for this modeling analysis. **Figures 12-2** and **12-3** present 2018 and 2019 actual total electrical generation (gross load – MW) and the hourly NOx emissions (lbs/hr) for all electric generation, cogeneration, and small electric providers within the OTR plus Virginia. As mentioned earlier, non-Part-75 units are not included in this analysis because of the lack of hourly data since they do not use CEMS. The blue line in **Figure 12-2** presents hourly total MW generated and the orange line shows the portion of the gross load produced by identified peaking units. Both lines demonstrate pronounced diurnal cycles with daytime maximums and nighttime minimums. Larger scale patterns also appear indicating periods of higher electrical demand, typically occurring during hot weather, which often correspond to periods of high ozone concentrations. Peaking units generally produce little electricity at night and generation appears to increase somewhat during periods of high electricity demand. Overall, during this 2018/2019 period, peaking units produced a small portion of electric generation, which increased in total generation percentage during high electricity demand.

***Figure 12-1*** *2018/19 Base Hourly Total OTR+VA "Peaking Units" Reporting NOx Emissions*




**|--------------------------- 2018 -----------------------------------|-------------------------------- 2019 ---------------------------**
**---|**

***Figure 12-2.*** *Hourly Total OTR+VA Hourly generation (MW) of Part-75 Listed and Peaking Units During the 2018 and 2019 Ozone Seasons*

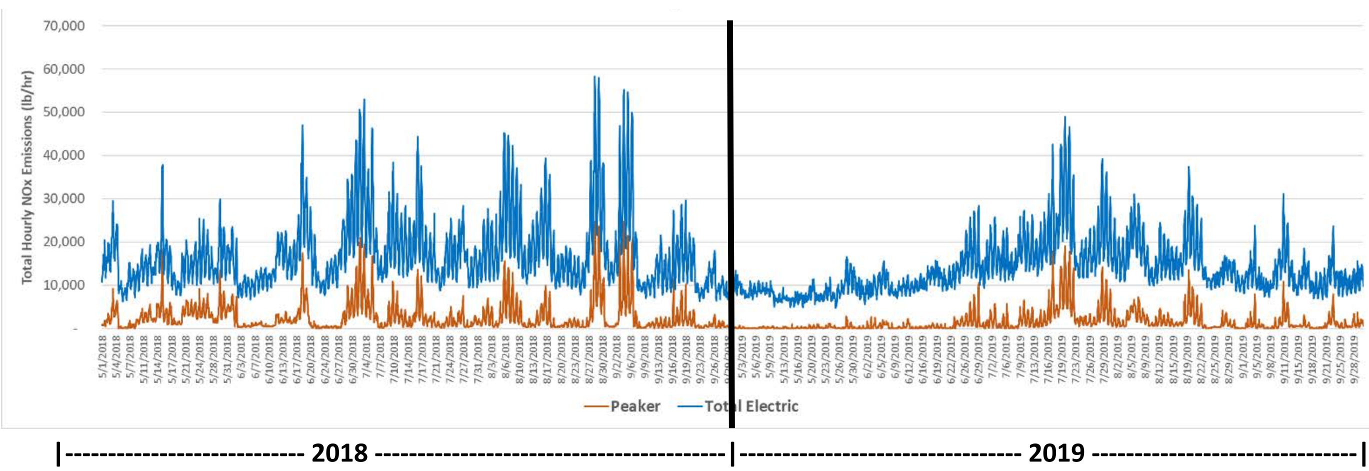



**|--------------------------- 2018 ------------------------------------|-------------------------------- 2019 ----------------------------|**

**Figure 12-3** presents in green the hourly NOx emissions (lbs NOx/hour) for the same units and periods identified for **Figure 12-2**. Diurnal cycles again are present but the daytime emission peaks are sharper, especially on days with the highest emissions. Peaking unit hourly emissions shown by the orange line follow the same pattern, but while the overall magnitude of NOx emissions from peakers is substantially lower that from the electric sector as a whole, they comprise a substantially higher percentage (approximately 50-66%) of overall NOx emissions during high emission days.

This dataset served as the source for emission parameters for conducting the episodic sensitivity modeling but since the modeling platform is based on 2016 meteorology, periods of peak energy demand and associated emissions needed to be provided in a way that is consistent for use with the platform. Since this modeling was most focused on analysis of peak energy demand, an OTC SAS Committee workgroup analyzed the electric generation during 2016 and more recent years. They found that high energy periods during the ozone seasons of 2018 and 2019 had similar characteristics to those that occurred during the July 1 – August 31, 2016 modeling platform period. They also determined that at that time, 2018 and 2019 were the most recent years available where emissions data representing current operational trends. 2020 and 2021 emissions were influenced by the COVID-19 pandemic and were therefore deemed not representative of typical operations.

***Figure 12-3.*** *Hourly Total OTR+VA Emissions of $NO_X$ from Part-75 Listed and Peaking Units During the 2018 and 2019 Ozone Seasons*




## 12.2 Peak Electricity Demand Modeling Matrix

Episodic peak energy sensitivity modeling was performed with the 2016 modeling platform with projected 2023 emissions for all sectors except CEMS reporting Part-75 EGUs, cogeneration units, and small electric providers where 2018/2019 actual operations and emissions were used. Key to this analysis is using actual hourly electric unit emissions rather than modeled or projected emissions which can act to smoothen and average out peak emissions.

Proposed episodic screening model runs include:

- **Run A** (2016 Base): 2016 emission inventory (with 2023 ERTAC outside the OTR+VA)
- **Run B** (2023 Base): 2023 emission inventory
- **Run 1** 2023 emissions inventory replacing all OTR+VA EGUs and non-EGUs hourly emissions with those from year 2016 (initial base). Favorable comparison of these

adjusted emissions to corresponding emissions in the original 2016 modeling platform emissions demonstrates performance of the data.

- **Run 2** (Rebase): 2023 emission inventory replacing all OTR+VA EGUs and non-EGUs hourly emissions with 2018/19. Approximately 1,035 units in the OTR have some degree of hourly operational data for the Rebase exercise. About 933 are electric producers and 384 of these are classified as peaking units (372 are Part-75 units and 6 are not).
- **Run 3** Run 2 base with zero emissions for OTR+VA Part-75 identified peaking electric generating units (372 units). Run 3 minus Run 2 shows the impact of OTR+VA Part-75 peaking unit emissions.
- **Run 4** *Tabled due to lack of data availability.* Run 2 base with **all** OTR+VA non-Part-75 units set to zero (100 units). Run 4 minus Run 2 shows the impact of OTR+VA non-Part-75 unit emissions. (Note: Non-Part-75 units were projected by IPM to 2023).
- **Run 5** *Tabled due to low emission differences*. Run 2 base with **all** OTR+VA non-electric generating units set to zero (86 units). Run 5 minus Run 2 shows the impact of OTR+VA non-EGUs emissions.
- **Run 6** Run 2 base with Part-75 identified peaking units replaced with dirtiest emitting units dispatched to meet actual 2016 hourly MW capacity by zone. Provides high-end bound of capacity equivalent maximum potential impact of Part-75 peaking units. (This adjustment considers only the 372 Part-75 peaking units).
- **Run 7** Run 2 base with Part-75 identified peaking units replaced with cleanest emitting units dispatched to meet actual 2016 hourly MW capacity by zone. Provides low-end bound of capacity equivalent potential impact of Part-75 peaking units. (This adjustment considers only the 372 Part-75 peaking units).
- **Run 8** Run 2 base with Part-75 identified peaking units replaced based with most frequently (2018/19) operated peaking units dispatched to meet actual 2016 hourly MW capacity by zone. Provides a center-point for Part-75 peaking units. (This adjustment considers only the 372 Part-75 peaking units).

In order to prepare an actual emission with 2018 and 2019 data from the 2016 modeling platform, units located in the OTR that came online after 2016, and units that retired after 2019 were identified in **Table 12-13** and **Table 12-4**, respectively. Units added by ERTAC for 2023 and were not online in 2018/19 are listed in **Table 12-5**. The units shaded in orange are defined as peaking units in this analysis.

***Table 12-1.*** *OTR+VA Part-75 Units Included in 2018 and 2019 data but not included in the 2016 Base files*

| State | Facility Name | Facility ID (ORISPL) | Unit ID | OTC Peaker? | 2019 NOx Emissions |
|---|---|---|---|---|---|
| CT | CPV Towantic Energy Center | 56047 | 1 | No | 49.1 |
| CT | CPV Towantic Energy Center | 56047 | 2 | No | 27.4 |
| CT | Wallingford Energy, LLC | 55517 | CT06 | No | 0.9 |
| CT | Wallingford Energy, LLC | 55517 | CT07 | No | 1.0 |
| MA | Blackstone | 1594 | 11 | Yes | 3.5 |
| MA | Blackstone | 1594 | 12 | Yes | 10.1 |
| MA | Exelon West Medway II | 59882 | J4 | No | 1.6 |
| MA | Exelon West Medway II | 59882 | J5 | No | 1.3 |

| | | | | | |
|---|---|---|---|---|---|
| MA | Salem Harbor Station NGCC | 60903 | 1 | No | 7.9 |
| MA | Salem Harbor Station NGCC | 60903 | 2 | No | 8.1 |
| MD | American Sugar Refining, Inc. | 54795 | C6 | No | 8.9 |
| MD | CPV St. Charles Energy Center | 56846 | GT1 | No | 28.5 |
| MD | CPV St. Charles Energy Center | 56846 | GT2 | No | 31.3 |
| MD | Keys Energy Center | 60302 | 11 | No | 49.6 |
| MD | Keys Energy Center | 60302 | 12 | No | 47.4 |
| MD | Perryman | 1556 | 6-2 | No | 4.1 |
| MD | Wildcat Point Generation Facility | 59220 | CT1 | No | 38.6 |
| MD | Wildcat Point Generation Facility | 59220 | CT2 | No | 44.7 |
| NJ | Sewaren Generating Station | 2411 | 7 | No | 73.0 |
| NY | Holtsville Facility | 8007 | U00019 | Yes | 5.0 |
| NY | Valley Energy Center | 56940 | 1 | No | 47.2 |
| NY | Valley Energy Center | 56940 | 2 | No | 44.8 |
| PA | Lackawanna Energy Center | 60357 | 1 | No | 62.2 |
| PA | Lackawanna Energy Center | 60357 | 2 | No | 64.6 |
| PA | Lackawanna Energy Center | 60357 | 3 | No | 58.4 |
| PA | Moxie Freedom Generation Plant | 59906 | 201 | No | 72.2 |
| PA | Moxie Freedom Generation Plant | 59906 | 202 | No | 67.1 |
| PA | Panda Hummel Station | 60368 | CT1 | No | 47.8 |
| PA | Panda Hummel Station | 60368 | CT2 | No | 44.9 |
| PA | York Energy Center | 55524 | 5 | No | 31.7 |
| PA | York Energy Center | 55524 | 6 | No | 31.0 |
| VA | Doswell Limited Partnership | 52019 | CT2 | No | 67.3 |
| VA | Doswell Limited Partnership | 52019 | CT3 | No | 68.5 |
| VA | Greensville County Power Station | 59913 | 1A | No | 55.5 |
| VA | Greensville County Power Station | 59913 | 1B | No | 59.0 |
| VA | Greensville County Power Station | 59913 | 1C | No | 55.9 |
| VA | Panda Stonewall Power Project | 59004 | CT1 | No | 33.1 |
| VA | Panda Stonewall Power Project | 59004 | CT2 | No | 32.3 |

***Table 12-2.*** *Retired Part-75 Units Removed from 2023 ERTAC File for this Modeling*

| State | Facility Name | Facility ID (ORISPL) | Unit ID | Offline Date |
|---|---|---|---|---|
| DE | McKee Run | 599 | 1 | 5/31/2017 |
| DE | McKee Run | 599 | 2 | 5/31/2017 |
| MA | Brayton Point | 1619 | 1 | 6/1/2017 |
| MA | Brayton Point | 1619 | 2 | 6/1/2017 |
| MA | Brayton Point | 1619 | 3 | 6/1/2017 |
| MA | Brayton Point | 1619 | 4 | 6/1/2017 |
| MA | Canal Station | 1599 | 2 | 1/1/2017 |
| MA | Exelon L Street Generating Station | 1587 | NBJ-1 | 1/1/2017 |
| MD | C P Crane | 1552 | 1 | 1/1/2018 |
| MD | C P Crane | 1552 | 2 | 1/1/2018 |
| MD | Gould Street | 1553 | 3 | 9/1/2017 |
| MD | Perryman | 1556 | CT2 | 1/1/2017 |
| MD | Riverside | 1559 | 4 | 1/1/2017 |
| NJ | B L England | 2378 | 2 | 5/1/2019 |
| NJ | B L England | 2378 | 3 | 1/31/2018 |

| | | | | |
|---|---|---|---|---|
| NJ | Hudson Generating Station | 2403 | 2 | 12/31/2017 |
| NJ | Mercer Generating Station | 2408 | 1 | 12/31/2017 |
| NJ | Mercer Generating Station | 2408 | 2 | 12/31/2017 |
| NJ | Sewaren Generating Station | 2411 | 1 | 4/30/2018 |
| NJ | Sewaren Generating Station | 2411 | 2 | 4/30/2018 |
| NJ | Sewaren Generating Station | 2411 | 3 | 4/30/2018 |
| NJ | Sewaren Generating Station | 2411 | 4 | 4/30/2018 |
| PA | Bruce Mansfield | 6094 | 1 | 2/5/2019 |
| PA | Bruce Mansfield | 6094 | 2 | 2/5/2019 |
| PA | MARCUS HOOK 50, L.P. | 50074 | 1 | 6/1/2019 |
| PA | Northeastern Power Company | 50039 | 31 | 10/24/2018 |
| PA | Shawville | 3131 | 1 | 1/1/2017 |
| PA | Shawville | 3131 | 2 | 1/1/2017 |
| PA | Shawville | 3131 | 3 | 1/1/2017 |
| PA | Shawville | 3131 | 4 | 1/1/2017 |
| VA | Bellemeade Power Station | 50966 | 1 | 12/31/2018 |
| VA | Bellemeade Power Station | 50966 | 2 | 12/31/2018 |
| VA | Bremo Power Station | 3796 | 3 | 12/31/2018 |
| VA | Bremo Power Station | 3796 | 4 | 12/31/2018 |
| VA | Chesterfield Power Station | 3797 | 3 | 12/13/2018 |
| VA | Chesterfield Power Station | 3797 | 4 | 12/13/2018 |
| VA | City Point Energy Center | 10377 | BLR01A | 6/25/2019 |
| VA | City Point Energy Center | 10377 | BLR01B | 6/25/2019 |
| VA | City Point Energy Center | 10377 | BLR01C | 6/25/2019 |
| VA | City Point Energy Center | 10377 | BLR02A | 6/25/2019 |
| VA | City Point Energy Center | 10377 | BLR02B | 6/25/2019 |
| VA | City Point Energy Center | 10377 | BLR02C | 6/25/2019 |
| VA | Mecklenburg Power Station | 52007 | 1 | 12/31/2018 |
| VA | Mecklenburg Power Station | 52007 | 2 | 12/31/2018 |
| VA | Possum Point Power Station | 3804 | 3 | 12/31/2018 |
| VA | Possum Point Power Station | 3804 | 4 | 12/31/2018 |
| VA | Spruance Genco, LLC | 54081 | BLR03A | 12/31/2018 |
| VA | Spruance Genco, LLC | 54081 | BLR03B | 12/31/2018 |
| VA | Spruance Genco, LLC | 54081 | BLR04A | 12/31/2018 |
| VA | Spruance Genco, LLC | 54081 | BLR04B | 12/31/2018 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01A | 1/1/2017 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01B | 1/1/2017 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01C | 1/1/2017 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02A | 1/1/2017 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02B | 1/1/2017 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02C | 1/1/2017 |
| VA | Yorktown Power Station | 3809 | 1 | 3/8/2019 |
| VA | Yorktown Power Station | 3809 | 2 | 3/8/2019 |

***Table 12-3.*** *New Part-75 Units Removed from 2023 ERTAC File for this Modeling*

| State | Facility Name | Facility ID (ORISPL) | Unit ID | Online Date |
|---|---|---|---|---|
| MD | C P Crane | 1552 | CT1 | 1/1/2020 |
| MD | C P Crane | 1552 | CT2 | 1/1/2020 |
| MD | C P Crane | 1552 | CT3 | 1/1/2020 |

| | | | | |
|---|---|---|---|---|
| MD | Chalk Point | 1571 | G24001 | 1/1/2023 |
| NJ | Linden Generating Station | 2406 | G34001 | 1/1/2023 |
| NJ | Middlesex Energy Center | 993401 | 1 | 1/1/2021 |
| NY | Athens Generating Company | 55405 | G36002 | 1/1/2023 |
| NY | Bethlehem Energy Center (Albany) | 2539 | G36004 | 1/1/2023 |
| NY | Empire Generating Company LLC | 56259 | G36003 | 1/1/2023 |
| NY | Independence | 54547 | G36001 | 1/1/2023 |
| PA | Fairless Energy, LLC | 55298 | G42001 | 1/1/2023 |
| VA | Berry Hill Power Station | 995122 | 1 | 1/1/2021 |
| VA | Bremo Power Station | 3796 | G51001 | 1/1/2023 |
| VA | C4GT | 995120 | 1A | 1/1/2021 |
| VA | C4GT | 995120 | 1B | 1/1/2021 |
| VA | Chickahominy Power, LLC | 995121 | 1 | 1/1/2021 |
| VA | Chickahominy Power, LLC | 995121 | 2 | 1/1/2021 |
| VA | Chickahominy Power, LLC | 995121 | 3 | 1/1/2021 |

*A full list of the OTR Part-75 Emission Units included in this Episodic HEDD modeling analysis are provided in **Appendix F**.*

## 12.3 "ReBasing" - Adjustment of Part-75 Electrical Facilities to 2018/19 Operation Levels

A critical yet complex component to this analysis is adapting the 2018/19 actual emissions to the 2016 platform meteorology for Part-75 electric units (with available hourly CEMS data), referred to here as "ReBasing." This criterion was specified by the OTC SAS Committee to better reflect operational and emission changes since 2016 reflecting economic and regulatory influences. During this period, the price of natural gas dropped and units fueled by it were more frequently dispatched into the electricity grid.

Emission processing for the episodic peak energy day modeling follows the methodology described below. Once the emissions were calculated, a Python script was used to translate this data into an ERTAC SMOKE-ready file, and from there, the emissions files were processed normally for modeling with CMAQ.

The emission OTC ReBasing project relies on geographic zones (**Figure 12-4**) to better differentiate regional power pool as well as regional weather and electricity demand variability. NERC/ISO regions were originally proposed for this role but were not reliably reported in the CAMD data file. This could potentially be applied in future modeling efforts. Instead, seven geographic zones roughly approximating New England, Upstate New York, Central/Western Pennsylvania, Western Virginia, New York City, Philadelphia, and Washington/Baltimore.

Within each zone, periods of actual electric demand within 2016 were preserved by matching 2016 electrical generation with periods of similar generation from 2018 and 2019 actual operations on a day-by-day basis. Once generation was matched, emissions and heat input data matching the hourly generation was carried over to complete the configuration. Efforts were made to maintain continuous multi-day 2018-2019 operations together to better account for continuity and unit start-up patterns during the most critical periods. This procedure meets the goal of using actual data emissions and operational conditions rather than the predictive data used in typical emissions projections. Nonetheless, matching electric generation from one year to another results in numerous chronological discontinuities, which, while it meets the needs for the goals of this modeling study, is improbable to be replicated in the real world.

For quality assurance, actual hourly total 2016 electric gross load was matched to 2018/19 ReBase gross load scenario for the entire OTR (**Figure 12-5**) and by region. Hourly gross load data was generally within 3% of the corresponding hour of each scenario, matching better during peak daytime hours and weakest during overnight hours. Each of the seven zones underwent a similar analysis with each of the highest generating zones matching very strongly.

***Figure 12-4.*** *OTR+VA Comparison of 2018/19 Electrical Generation (MW) Matched to 2016 Actual Generation*

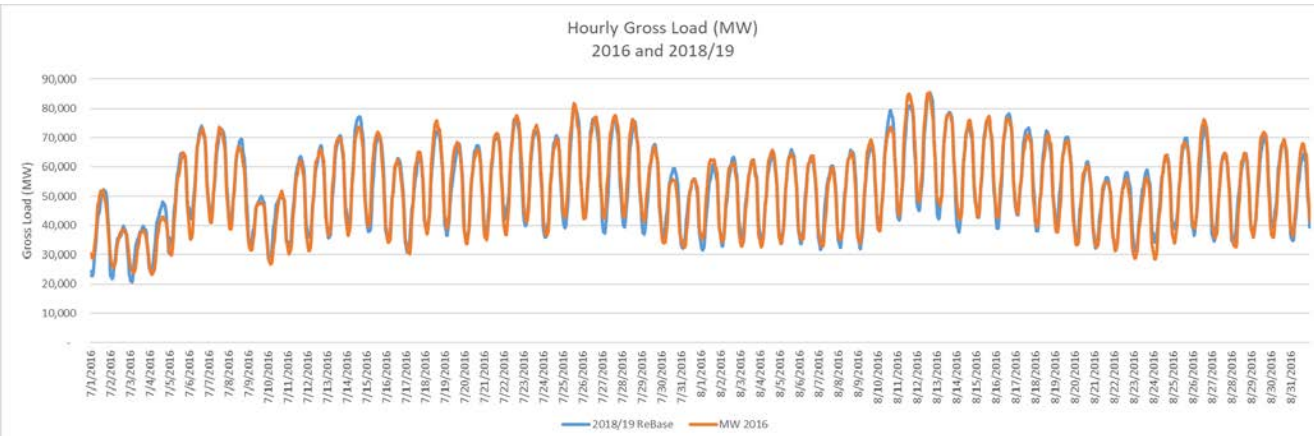
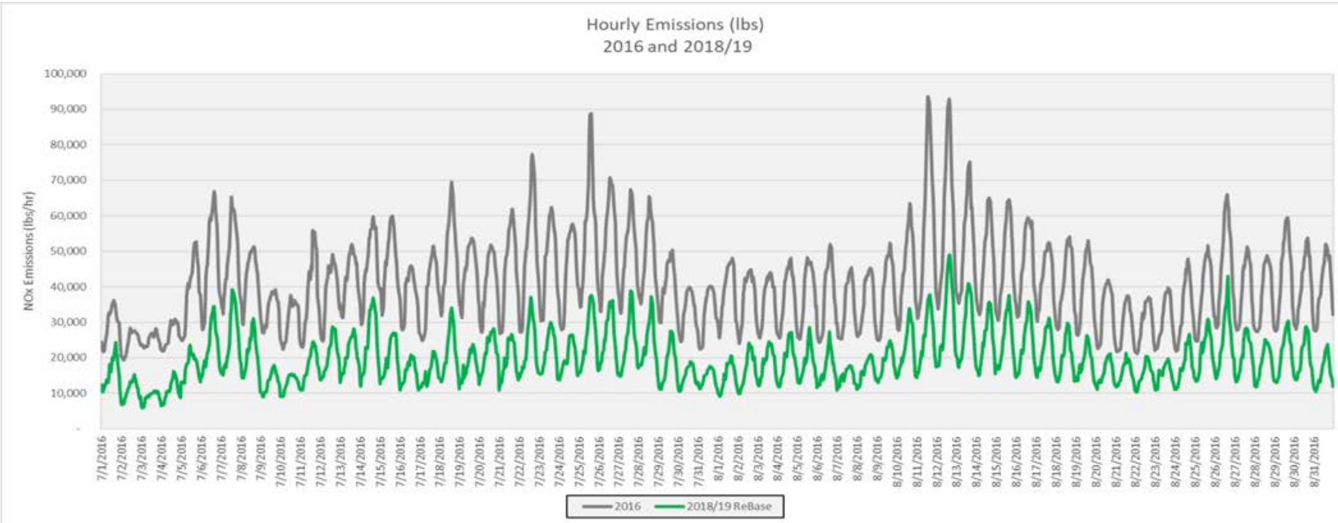



**Figure 12-6** presents hourly emissions for 2016 actual compared to the emissions resulting from the 2018/19 ReBasing calculations for the entire OTR. It is clear that overall NOx emissions from electric generation are down considerably from 2016 to 2018/19. The analysis found that emission rates for most units did not change significantly on an individual basis (increase or decrease), but rather most of the change in emissions resulted from different dispatching priorities. Operation of older coal and oil burning units became more expensive than units burning natural gas, and subsequently operated less during 2018/19 than they did in 2016. Again, this is a critical component to the ReBasing analyses.

***Figure 12-5.*** *OTR+VA Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*




While still providing a generally good match, regional zones with lower total generation generally had fewer days in 2018/19 that matched optimally with 2016 generation. Zones 3 (Western/Central PA) and 4 (Western VA) were especially difficult to match due to the lower overall generation needs and the electrical generation in 2018/2019, however because these regions have much lower generation and associated emissions, they are relatively less important to this modeling analysis.

Emissions for Zones 3 (Western/Central PA), 4 (Western VA), and 6 (Philadelphia) show large reductions from 2016 to 2018/19 levels, while 2018/19 emission data for Zones 1 (New England), 2 (Upstate NY), and 5 (NYC) were very similar to 2016 levels. The remaining zone 7 (Washington/Baltimore/Eastern VA) falls in the middle with moderate level emissions reductions. See **Figures 12-7 through 12-13** for detailed emission changes for each of the seven regions).

***Figure 12-6***. *Zone 1 (New England) Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*

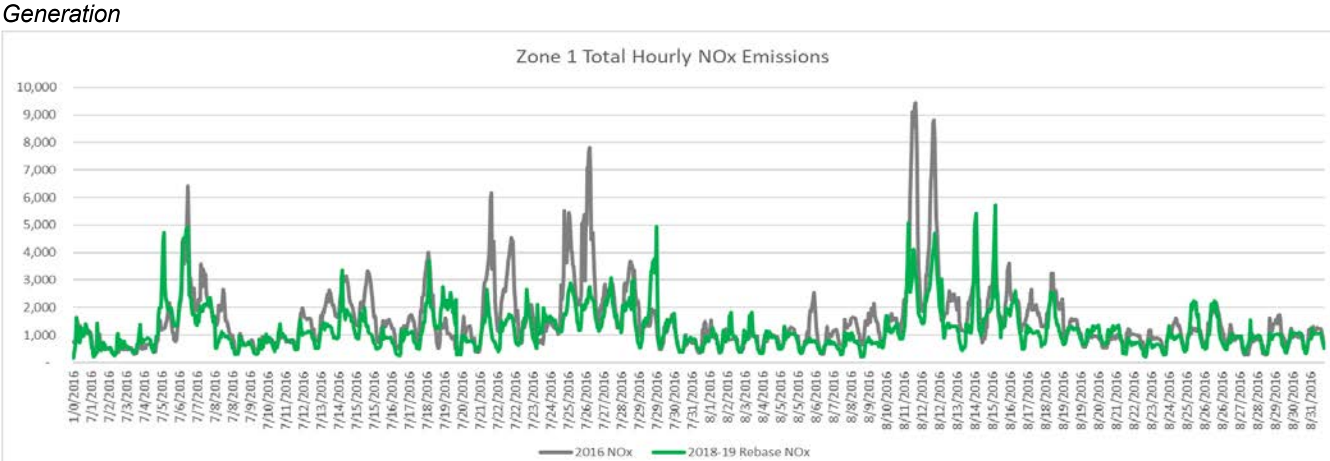


***Figure 12-7.*** *Zone 2 (Upstate New York) Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*

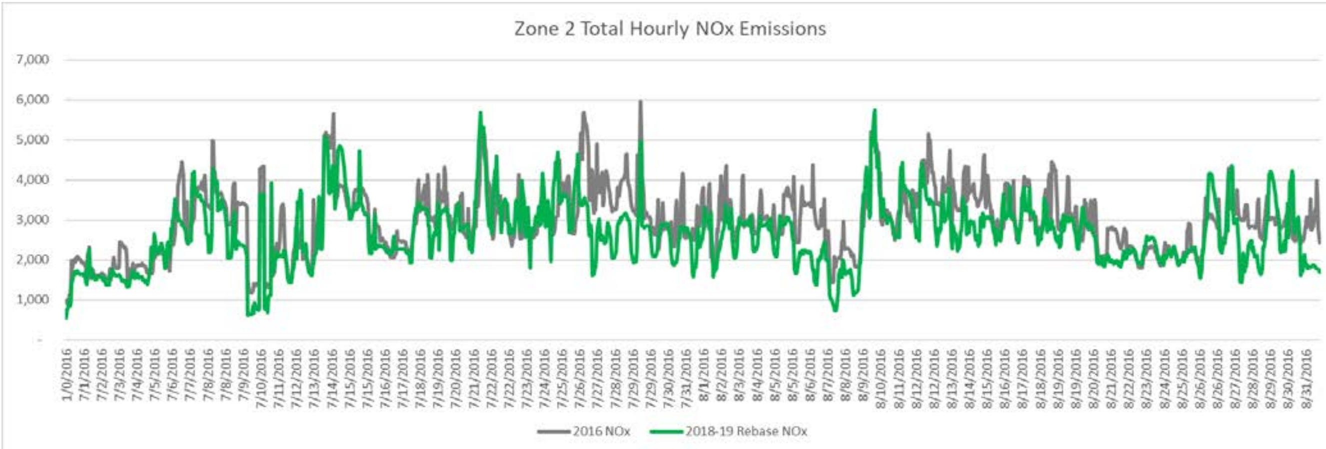



***Figure 12-8.*** *Zone 3 (Western and Central Pennsylvania) Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*

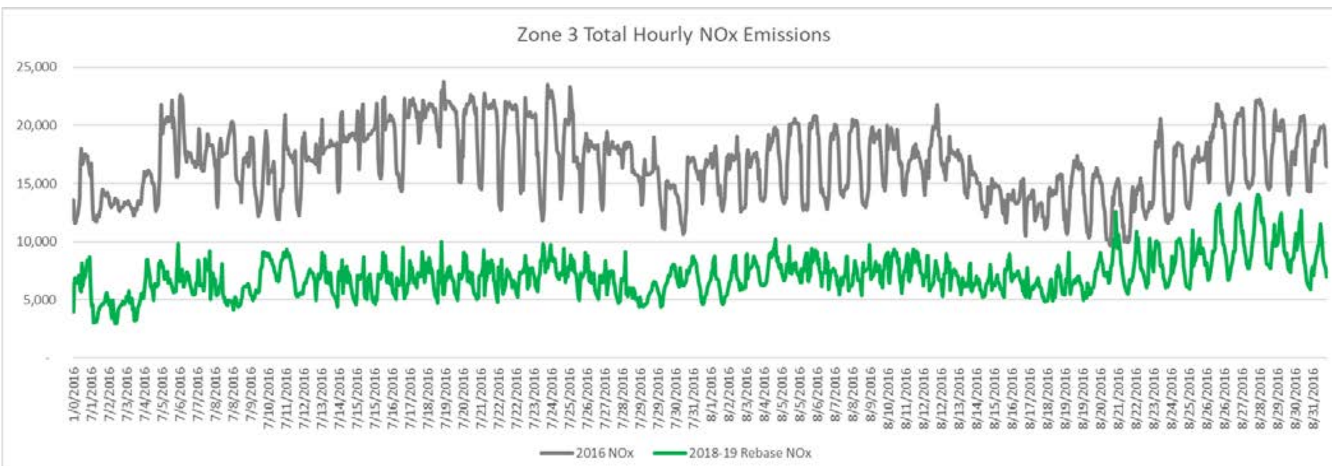



***Figure 12-9****. Zone 4 (Western Virginia) Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*

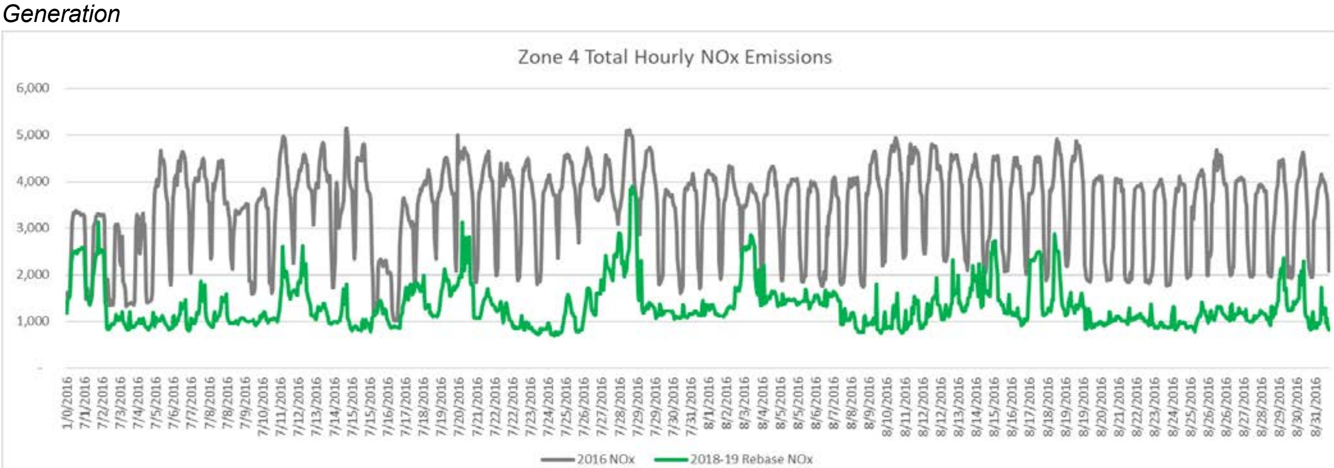


***Figure 12-10.*** *Zone 5 (New York City) Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*

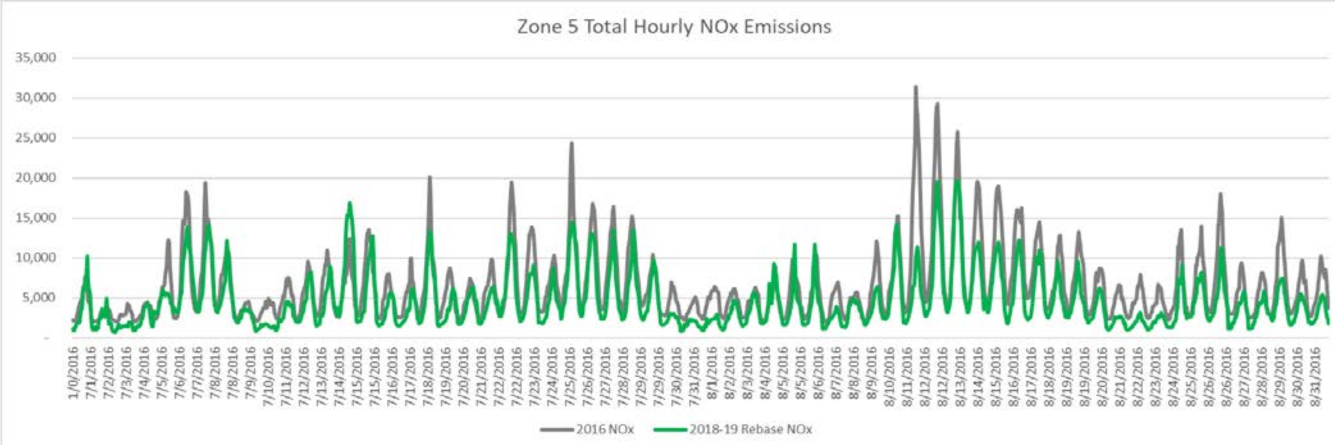



***Figure 12-11.*** *Zone 6 (Philadelphia) Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*

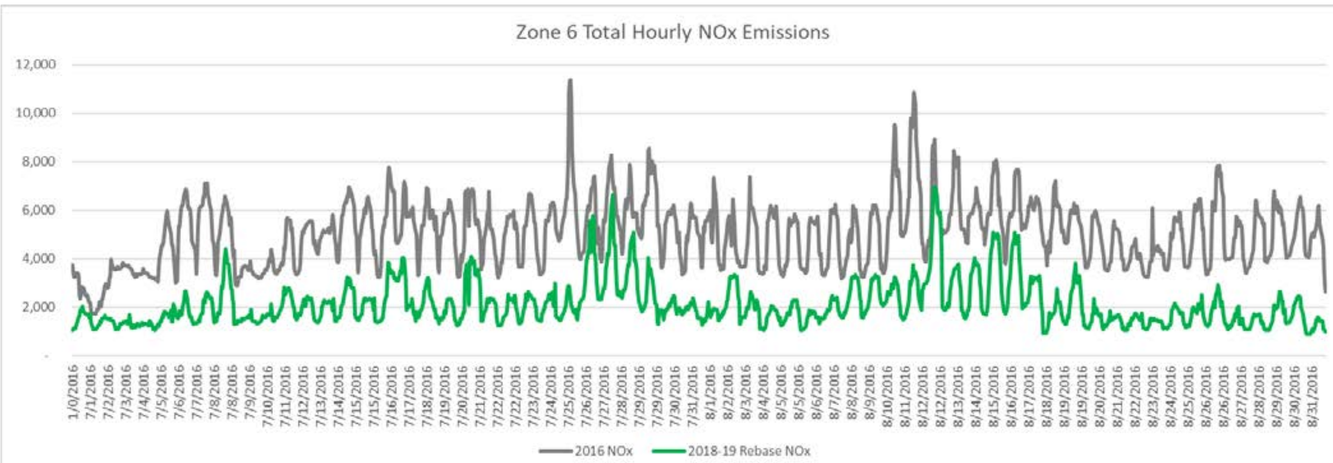
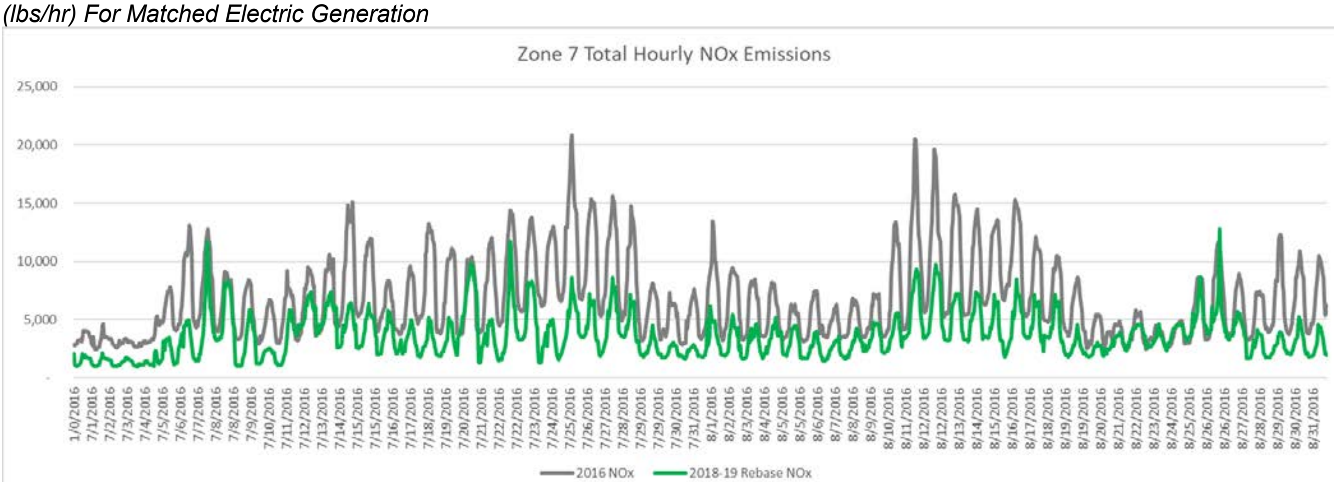



***Figure 12-12.*** *Zone 7 (Washington/Baltimore/Eastern Virginia) Comparison of 2016 to 2018/19 $NO_X$ Emissions (lbs/hr) For Matched Electric Generation*



## *12.4 Data Review of the 2018/19 ReBase Scenario*

Similar to the analysis conducted for actual 2018/19 operations, **Figures 12-14** and **12-15** present the total electrical hourly generation and NOx emissions for the 2018/2019 ReBase (adjusted to 2016) for all electric generation, cogeneration, and small electric providers within the OTR plus Virginia. Non-Part-75 units are not included in these plots because of lack of hourly CEMS data. While such units can and will exhibit peaking behavior, hourly changes are estimated by models based on a standardized emission profile from reported annual emissions. Total electric gross load is shown in blue and the gross load from peaking units is in red. Total electric NOx emissions is shown in gray and the peaker emissions are in blue in **Figure 12-15.** The maximum hourly peaker gross load and NOx emissions are about 17% and 47% of total gross load.

***Figure 12-13.*** *2016 Hourly Total OTR+VA MW generation of Part-75 Listed and Peaking Units During the 2018/19 ReBase Modeling Period*

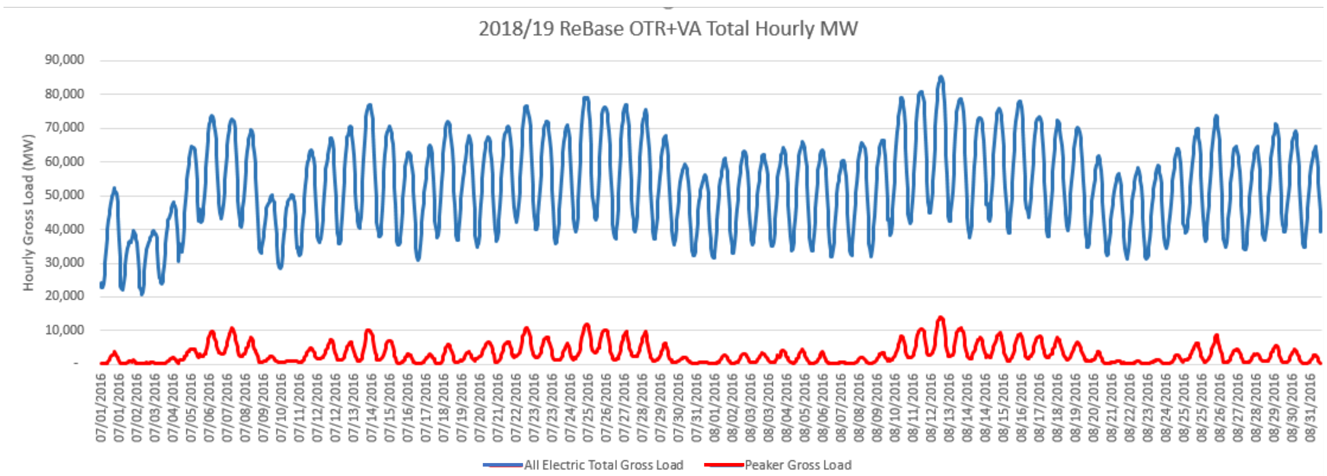
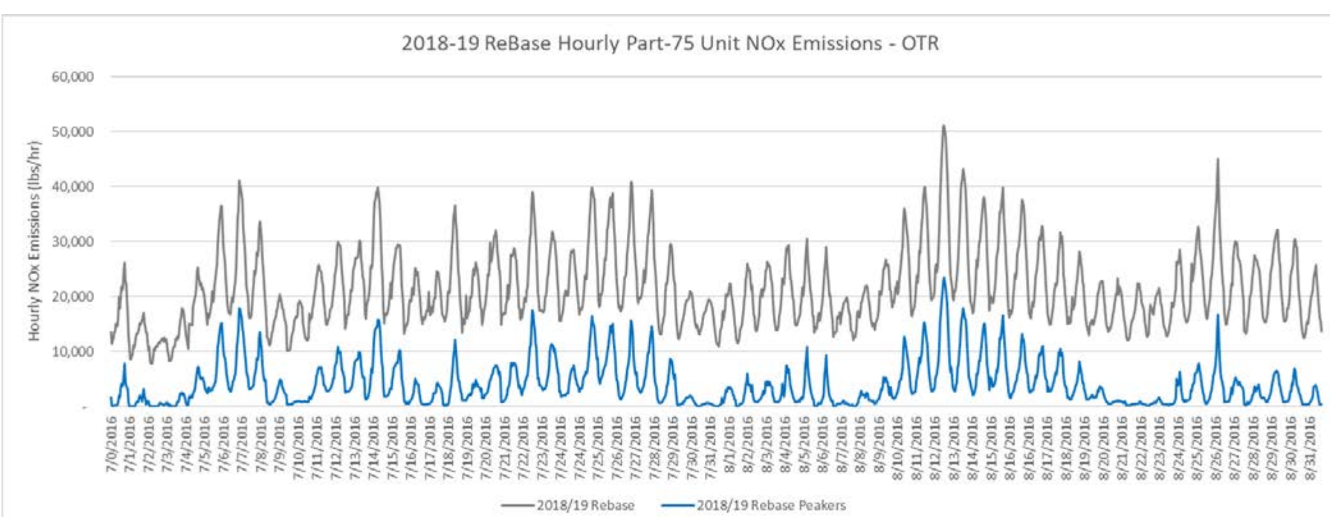


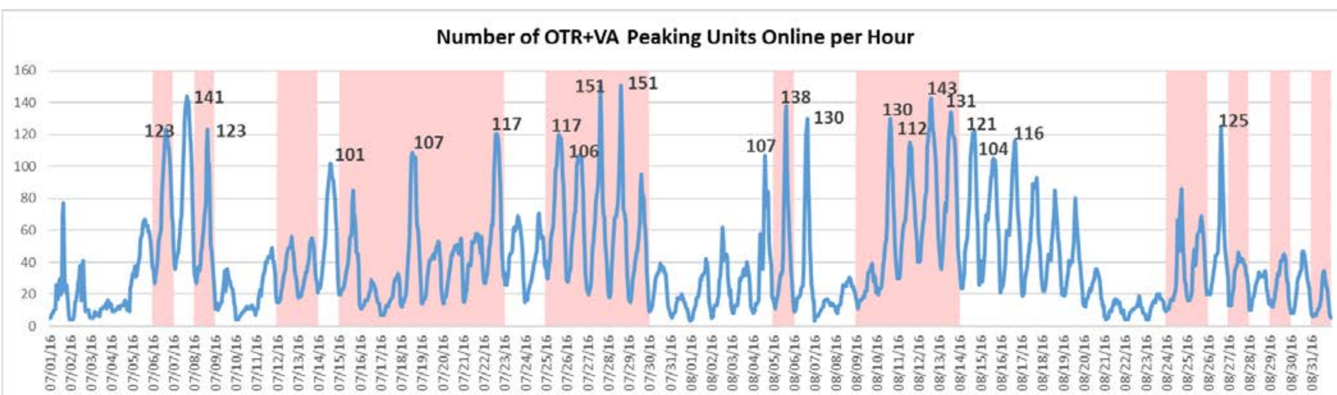

***Figure 12-14.*** *Hourly Total OTR+VA Emissions of $NO_X$ from Part-75 Listed and Peaking Units During the 2018/19 ReBase Modeling Period*



Overall, between 143 and 549 electric providing units were online during any given hour within the 2018/19 ReBased period, with an average of 323 in operation (all Part-75 electric generating units). The number of Electric providing units with measurable NOx emissions during this period ranged between 100 and 589 during any given hour with an average of about 253.

**Figure 12-16** shows the 32-day 2018/19 ReBase scenario emissions. The number of peaking units with measurable NOx emissions during the ReBase period ranged between 3 and 151 during any given hour with an average of about 40. This compares with the 2018 and 2019 baseline period for emissions, which ranged from 0 to 166 and averaged 20. The higher number of peaking units operating during the ReBase emission period of July 1-August 31, 2016 was expected because the period was selected as having higher than normal electrical demand. The areas in pink shading represent periods where ozone concentrations for at least one monitor in the OTR exceeded 71ppb. As before, non-Part-75 peaking units are not included in these unit counts since they do not have actual hourly operation and emission data available.

***Figure 12-15**. 2018/19 ReBased Hourly Total OTR+VA "Peaking Units" Reporting $NO_X$ Emissions (lbs/hour)*




## 12.5 Model Scenario Emissions Processing

**Run 1: Part-75 Unit Emission Methodology (2016 Base)**

Run 1 extracts actual 2016 reported hourly emissions for each Part-75 listed unit from the CAMD database for the dates and hours matching the episodic modeling period (July 1 – August 31, 2016). Hourly NOx emissions, hourly average emission rates (lbs/mmBTU), gross load (MW), and heat input rates (mmBTU/hr) were prepared into a format for processing with a Python script for conversion into an ERTAC-SMOKE-ready emission file. The file was then prepared for CMAQ modeling through the normal process. While Part-75 non-electric units were included in the adjusted dataset, they were not processed as part of this analysis.

**Run 2: Part-75 Unit Emission Methodology (2018/19 ReBase)**

Run 2 uses the ReBased 2018/19 dataset described above which matches total actual hourly 2016 electric gross loads by region to actual operations during periods during 2018 and 2019. As with Run 1, the hourly data were prepared into a format for input to a Python script for conversion into an ERTAC-SMOKE emission file. The file was then prepared for SMOKE and CMAQ modeling through the normal process.

**Runs 3 and 4: Part-75 Unit Emission Methodology (2018/19 ReBase – Zero Peakers)**
Runs 3 and 4 both begin with the ReBased (Run 2) emission file for July 1 – August 31. Run 3 then sets all units identified as being an electric peaking unit to zero for all hourly emissions and operations, without concern for maintaining hourly gross load. Once zeroed, the data is prepared and process into a format for input to a Python script and prepared for CMAQ modeling. Run 4, which was temporarily tabled due to insufficient data, uses the Run 2 file since it seeks to maintain 2018/19 ReBased Part-75 emissions and instead zeroing emissions from the non-Part-75 emission units.

**Run 5: Part-75 Unit Emission Methodology (2018/19 ReBase – Zero non-Electric)**
Run 5 was tabled due to estimated low impact on emissions. Should it ultimately be processed, it will begin with the ReBased (Run 2) emission file and then all hourly emissions and operations for units listed as being a non-electric unit will be set to zero. Once calculated, the data will be prepared into a format for input to a Python script for conversion into an ERTAC emission file. The file will then be prepared for SMOKE and CMAQ modeling through the normal process.

**Runs 6, 7 and 8: Part-75 Unit Emission Methodology (2018/19 ReBase – Differing Dispatch Priorities)**
Runs 6, 7, and 8 are designed to be bounding runs representing the highest, lowest, and most frequently operated unit configurations in a way where changing units' dispatch maintains hourly total gross load by region. To do this, regional total gross load was calculated from the rebase scenario and the load generated by dispatched units identified as peakers. This hourly gross load does not and should not match the hourly gross load from peaking units in 2016 for a couple of reasons. First, peaking unit designations were based on the entire 2018/19 ozone seasons and units would not necessarily operate identically during the higher 2018/19 electric demand periods that were matched through ReBasing. In addition, the rebase was set to match total gross load by region, not peaking load. However, units were dispatched in the total load matching exercise determined the new peaking load.

Runs 6 and 7 adjust dispatch priorities to create theoretical high and low bounds of NOx emissions in a way that meets electrical demand in the cleanest and dirtiest emitting operating unit configurations. Run 8 uses 2018/19 full ozone season that prioritizes operation of the actual most frequently operated units. To do this, each unit's hours of operation were calculated from the 2018 and 2019 full ozone season operations. A theoretical scenario was then developed where the most frequently operated units operated first and most frequently in a theoretical most likely emission scenario.

Runs 6, 7, and 8 introduce some addition challenges where unit load may be called-upon in ways that didn't occur during the 2018 or 2019 full ozone seasons. To accomplish this, a special routine was developed to estimate emissions based on 2018 and 2019 actual data based on an emission rate by operational load curve. Unit profiles consisted of 2018/19 actual emission rate averaged by MW range, grouped in 10% total MW ranges. An example of this is provided in **Figure 12-17** where average emission rates for 10% incremental ranges of gross load are marked by red dots and the linear best fit line (blue dots) is calculated for required unit gross loads. This allows for any gross load to have a corresponding emission rate and accounts for unit inefficacies and higher emissions at lower loads. The discontinuity in the lowest end of gross load is caused by an adjustment to account for emissions produced before the unit initiates electrical load. Unit start-ups were calculated starting 12-hours prior to initiation of gross load, where a 6-hour ramp-up from zero to 25% average unit NOx hourly emissions rate corresponded with an increase to 10% of the average unit heat input. The unit was then allowed to idle for 6 hours until load was started. Unit shut-downs were not ramped-down in this model.

Run 6 prioritizes dispatch based on 2018/19 ozone season highest to lowest hourly average NOx emission rates within each region (same as described in the ReBasing discussion above). The dirtiest emitting units will come online first and handle the load until it meets its maximum generation capacity, and then the next dirtiest unit is added. Tiebreakers were based on a lb NOx/mmBTU to maximum MW ratio so that the least efficient units were dispatched first. This adjustment is performed for each hour of the modeling period, matching regional hourly gross load needs. Run 7 is similar to Run 6, however it prioritizes dispatching from lowest to highest average emission rates from the same period and regions. Tiebreakers were based on a lb NOx/mmBTU to maximum MW ratio so that the most efficient units during the 2018 and 19 ozone seasons were dispatched first. Run 8 follows a similar routine, but prioritizes dispatch based on 2018/19 ozone season total hours of operation from highest to lowest by region. The tiebreaker for Run 8 was based on a lb NOx/mmBTU to maximum MW ratio so that the most frequently operated units during the 2018 and 19 ozone seasons would be dispatched first. A comparison of hourly emissions for each model run is summarized in **Figure 12-18**.

***Figure 12-16.*** *Sample Emission Profile and Resulting Data*

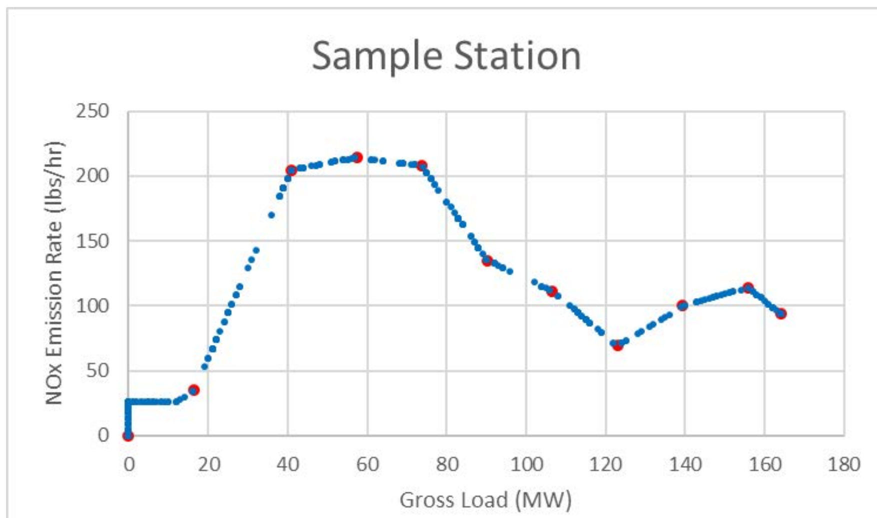
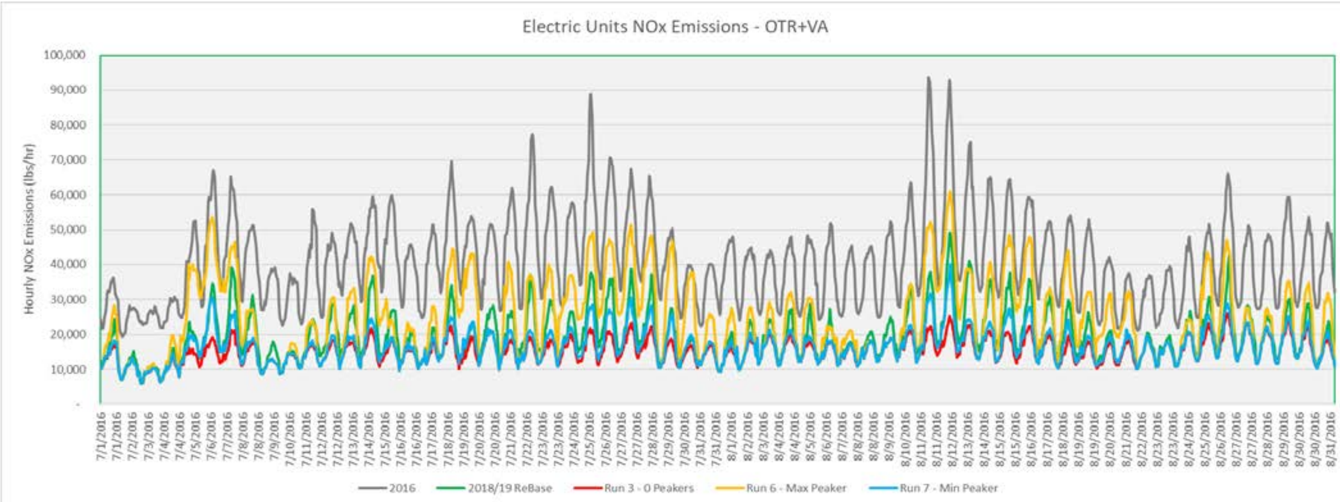


***Figure 12-17.*** *Runs 3, 6, and 7 Hourly Total OTR+VA Emissions of $NO_X$ from Part-75 Listed and Peaking Units During the 2018/19 ReBase Modeling Period*




While the 2018/19 ReBasing routine accounts for units that never operated during that period by keeping them at zero emissions, some units included in Runs 6 through 8 do not benefit from this because they lack 2018/19 operational data. In these cases, operational data could be used from similar units at the same facility, or from 2016 operations if appropriate surrogate operational parameters are not available. However, if no operational data was reported for 2016, 2018, or 2019, then the unit was considered "non-operational" for this study and thus are not dispatched in Runs 6, 7, or 8 (**Table 12-4**). Units that did not operate during summer 2018 or 2019 and thus did not have 2018 or 2019 actual operation data to generate an emission/gross load curve created another challenge. In this case, emissions were estimated based on similar units at the same facility or based on data collected for a different year as indicated in **Table 12-5**.

***Table 12-4.*** *OTR Part-75 "non-operational" electric providing units that are not dispatched for Runs 6, 7, and 8*

| State | Facility Name | Facility ID (ORISPL) | Unit ID |
|---|---|---|---|
| NJ | B L England | 2378 | 3 |
| NY | AG – Energy | 10803 | 1 |
| NY | AG – Energy | 10803 | 2 |
| NY | NRG Dunkirk Power | 2554 | 1 |
| NY | NRG Dunkirk Power | 2554 | 2 |
| NY | NRG Dunkirk Power | 2554 | 3 |
| NY | NRG Dunkirk Power | 2554 | 4 |
| PA | North East Cogeneration Plant | 54571 | 001 |
| PA | North East Cogeneration Plant | 54571 | 002 |
| VT | Berlin 5 | 3734 | A |
| VT | Berlin 5 | 3734 | B |
| VT | Penny Lane Gas Turbine | 3754 | CT1 |
| VT | Penny Lane Gas Turbine | 3754 | CT2 |

***Table 12-5.*** *OTR Part-75 “non-operational” electric providing units and their corresponding estimated data source(s) for Runs 6, 7, and 8*

| State | Facility Name | Facility ID (ORISPL) | Unit ID | Source |
|---|---|---|---|---|
| NJ | Bayonne Plant Holding, LLC | 50497 | 001001 | 2016 data |
| NJ | Bayonne Plant Holding, LLC | 50497 | 002001 | 2016 data |
| NJ | Bayonne Plant Holding, LLC | 50497 | 004001 | 2016 data |
| NY | Astoria Gas Turbine Power | 55243 | CT0005 | CT2-1A |
| NY | Astoria Gas Turbine Power | 55243 | CT0007 | CT2-1A |
| NY | Astoria Gas Turbine Power | 55243 | CT0008 | CT2-1A |
| NY | Astoria Gas Turbine Power | 55243 | CT0010 | CT2-1A |
| NY | Astoria Gas Turbine Power | 55243 | CT0011 | CT2-1A |
| NY | Astoria Gas Turbine Power | 55243 | CT0012 | CT2-1A |
| NY | Astoria Gas Turbine Power | 55243 | CT0013 | CT2-1A |
| NY | Astoria Generating Station | 8906 | 41SH | 32SH |
| NY | Astoria Generating Station | 8906 | 42RH | 51RH |
| NY | Cayuga Operating Company, LLC | 2535 | 2 | 2016 data |
| NY | Covanta Niagara | 50472 | R1B02 | R1B01 |
| NY | E F Barrett | 2511 | U00010 | U00011 |
| NY | Hudson Avenue | 2496 | CT0004 | CT0003 |
| NY | Ravenswood Generating Station | 2500 | CT0004 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT0005 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT0006 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT0007 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT0008 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT0009 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT02-1 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT02-2 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT02-3 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT02-4 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT03-1 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT03-2 | 2016 data |
| NY | Ravenswood Generating Station | 2500 | CT03-3 | 2016 CT03-4 |
| NY | Ravenswood Generating Station | 2500 | CT03-4 | 2016 data |
| PA | Mountain | 3111 | 031 | 032 |
| VA | Mecklenburg Power Station | 52007 | 1 | 2016 data |
| VA | Mecklenburg Power Station | 52007 | 2 | 2016 data |

## 12.6 Episodic HEDD Modeling Results

As discussed above, the OTC Modeling Committee selected six scenarios for high energy demand day analysis with episodic modeling. These scenarios are as follows:

- Run 1 – 2023 emissions with 2016 Part-75 electricity generating units (EGUs) in the OTR,
- Run 2 – 2023 emissions with 2018/19 Part-75 EGUs in the OTR,
- Run 3 – Based on Run 2 with zeroed out OTC identified peaking units,
- Run 6 – Based on Run 2 and redispatches OTC identified peaking unit actual electric capacity based on highest NOx emitting units coming online first,

- Run 7 – Based on Run 2 and redispatches OTC identified peaking unit actual electric capacity based on lowest NOx emitting units coming online first,
- Run 8 – Based on Run 2 and redispatches OTC identified peaking unit actual electric capacity based on the most frequently operated units coming online first.

These scenarios were selected to test the overall impact of peaking unit operation and to explore reasonable upper and lower bounds of potential capacity preserving operations. The difference between Runs 1 and 2 indicate emission changes taking place between the 2018/19 ReBase and the 2016 base year. The difference between Runs 2 and 3 shows the influence of peaking units on ozone in the region. And the differences between Run 2 and Runs 6, 7, and 8 indicate the influences that each of the three strategies would have while maintaining electrical capacity. Assuming that no different technology is introduced to supply electrical capacity, then Runs 6 and 7 produce upper and lower ranges current unit peak electric supplying options. Recall that Run 2 is designed to use actual emissions and Runs 6, 7, and 8 are more theoretical. Run 8 makes an interesting comparison of units most likely operate based on frequency of actual operation with what actually ran during the peak energy demand period (Run 2).

**Figure 12-19** shows the emissions associated with each of these screening modeling runs. There is a significant decrease in NOx emissions for both baseload and peaking units between the 2016 base year and the 2018/19 electric and 2023 other sector emissions. The differences between Run 2 and the other screening scenarios are more subtle, but significant. Note that dispatching the dirtiest burning units first increases NOx emissions of peaking units by about 50% and dispatching the cleanest burning peaking units can reduce peaking unit NOx emissions by about 30%. It is interesting that the NOx emissions for dispatching the most frequently used peaking units first produces very similar NOx emissions to dispatching the cleanest peaking units first.

***Figure 12-18.*** *Scenario Changes in EGU NOx Emission*

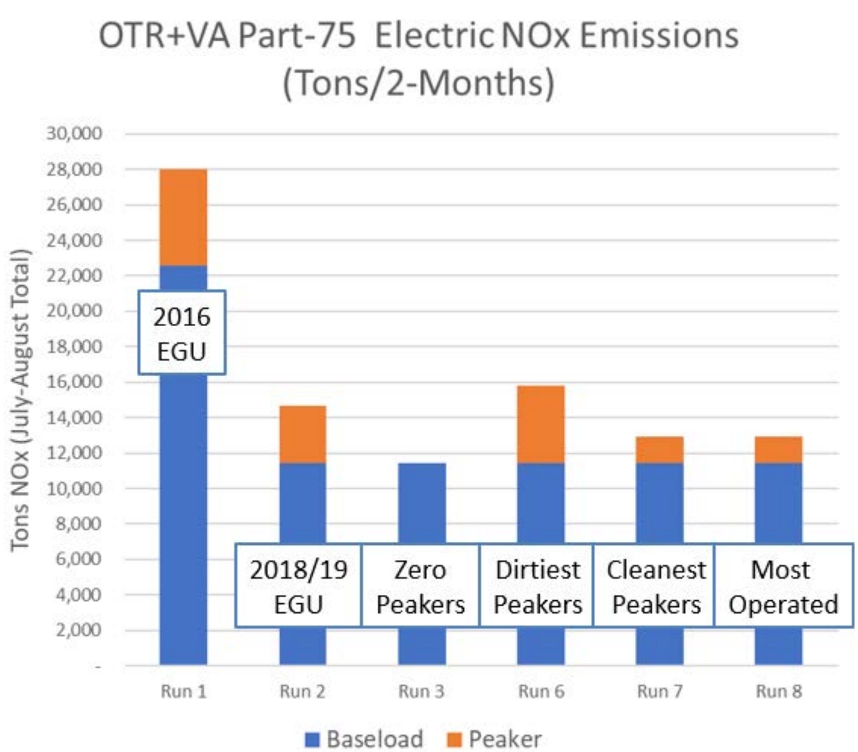



**Figure 12-20** Shows three high ozone days (July 24, 25, and August 11) with the modeled total ozone shown on the left and the change in modeled ozone for the day when all peaking units were turned off (e.g. Run 3-Run 2). Ozone changes were

generally localized in areas extending 50-100 miles downwind of the peaking units, with more mild changes extending further downwind. Since it is difficult to predict which peaking unit will operate on what day, the location of peaking unit impact on ozone is similarly difficult to predict. On July 24, ozone changes of up to 6.3 ppb were modeled in Maryland and up to 4.3 ppb in New Jersey. On July 25$^{th}$, up to 7.1 ppb in Maryland and 2.2 ppb in New Jersey and Delaware were modeled. On August 11, 8-hour ozone changes of 3.2 ppb were modeled in Connecticut and New Jersey, 2.3 ppb was modeled in New York, and 3.7 ppb was modeled in Pennsylvania.

Large areas of higher ozone concentrations can be seen along the coastal areas of the OTR spanning from Virginia into the Gulf of Maine in **Figure 12-21(A)**. This area includes all five ozone nonattainment areas in the OTR. **Figure 12-21(B)** shows the ozone reductions as a result of EGU emissions differences between 2016 and 2018/19. The largest improvement took place throughout Delaware, the District of Columbia, Maryland, New Jersey, Pennsylvania, and the eastern portion of Virginia. The high ozone areas of New York City and Connecticut did not see similar levels of benefit. **Figure 12-21(C)** presents the theoretical scenario where all peaking units are simply turned off. In this scenario, modest ozone improvements occur throughout the region with larger ozone reductions of greater than 1 ppb and up to 5 ppb occurring over the Washington D.C., Baltimore, New York City, and Greater Connecticut nonattainment areas.

**Figure 12-22** presents the results of Runs 6 (highest NOx emitting units first), 7(lowest NOx emitting units first), and 8 (Most frequently operated units first) where each scenario preserves electric capacity occurring during the 2016 base period. The plots indicate modeled 8-hour ozone differences between the 2018/19 rebase scenario and each of the other three scenarios. **Figure 12-22(A)** highlights a large area extending from New York City eastward through southern New England where the higher NOx emissions result in increased ozone concentrations of up to 3.3 ppb. This suggests that dispatching of peaking units could have been done in such a way as to increase ozone at some of the highest ozone areas in the OTR by 2-3.3 ppb. **Figure 12-22(B)** shows that dispatching peaking units in the cleanest possible way could further decrease ozone in the New Your City and Greater Connecticut nonattainment areas by 1-2 ppb and some high ozone locations in Maryland by up to 2.5 ppb. Run 8 (**Figure 12-22(C)**) produces ozone benefits very similar in magnitude and location to those seen in Run 7 (Cleanest). This suggests that peaking units that operate the most are generally also the lowest emitting units. While frequently operating units are often some of the cleanest, they are not always the ones that actually get dispatched during high power demand periods. Thus, there is room for improvement that would benefit several high ozone locations in the OTR on some of the highest ozone days of the year.

**Tables 12-6 and 12-7** present modeling data for each scenario. **Table 12-6** is a summary of the high ozone locations in the OTR and **Table 12-7** presents monitor-by-monitor design value and daily maximum 8-hour ozone differences. Blank values indicate that too few days had high enough ozone to calculate a design value.

## 12.7 Conclusion

Peaking unit operation is notoriously difficult to predict ahead of time, including predicting how they might operate in projected future years. This is why this project used actual operations of peaking units for a recent year and fit into the 2016 modeling platform. While not perfect, it produced a more realistic representation of recent operations years after the base modeling platform was created and captured important operating details. Because peaking unit operation is so infrequent and variable, changes in ozone resulting from the units operated are also difficult to predict. Some units create localized impacts, others collectively create regions of reduced ozone that can extend downwind. High NOx emitting units in high NOx areas can cause localized areas of titration (decreased ozone) on some days while causing lower ozone on other days. However, modeling indicates that even with the variable operations and conditions, that ozone will decrease more often than potential increases, and that reductions of ozone would occur in some of the highest ozone areas of the OTR. This is verified by model predicted DVFs showing improvements at all the high ozone locations in the OTR.

***Figure 12-19.*** *Three High Ozone Days and Corresponding Changes in Ozone – All Peaking Units Off*

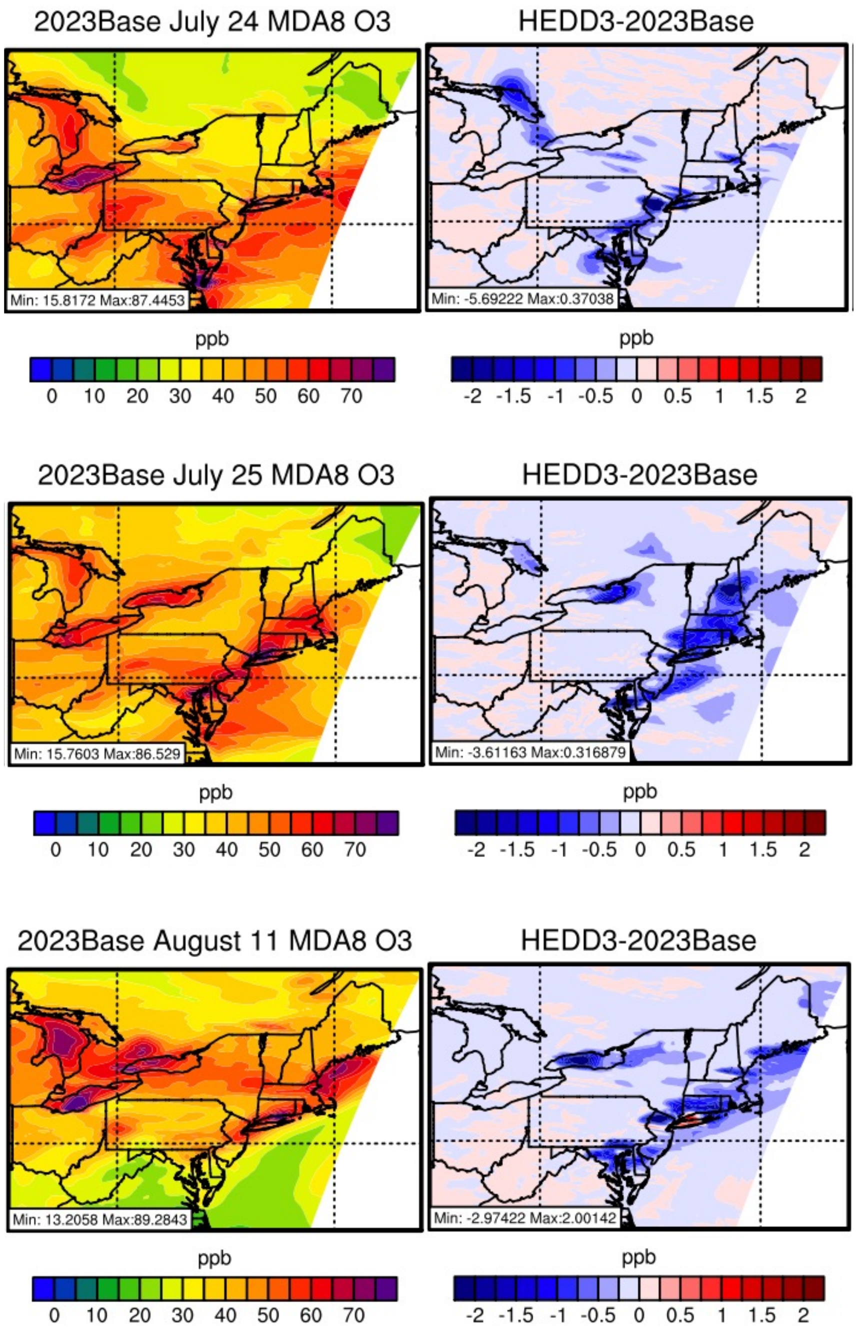


***Figure 12-20** (Left) Predicted 8-hour peak ozone (ppb). (Middle) Predicted average 8-hour ozone differences 2018/19 – 2016. (Right) Predicted average 8-hour ozone differences when peaking units are turned off.*

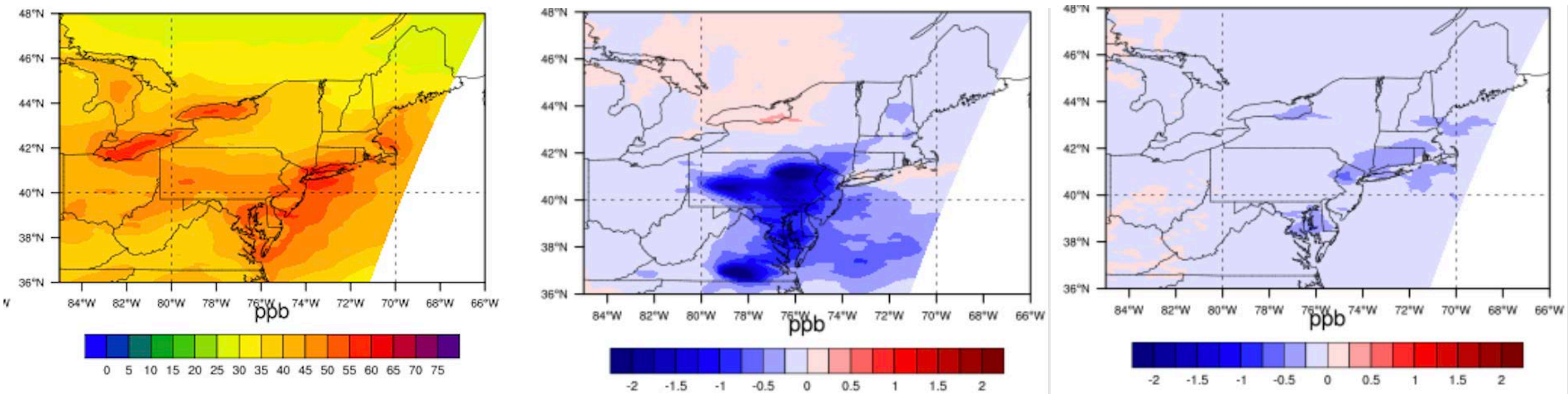



***Figure 12-21.** (Left) Predicted average 8-hour ozone difference when highest $NO_X$ emitting units are dispatched first. (Middle) Same as (Left) except when lowest $NO_X$ emitting units are dispatched first. (Right) Same as (Left) except for when typically used units are dispatched first.*

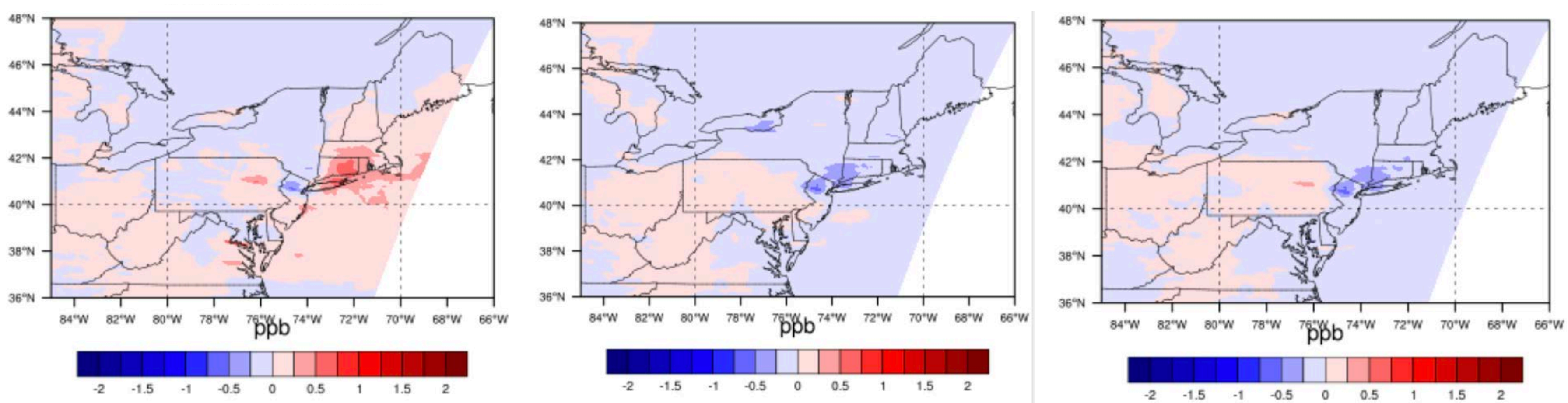


***Table 12-6****. Episodic Screening Modeling Maximum 8-Hour Ozone Summary for High Ozone Locations in the OTR*

| | | | DVF | | | | Change in DVF | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| siteID | State | Location | 2019-21 DV | 2023 DVF | 2023 with 2016 Part-75 DVF | 2023 with 2018/19 Part-75 DVF | 2016 to 2018/19 | 2018/19 to Zero Peaker | 2018/19 to Worst Case | 2018/19 to Best Cast | 2018/19 to Most Frequent | Worst Case to Best Case | Most Frequent to Best Case |
| 90099002 | CT | Madison | 82 | 71.5 | 71.3 | 71.7 | 0.4 | -0.6 | 1 | -0.5 | -0.5 | -1.5 | 0 |
| 90013007 | CT | Stratford | 81 | 74.4 | 74.1 | 74.3 | 0.2 | -0.6 | 0.2 | -0.5 | -0.5 | -0.7 | 0 |
| 90019003 | CT | Westport | 80 | 75.7 | 75.7 | 75.5 | -0.2 | -0.7 | -0.2 | -0.6 | -0.6 | -0.4 | 0 |
| 90010017 | CT | Greenwich | 79 | 75.3 | 75.5 | 75.2 | -0.3 | -0.3 | -0.1 | -0.3 | -0.3 | -0.2 | 0 |
| 90079007 | CT | Middletown | 74 | 70.2 | 70.2 | 70.4 | 0.2 | -0.8 | 0.8 | -0.6 | -0.6 | -1.4 | 0 |
| 90110124 | CT | Groton Fort Griswold | 73 | 71.3 | 71.6 | 71.4 | -0.2 | -0.3 | 0 | -0.2 | -0.2 | -0.2 | 0 |
| 361030002 | NY | Babylon | 73 | 68.2 | 68.3 | 67.8 | -0.5 | -0.5 | 0.3 | -0.3 | -0.3 | -0.6 | 0 |
| 90090027 | CT | New Haven | 72 | 68.5 | 68.3 | 68.5 | 0.2 | -0.5 | 0.3 | -0.4 | -0.4 | -0.7 | 0 |
| 240251001 | MD | Edgewood | 72 | 65.3 | 65.8 | 64.7 | -1.1 | -0.4 | 0.1 | 0.2 | -0.3 | 0.1 | -0.5 |
| 340030006 | NJ | Leonia | 71 | 68.1 | 68.7 | 68.3 | -0.4 | -0.2 | -0.3 | -0.1 | -0.1 | 0.2 | 0 |
| 360810124 | NY | NYC-Queens | 71 | 66.9 | 67 | 66.7 | -0.3 | -0.4 | 0 | -0.3 | -0.3 | -0.3 | 0 |
| 420170012 | PA | Bristol | 71 | 70.6 | 71.1 | 70.1 | -1 | -0.2 | 0.2 | 0.3 | 0.1 | 0.1 | -0.2 |
| 421010024 | PA | NEA | 71 | 69.3 | 70 | 69 | -1 | -0.2 | 0.1 | 0.2 | 0 | 0.1 | -0.2 |

***Table 12-7.*** *Episodic Ozone Screening Modeling Results for each Modeling Scenario and each Monitor in the OTR*

| ID | St | Location | 2019-21 DV | Predicted 2023 Design Values | | | | | | Maximum 8-Hour Concentration Difference | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Run 1 | Run 2 | Run 3 | Run 6 | Run 7 | Run 8 | Runs 1-2 | Runs 2-3 | Runs 2-6 | Runs 2-7 | Runs 2-8 | Runs 7-6 |
| 90010017 | CT | Greenwich | 79 | 72.5 | 72.1 | 71.9 | 72.0 | 71.9 | 71.9 | 1.76 | 1.99 | -2.92 | 1.99 | 1.61 | 3.30 |
| 90011123 | CT | Danbury | 70 | 69.4 | 69.1 | 68.3 | 68.8 | 68.4 | 68.4 | 2.53 | 3.23 | -1.16 | 3.05 | 2.99 | 1.60 |
| 90013007 | CT | Stratford | 81 | 79.7 | 80.0 | 79.6 | 80.4 | 79.7 | 79.7 | 1.15 | 1.76 | -2.06 | 1.76 | 1.68 | 2.84 |
| 90019003 | CT | Westport | 80 | 83.4 | 82.8 | 82.3 | 82.7 | 82.4 | 82.4 | 0.94 | 1.60 | -2.72 | 1.50 | 1.58 | 3.07 |
| 90031003 | CT | East Hartford | 67 | 63.6 | 63.3 | 62.7 | 64.0 | 62.8 | 62.8 | 1.58 | 1.27 | -3.51 | 1.25 | 1.23 | 3.65 |
| 90050005 | CT | Mohawk Mt | 64 | 63.1 | 63.1 | 62.1 | 62.8 | 62.2 | 62.2 | 2.46 | 1.51 | -0.75 | 1.41 | 1.32 | 1.11 |
| 90079007 | CT | Middletown | 74 | 70.9 | 71.1 | 70.3 | 72.0 | 70.4 | 70.4 | 1.39 | 1.52 | -2.83 | 1.39 | 1.43 | 3.29 |
| 90090027 | CT | New Haven | 72 | 73.9 | 74.2 | 73.9 | 74.8 | 74.0 | 73.9 | 0.91 | 1.00 | -2.04 | 0.97 | 0.93 | 2.61 |
| 90099002 | CT | Madison | 82 | 77.2 | 77.3 | 77.1 | 77.5 | 77.2 | 77.1 | 1.08 | 1.74 | -3.32 | 1.63 | 1.64 | 4.95 |
| 90110124 | CT | Groton | 73 | 73.1 | 73.1 | 72.9 | 73.2 | 73.0 | 73.0 | 1.19 | 1.20 | -1.99 | 1.22 | 1.25 | 2.21 |
| 90131001 | CT | Stafford | 67 | 63.3 | 63.0 | 62.4 | 64.2 | 62.5 | 62.5 | 1.97 | 1.41 | -2.26 | 1.38 | 1.36 | 2.71 |
| 90159991 | CT | Abington | 65 | 62.3 | 62.1 | 61.5 | 62.9 | 61.7 | 61.6 | 1.37 | 1.46 | -3.07 | 1.08 | 1.07 | 3.18 |
| 100010002 | DE | Killens | 63 | 62.9 | 62.1 | 62.0 | 62.3 | 62.3 | 62.1 | 2.24 | 2.25 | -0.75 | 1.61 | 1.16 | 0.57 |
| 100031007 | DE | LUMS2 | | 60.4 | 59.2 | 58.9 | 59.6 | 59.4 | 59.1 | 3.86 | 2.99 | -0.75 | 2.72 | 2.72 | 0.68 |
| 100031010 | DE | BCSP | | 66.7 | 65.2 | 64.8 | 65.5 | 65.5 | 65.2 | 3.25 | 1.62 | -1.15 | 1.27 | 1.25 | 0.91 |
| 100031013 | DE | BELLFNT2 | 64 | 64.4 | 62.9 | 62.5 | 63.1 | 63.2 | 62.9 | 3.53 | 1.89 | -1.09 | 1.69 | 1.57 | 0.94 |
| 100032004 | DE | Wilmington-M | | 64.6 | 63.1 | 62.8 | 63.4 | 63.5 | 63.2 | 3.53 | 1.89 | -1.09 | 1.69 | 1.57 | 0.94 |
| 100051002 | DE | Seaford | 62 | 59.4 | 58.3 | 58.2 | 58.6 | 58.6 | 58.4 | 2.94 | 2.89 | -0.74 | 2.76 | 2.68 | 1.29 |
| 100051003 | DE | Lewes | | 60.6 | 59.9 | 59.7 | 60.0 | 59.9 | 59.9 | 2.64 | 1.14 | -0.75 | 1.11 | 1.08 | 0.89 |
| 110010041 | DC | RIVER_Terrace | 60 | 49.8 | 48.9 | 48.8 | 48.9 | 48.9 | 48.9 | 3.54 | 1.11 | -0.86 | 0.84 | 0.80 | 0.76 |
| 110010043 | DC | McMillan | 68 | 62.0 | 60.9 | 60.8 | 61.0 | 61.0 | 60.9 | 3.54 | 1.11 | -0.86 | 0.84 | 0.80 | 0.76 |
| 110010050 | DC | TakomaRec | 66 | 60.3 | 59.2 | 59.1 | 59.2 | 59.3 | 59.2 | 3.50 | 1.29 | -0.64 | 0.96 | 0.91 | 0.45 |
| 230010014 | ME | Durham | 53 | 58.5 | 58.1 | 57.8 | 58.3 | 58.0 | 58.0 | 1.63 | 4.30 | -0.56 | 3.80 | 3.77 | 0.71 |
| 230039991 | ME | Ashland | 52 | | | | | | | 0.80 | 0.55 | -0.15 | 0.47 | 0.44 | 0.38 |
| 230052003 | ME | Cape Elizabeth | 62 | 62.7 | 62.2 | 61.8 | 62.4 | 61.9 | 62.0 | 1.10 | 0.75 | -0.66 | 0.63 | 0.50 | 0.85 |
| 230090102 | ME | Cadillac Summit | 67 | 69.4 | 69.1 | 68.8 | 69.4 | 69.0 | 68.9 | 0.82 | 0.69 | -1.32 | 0.52 | 0.49 | 0.97 |
| 230090103 | ME | McFarland Hill | 60 | 62.4 | 62.1 | 61.8 | 62.3 | 62.0 | 61.9 | 0.75 | 1.36 | -0.53 | 0.57 | 0.51 | 0.90 |
| 230112001 | ME | Gardiner | | | | | | | | 0.97 | 1.57 | -0.53 | 1.39 | 1.36 | 0.76 |
| 230130004 | ME | Port Clyde | 60 | 62.9 | 62.4 | 62.0 | 62.6 | 62.1 | 62.1 | 1.01 | 1.57 | -0.92 | 0.85 | 0.88 | 1.25 |
| 230194008 | ME | Holden | 57 | | | | | | | 0.80 | 0.64 | -0.67 | 0.54 | 0.57 | 1.02 |
| 230290019 | ME | Jonesport | 55 | | | | | | | 0.97 | 0.93 | -1.53 | 0.45 | 0.43 | 1.87 |
| 230310038 | ME | Hollis/West Buxton | | | | | | | | 0.92 | 1.28 | -0.45 | 1.04 | 0.79 | 0.43 |
| 230310040 | ME | Shapleigh | 56 | | | | | | | 1.46 | 1.16 | -0.85 | 0.92 | 0.45 | 0.97 |
| 230312002 | ME | Kennebunkport | 64 | 64.0 | 63.7 | 63.3 | 63.8 | 63.5 | 63.7 | 0.93 | 1.44 | -0.49 | 1.42 | 0.99 | 0.78 |
| 240031003 | MD | GLEN BURNIE | 70 | 68.2 | 66.8 | 66.7 | 67.2 | 67.2 | 66.7 | 4.64 | 1.04 | -1.24 | 0.81 | 1.04 | 0.64 |
| 240051007 | MD | Padonia | 69 | 63.7 | 61.2 | 60.8 | 61.3 | 61.2 | 61.0 | 5.09 | 1.00 | -0.67 | 0.73 | 0.96 | 0.37 |
| 240053001 | MD | Essex | 70 | 67.1 | 66.1 | 65.8 | 66.2 | 66.4 | 65.9 | 3.43 | 1.62 | -1.14 | 1.17 | 1.61 | 0.50 |
| 240090011 | MD | CALVERT-B | 58 | 63.4 | 62.2 | 61.9 | 62.1 | 62.4 | 62.2 | 10.68 | 5.55 | -1.56 | 4.93 | 4.93 | 0.83 |
| 240130001 | MD | South Carroll | 64 | 60.0 | 58.2 | 57.6 | 57.9 | 58.0 | 57.7 | 2.95 | 1.55 | -0.62 | 1.45 | 1.55 | 0.46 |
| 240150003 | MD | Fair Hill | 67 | 65.7 | 64.6 | 64.1 | 64.8 | 64.8 | 64.4 | 3.95 | 2.06 | -1.41 | 1.77 | 1.90 | 0.88 |

| ID | St | Location | 2019-21 DV | Predicted 2023 Design Values | | | | | | Maximum 8-Hour Concentration Difference | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Run 1 | Run 2 | Run 3 | Run 6 | Run 7 | Run 8 | Runs 1-2 | Runs 2-3 | Runs 2-6 | Runs 2-7 | Runs 2-8 | Runs 7-6 |
| 240170010 | MD | Southern MD | 59 | 60.8 | 58.5 | 58.0 | 58.0 | 58.4 | 58.4 | 5.64 | 6.29 | -1.30 | 1.90 | 1.72 | 1.61 |
| 240190004 | MD | Horn Point | 64 | 61.9 | 60.7 | 59.5 | 59.9 | 60.2 | 60.2 | 7.29 | 7.12 | -1.58 | 4.14 | 3.31 | 1.06 |
| 240199991 | MD | Blackwater NWR | 62 | 63.5 | 61.7 | 61.6 | 61.9 | 61.9 | 61.7 | 6.70 | 3.95 | -1.45 | 3.00 | 2.91 | 1.31 |
| 240210037 | MD | Frederick Co. | 65 | 59.7 | 57.8 | 57.3 | 57.5 | 57.7 | 57.5 | 4.40 | 1.87 | -0.40 | 1.68 | 1.87 | 0.71 |
| 240230002 | MD | Piney Run | 58 | | | | | | | 3.94 | 0.14 | -0.09 | 0.11 | 0.12 | 0.08 |
| 240251001 | MD | Edgewood | 72 | 68.7 | 67.7 | 67.3 | 67.9 | 67.9 | 67.4 | 4.01 | 3.21 | -0.68 | 2.46 | 2.92 | 0.42 |
| 240259001 | MD | Aldino | 68 | 66.9 | 66.0 | 65.4 | 65.9 | 65.9 | 65.5 | 3.51 | 3.08 | -1.83 | 2.67 | 2.88 | 1.54 |
| 240290002 | MD | Millington | 64 | 61.5 | 60.6 | 60.1 | 60.8 | 60.7 | 60.3 | 4.39 | 3.10 | -1.67 | 2.87 | 2.85 | 1.30 |
| 240313001 | MD | Rockville | 63 | 58.3 | 57.7 | 57.5 | 57.7 | 57.7 | 57.6 | 3.82 | 3.40 | -1.59 | 3.40 | 3.40 | 1.23 |
| 240330030 | MD | HU-Beltsville | 67 | 59.7 | 58.5 | 58.3 | 58.5 | 58.6 | 58.5 | 3.93 | 2.93 | -1.59 | 2.93 | 2.93 | 1.21 |
| 240338003 | MD | Prince Georges | 65 | 61.4 | 60.7 | 60.6 | 60.6 | 60.7 | 60.6 | 5.16 | 1.54 | -0.83 | 1.55 | 1.37 | 0.86 |
| 240339991 | MD | Beltsville | 70 | 60.4 | 58.7 | 58.5 | 58.9 | 59.3 | 58.7 | 3.99 | 2.46 | -1.60 | 2.45 | 2.46 | 1.18 |
| 240430009 | MD | Hagerstown | 60 | | | | | | | 3.23 | 1.00 | -0.31 | 0.99 | 0.99 | 0.30 |
| 245100054 | MD | Furley Rec Cntr | | 62.9 | 61.7 | 61.5 | 62.0 | 62.0 | 61.6 | 3.55 | 1.58 | -1.23 | 1.33 | 1.55 | 0.47 |
| 250010002 | MA | Truro | 64 | 65.7 | 65.6 | 65.4 | 65.8 | 65.5 | 65.5 | 2.23 | 0.85 | -1.64 | 0.67 | 0.67 | 1.36 |
| 250051004 | MA | Fall River | | 71.2 | 71.0 | 70.9 | 71.4 | 70.9 | 70.9 | 1.17 | 1.25 | -2.63 | 1.01 | 1.03 | 3.29 |
| 250051006 | MA | Fairhaven2 | 63 | 65.9 | 65.7 | 65.5 | 65.9 | 65.5 | 65.6 | 1.64 | 0.86 | -3.07 | 0.66 | 0.62 | 2.68 |
| 250070001 | MA | Martha's Vineyard | 65 | 69.0 | 69.0 | 68.7 | 69.4 | 68.7 | 68.8 | 2.48 | 1.13 | -2.60 | 1.01 | 0.62 | 2.47 |
| 250092006 | MA | Lynn | 62 | 65.4 | 65.0 | 64.7 | 65.4 | 64.9 | 64.9 | 1.27 | 1.05 | -1.59 | 0.78 | 0.62 | 1.59 |
| 250094005 | MA | Newbury-B | | 61.4 | 61.1 | 60.8 | 61.3 | 60.9 | 61.0 | 1.26 | 1.56 | -0.77 | 1.60 | 0.74 | 1.50 |
| 250095005 | MA | Haverhill | 58 | 56.6 | 56.0 | 55.6 | 56.5 | 55.8 | 55.8 | 1.50 | 1.88 | -1.73 | 1.86 | 0.69 | 2.16 |
| 250112005 | MA | Greenfield | 55 | | | | | | | 1.21 | 1.20 | -1.70 | 1.15 | 1.16 | 1.74 |
| 250130008 | MA | Chicopee | 63 | 61.3 | 60.7 | 60.0 | 62.1 | 60.3 | 60.3 | 1.85 | 1.14 | -2.06 | 0.91 | 0.96 | 2.70 |
| 250154002 | MA | Ware | | 60.5 | 60.0 | 59.3 | 61.2 | 59.5 | 59.5 | 1.50 | 1.28 | -2.32 | 0.77 | 0.90 | 2.99 |
| 250170009 | MA | Chelmsford LAB | 58 | 57.9 | 57.2 | 56.8 | 58.0 | 57.0 | 57.0 | 1.56 | 1.04 | -1.84 | 0.96 | 0.95 | 2.30 |
| 250213003 | MA | E Milton (Blue Hill) | 56 | 66.8 | 66.4 | 66.2 | 66.9 | 66.3 | 66.3 | 1.27 | 1.18 | -1.95 | 0.65 | 0.73 | 2.19 |
| 250230005 | MA | Brockton | 60 | 60.4 | 59.9 | 59.4 | 60.5 | 59.7 | 59.6 | 1.09 | 1.24 | -1.63 | 0.82 | 0.87 | 1.63 |
| 250250042 | MA | Boston-Roxbury | 59 | 58.7 | 58.3 | 58.1 | 58.6 | 58.2 | 58.3 | 1.19 | 1.50 | -2.44 | 0.71 | 1.52 | 2.78 |
| 250270015 | MA | Worcester | 62 | 57.4 | 56.8 | 56.2 | 57.8 | 56.4 | 56.4 | 1.58 | 1.25 | -2.07 | 1.17 | 1.18 | 2.75 |
| 250270024 | MA | Uxbridge | 60 | 60.1 | 59.3 | 58.8 | 60.1 | 59.0 | 59.0 | 1.36 | 1.29 | -1.97 | 1.01 | 1.02 | 1.88 |
| 330012004 | NH | Laconia-B | 53 | 51.7 | 50.1 | 49.0 | 49.9 | 49.3 | 49.7 | 6.82 | 3.40 | -0.35 | 2.62 | 1.09 | 2.23 |
| 330050007 | NH | Keene | 54 | | | | | | | 1.29 | 0.84 | -0.93 | 0.78 | 0.74 | 1.13 |
| 330074001 | NH | Mt Washington Smt | | | | | | | | 1.27 | 0.34 | -0.52 | 0.32 | 0.32 | 0.56 |
| 330074002 | NH | Mt Washington Bs | 53 | | | | | | | 1.33 | 0.86 | -0.71 | 0.79 | 0.34 | 0.75 |
| 330090010 | NH | Lebanon | 52 | | | | | | | 1.89 | 0.54 | -0.72 | 0.52 | 0.54 | 0.76 |
| 330099991 | NH | Woodstock | 51 | | | | | | | 2.11 | 1.10 | -0.63 | 1.00 | 0.45 | 0.89 |
| 330111011 | NH | Nashua-Gilson | 56 | | | | | | | 1.53 | 1.03 | -1.90 | 0.77 | 0.80 | 2.41 |
| 330115001 | NH | Peterborough | 59 | | | | | | | 1.88 | 0.86 | -1.44 | 0.74 | 0.78 | 1.45 |
| 330131007 | NH | Concord-B | 56 | | | | | | | 6.36 | 3.85 | -0.95 | 3.68 | 1.39 | 4.02 |
| 330150014 | NH | Portsmouth | 54 | 61.9 | 61.8 | 61.5 | 61.9 | 61.5 | 61.7 | 1.43 | 3.08 | -0.64 | 2.02 | 0.83 | 1.85 |
| 330150016 | NH | Rye-Odiorne | 62 | 65.2 | 65.1 | 64.8 | 65.2 | 64.9 | 65.0 | 1.43 | 3.08 | -0.64 | 2.02 | 0.83 | 1.85 |
| 330150018 | NH | Londonderry | 57 | | | | | | | 1.51 | 1.43 | -1.69 | 1.13 | 0.97 | 2.22 |
| 340010006 | NJ | Brigantine | 59 | 61.1 | 60.5 | 60.3 | 60.8 | 60.5 | 60.5 | 2.16 | 1.01 | -1.72 | 0.85 | 0.85 | 1.80 |
| 340030006 | NJ | Leonia | 71 | 70.2 | 69.9 | 69.7 | 69.6 | 69.8 | 69.8 | 2.38 | 1.49 | -1.03 | 1.43 | 1.31 | 1.22 |
| 340070002 | NJ | Camden | 66 | 67.4 | 66.4 | 66.1 | 66.7 | 66.8 | 66.4 | 2.37 | 0.96 | -0.76 | 0.93 | 0.89 | 0.51 |
| 340071001 | NJ | Ancora | 62 | 59.0 | 58.3 | 58.0 | 58.6 | 58.6 | 58.2 | 2.57 | 1.11 | -1.68 | 0.99 | 0.96 | 1.57 |
| 340110007 | NJ | Millville | 65 | 59.2 | 58.3 | 58.0 | 58.6 | 58.6 | 58.2 | 4.43 | 2.57 | -1.76 | 2.02 | 2.02 | 1.28 |
| 340130003 | NJ | Newark | 65 | 63.5 | 63.1 | 62.9 | 63.0 | 62.9 | 63.0 | 2.27 | 1.43 | -1.23 | 1.35 | 1.22 | 1.51 |
| 340150002 | NJ | Clarksboro | 66 | 67.5 | 66.3 | 66.1 | 66.6 | 66.6 | 66.3 | 2.77 | 1.27 | -0.95 | 5.22 | 1.16 | 5.77 |
| 340170006 | NJ | Bayonne | 66 | 72.8 | 72.4 | 72.2 | 72.2 | 72.3 | 72.3 | 2.93 | 0.46 | -3.28 | 0.32 | 0.33 | 1.32 |
| 340190001 | NJ | Flemington | 63 | 63.0 | 61.9 | 61.8 | 62.0 | 62.0 | 62.0 | 3.70 | 3.09 | -1.00 | 3.08 | 2.99 | 1.17 |
| 340210005 | NJ | Rider U | 69 | 63.7 | 62.5 | 62.4 | 62.8 | 62.9 | 62.6 | 2.48 | 1.74 | -0.63 | 1.74 | 1.72 | 0.70 |
| 340219991 | NJ | Wash Crossing | 66 | 65.6 | 64.5 | 64.3 | 64.6 | 64.8 | 64.5 | 2.49 | 2.73 | -0.66 | 2.71 | 2.73 | 0.72 |
| 340230011 | NJ | Rutgers U | 68 | 68.1 | 67.5 | 67.4 | 67.7 | 67.6 | 67.5 | 4.08 | 1.65 | -0.99 | 1.63 | 1.64 | 1.31 |
| 340250005 | NJ | Monmouth U | 66 | 65.6 | 65.0 | 64.8 | 64.9 | 65.0 | 64.9 | 3.55 | 0.97 | -1.61 | 0.94 | 0.97 | 1.86 |
| 340273001 | NJ | Chester | 62 | 61.3 | 60.5 | 60.3 | 60.6 | 60.4 | 60.4 | 3.73 | 4.29 | -1.25 | 4.27 | 4.28 | 1.37 |
| 340290006 | NJ | Colliers Mills | 66 | 64.5 | 63.7 | 63.5 | 63.8 | 63.9 | 63.7 | 2.22 | 0.64 | -1.28 | 0.62 | 0.61 | 1.31 |
| 340315001 | NJ | Ramapo | 62 | 61.6 | 61.2 | 61.0 | 61.3 | 61.1 | 61.1 | 2.87 | 2.58 | -0.91 | 2.36 | 2.28 | 1.13 |
| 340410007 | NJ | Columbia Site | 58 | 57.2 | 54.8 | 54.3 | 54.5 | 54.4 | 54.4 | 8.30 | 2.58 | -2.70 | 2.38 | 2.52 | 2.80 |
| 360010012 | NY | Loudonville | 57 | | | | | | | 1.96 | 0.83 | -1.00 | 0.77 | 0.73 | 0.91 |

| ID | St | Location | 2019-21 DV | Predicted 2023 Design Values | | | | | | Maximum 8-Hour Concentration Difference | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Run 1 | Run 2 | Run 3 | Run 6 | Run 7 | Run 8 | Runs 1-2 | Runs 2-3 | Runs 2-6 | Runs 2-7 | Runs 2-8 | Runs 7-6 |
| 360050110 | NY | NYC-IS52 | 68 | 63.5 | 63.5 | 63.3 | 63.5 | 63.4 | 63.4 | 4.04 | 0.87 | -3.38 | 0.87 | 0.89 | 1.41 |
| 360050133 | NY | NYBG-Bronx | 70 | 64.1 | 63.8 | 63.6 | 63.8 | 63.7 | 63.7 | 1.78 | 1.39 | -1.11 | 1.39 | 1.39 | 1.42 |
| 360130006 | NY | Dunkirk | 65 | 61.2 | 60.9 | 60.9 | 60.9 | 60.9 | 60.9 | 1.51 | 0.74 | -0.02 | 0.71 | 0.64 | 0.10 |
| 360270007 | NY | Millbrook | 60 | 60.2 | 60.7 | 59.7 | 59.9 | 59.7 | 59.7 | 2.42 | 1.99 | -0.55 | 1.85 | 1.89 | 0.67 |
| 360290002 | NY | Amherst | 65 | 65.5 | 65.1 | 65.1 | 65.1 | 65.1 | 65.1 | 0.93 | 7.91 | -0.13 | 7.91 | 7.91 | 0.17 |
| 360310002 | NY | Whiteface Mt Smt | 62 | | | | | | | 1.57 | 0.37 | -0.34 | 0.37 | 0.36 | 0.45 |
| 360310003 | NY | Whiteface Mt Base | 59 | | | | | | | 1.57 | 0.37 | -0.34 | 0.37 | 0.36 | 0.45 |
| 360319991 | NY | Huntington | 52 | | | | | | | 1.79 | 0.40 | -0.41 | 0.40 | 0.39 | 0.54 |
| 360337003 | NY | St Regis Mohawk | | | | | | | | 1.16 | 0.67 | -0.33 | 0.67 | 0.65 | 0.46 |
| 360410005 | NY | Piseco Lake | 56 | | | | | | | 1.77 | 0.45 | -0.15 | 0.40 | 0.41 | 0.18 |
| 360430005 | NY | Nicks Lake | | | | | | | | 1.33 | 0.38 | -0.28 | 0.37 | 0.34 | 0.46 |
| 360450002 | NY | Perch River | | 56.6 | 56.8 | 56.4 | 56.4 | 56.4 | 56.4 | 0.77 | 1.08 | -0.22 | 1.08 | 0.97 | 0.40 |
| 360551007 | NY | Rochester-B | 62 | 59.0 | 59.6 | 58.7 | 59.1 | 58.7 | 59.3 | 1.11 | 1.67 | -1.19 | 1.67 | 1.36 | 1.12 |
| 360610135 | NY | NYC-CCNY | 70 | 66.0 | 65.9 | 65.8 | 65.9 | 65.8 | 65.8 | 4.04 | 0.87 | -3.38 | 0.87 | 0.89 | 1.41 |
| 360631006 | NY | Middleport | 63 | 61.5 | 62.2 | 61.4 | 61.7 | 61.4 | 61.8 | 0.84 | 3.52 | -0.11 | 3.52 | 3.52 | 0.42 |
| 360671015 | NY | E Syracuse | 61 | | | | | | | 1.63 | 0.77 | -0.19 | 0.53 | 0.61 | 0.28 |
| 360715001 | NY | Valley Central HS | 58 | | | | | | | 3.76 | 1.27 | -0.94 | 1.33 | 1.32 | 0.80 |
| 360750003 | NY | Fulton | 59 | 55.0 | 55.1 | 54.8 | 54.9 | 54.8 | 54.9 | 1.88 | 1.34 | -0.28 | 1.34 | 1.06 | 0.99 |
| 360790005 | NY | Mt Ninham | 61 | 63.3 | 63.4 | 62.6 | 63.0 | 62.7 | 62.7 | 2.80 | 2.33 | -0.64 | 2.15 | 2.03 | 0.68 |
| 360810124 | NY | NYC-Queens | 71 | 67.9 | 67.8 | 67.6 | 67.8 | 67.7 | 67.7 | 1.80 | 1.63 | -1.39 | 1.28 | 1.21 | 1.80 |
| 360850067 | NY | NYC-Susan WagHS | | 77.6 | 77.3 | 77.0 | 77.1 | 77.1 | 77.1 | 2.30 | 1.09 | -1.45 | 1.09 | 1.08 | 1.75 |
| 360870005 | NY | Rockland County | 63 | 64.0 | 63.4 | 63.2 | 63.4 | 63.3 | 63.3 | 2.98 | 1.99 | -0.74 | 1.78 | 1.68 | 0.93 |
| 360910004 | NY | Stillwater | 56 | | | | | | | 1.89 | 0.63 | -0.32 | 0.58 | 0.55 | 0.55 |
| 361010003 | NY | Pinnacle State Park | 55 | | | | | | | 2.21 | 0.18 | -0.28 | 0.17 | 0.17 | 0.27 |
| 361030002 | NY | Babylon | 73 | 68.8 | 68.6 | 67.9 | 68.3 | 68.0 | 68.0 | 2.08 | 1.75 | -2.56 | 1.60 | 1.51 | 2.97 |
| 361030004 | NY | Riverhead | 69 | 70.1 | 70.1 | 69.9 | 70.5 | 70.0 | 69.9 | 1.20 | 2.74 | -2.48 | 2.55 | 2.59 | 3.57 |
| 361030009 | NY | Suffolk County | 70 | 70.1 | 70.1 | 69.7 | 71.1 | 69.8 | 69.8 | 7.89 | 2.03 | -3.09 | 1.89 | 1.83 | 4.98 |
| 361099991 | NY | Connecticut Hill | 58 | | | | | | | 3.04 | 1.47 | -1.25 | 1.47 | 1.47 | 1.27 |
| 361173001 | NY | Williamson | 61 | | | | | | | 0.95 | 2.01 | -0.56 | 2.01 | 1.69 | 1.51 |
| 361192004 | NY | White Plains | 69 | 67.6 | 67.2 | 67.0 | 67.2 | 67.0 | 67.0 | 2.75 | 1.92 | -1.04 | 1.85 | 1.82 | 1.28 |
| 420010001 | PA | AREN | 62 | | | | | | | 3.27 | 0.93 | -0.54 | 0.91 | 0.91 | 0.23 |
| 420019991 | PA | Arendtsville | 61 | | | | | | | 3.27 | 0.93 | -0.54 | 0.91 | 0.91 | 0.23 |
| 420030008 | PA | BAPC | 64 | 60.6 | 59.4 | 59.4 | 59.4 | 59.5 | 59.4 | 5.45 | 0.17 | -0.10 | 0.20 | 0.15 | 0.12 |
| 420030067 | PA | South Fayette | 66 | 59.4 | 58.6 | 58.6 | 58.6 | 58.6 | 58.6 | 3.65 | 0.07 | -0.06 | 0.08 | 0.05 | 0.05 |
| 420031008 | PA | Harrison Township | 65 | 62.0 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 6.57 | 0.15 | -0.09 | 0.12 | 0.15 | 0.13 |
| 420050001 | PA | Kittanning | 64 | 63.1 | 60.5 | 60.5 | 60.5 | 60.5 | 60.5 | 3.37 | 0.13 | -0.10 | 0.10 | 0.09 | 0.15 |
| 420070002 | PA | HOOK | 64 | 54.9 | 53.6 | 53.6 | 53.6 | 53.6 | 53.6 | 4.83 | 0.11 | -0.02 | 0.08 | 0.08 | 0.04 |
| 420070005 | PA | BRI1 | 63 | 54.0 | 52.7 | 52.7 | 52.7 | 52.7 | 52.7 | 5.87 | 0.12 | -0.03 | 0.10 | 0.10 | 0.06 |
| 420070014 | PA | Beaver Falls | 63 | 52.8 | 52.1 | 52.1 | 52.1 | 52.1 | 52.1 | 3.97 | 0.12 | -0.03 | 0.11 | 0.11 | 0.05 |
| 420110006 | PA | KUT2 | 59 | 58.3 | 56.5 | 56.5 | 56.7 | 56.8 | 56.7 | 4.73 | 0.72 | -1.01 | 0.69 | 0.69 | 0.88 |
| 420110011 | PA | REA3 | | 61.8 | 59.7 | 59.6 | 59.8 | 59.9 | 59.9 | 6.00 | 0.61 | -0.44 | 0.59 | 0.39 | 0.73 |
| 420130801 | PA | Altoona | | | | | | | | 4.36 | 0.25 | -0.05 | 0.25 | 0.23 | 0.10 |
| 420150011 | PA | Towanda | 56 | | | | | | | 8.19 | 0.56 | -1.11 | 0.56 | 0.56 | 0.98 |
| 420170012 | PA | Bristol | 71 | 70.7 | 69.6 | 69.3 | 69.9 | 70.1 | 69.6 | 6.13 | 1.40 | -0.91 | 1.38 | 1.36 | 0.66 |
| 420210011 | PA | Johnstown | 59 | 58.1 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 7.77 | 0.17 | -0.07 | 0.11 | 0.12 | 0.08 |
| 420270100 | PA | State College | 55 | | | | | | | 3.24 | 0.71 | -0.23 | 0.71 | 0.59 | 0.13 |
| 420279991 | PA | Penn State | 61 | | | | | | | 3.99 | 0.36 | -0.23 | 0.36 | 0.32 | 0.14 |
| 420290100 | PA | NEWG | | 64.5 | 63.4 | 63.1 | 63.7 | 63.6 | 63.4 | 4.21 | 1.92 | -0.98 | 1.79 | 1.87 | 0.32 |
| 420334000 | PA | MOSH | 53 | | | | | | | 3.98 | 0.71 | -0.05 | 0.71 | 0.64 | 0.07 |
| 420430401 | PA | Harrisburg | 62 | 59.9 | 55.4 | 55.3 | 55.5 | 55.6 | 55.6 | 5.73 | 0.69 | -0.68 | 0.67 | 0.65 | 0.66 |
| 420431100 | PA | Hershey | 60 | 60.5 | 56.2 | 56.1 | 56.3 | 56.3 | 56.4 | 7.34 | 0.51 | -1.12 | 0.51 | 0.49 | 1.04 |
| 420450002 | PA | Chester | 66 | 64.9 | 63.6 | 63.3 | 63.9 | 64.3 | 63.6 | 2.49 | 1.52 | -0.92 | 1.35 | 1.23 | 1.24 |
| 420479991 | PA | Kane Exp Forest | 57 | | | | | | | 2.11 | 0.52 | -0.08 | 0.52 | 0.45 | 0.10 |
| 420490003 | PA | Erie | 60 | 59.2 | 59.1 | 59.1 | 59.1 | 59.1 | 59.1 | 1.88 | 0.44 | -0.06 | 0.41 | 0.39 | 0.11 |
| 420550001 | PA | METH | 56 | | | | | | | 3.01 | 0.91 | -0.41 | 0.89 | 0.90 | 0.37 |
| 420590002 | PA | HOLB | | | | | | | | 1.21 | 0.08 | -0.06 | 0.06 | 0.06 | 0.04 |
| 420630004 | PA | Strongtown | 65 | 64.6 | 60.0 | 60.0 | 60.1 | 60.1 | 60.1 | 7.02 | 0.15 | -0.05 | 0.09 | 0.11 | 0.08 |
| 420690101 | PA | PECK | 58 | | | | | | | 5.50 | 0.30 | -0.82 | 0.21 | 0.22 | 0.70 |
| 420692006 | PA | Scranton | 58 | | | | | | | 5.50 | 0.30 | -0.82 | 0.21 | 0.22 | 0.70 |
| 420710007 | PA | Lancaster | 64 | 61.9 | 58.7 | 58.6 | 58.8 | 58.8 | 58.8 | 4.51 | 0.57 | -1.03 | 0.57 | 0.57 | 1.01 |

| ID | St | Location | 2019-21 DV | Predicted 2023 Design Values | | | | | | Maximum 8-Hour Concentration Difference | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Run 1 | Run 2 | Run 3 | Run 6 | Run 7 | Run 8 | Runs 1-2 | Runs 2-3 | Runs 2-6 | Runs 2-7 | Runs 2-8 | Runs 7-6 |
| 420710012 | PA | LAN1 | 63 | 57.8 | 55.6 | 55.5 | 55.6 | 55.6 | 55.6 | 5.39 | 0.80 | -0.51 | 0.80 | 0.80 | 0.42 |
| 420730015 | PA | New Castle | 59 | 56.5 | 55.3 | 55.3 | 55.3 | 55.3 | 55.3 | 4.86 | 0.11 | -0.03 | 0.08 | 0.08 | 0.06 |
| 420750100 | PA | Lebanon | | 61.4 | 58.5 | 58.5 | 58.6 | 58.8 | 58.8 | 5.46 | 0.67 | -0.98 | 0.67 | 0.67 | 0.98 |
| 420770004 | PA | Allentown | 63 | 61.9 | 60.6 | 60.5 | 60.7 | 60.6 | 60.6 | 3.66 | 0.54 | -1.44 | 0.53 | 0.60 | 1.11 |
| 420791101 | PA | Wilkes-Barre | | | | | | | | 8.39 | 0.27 | -1.51 | 0.28 | 0.27 | 1.28 |
| 420810100 | PA | Montoursville | 57 | | | | | | | 6.52 | 0.50 | -0.64 | 0.49 | 0.37 | 0.83 |
| 420850100 | PA | Farrell | 63 | 60.0 | 59.5 | 59.5 | 59.5 | 59.5 | 59.5 | 1.80 | 0.17 | -0.02 | 0.16 | 0.12 | 0.06 |
| 420859991 | PA | MK Goddard | 62 | | | | | | | 2.59 | 0.18 | -0.05 | 0.17 | 0.12 | 0.06 |
| 420890002 | PA | Pocono | | | | | | | | 5.95 | 1.11 | -1.24 | 1.06 | 1.09 | 1.29 |
| 420910013 | PA | Norristown | | 64.6 | 63.6 | 63.4 | 63.7 | 63.7 | 63.6 | 3.21 | 1.14 | -0.56 | 1.13 | 1.13 | 0.67 |
| 420950025 | PA | FREE | 64 | 62.2 | 61.0 | 60.9 | 61.1 | 61.0 | 61.0 | 3.35 | 0.51 | -1.16 | 0.57 | 0.49 | 1.01 |
| 420958000 | PA | Easton-B | | 61.2 | 59.5 | 59.3 | 59.5 | 59.4 | 59.4 | 2.98 | 0.92 | -0.80 | 0.92 | 0.92 | 0.86 |
| 421010004 | PA | LAB | | 54.8 | 53.9 | 53.7 | 54.1 | 54.2 | 53.9 | 2.36 | 1.02 | -0.92 | 0.96 | 0.90 | 0.50 |
| 421010024 | PA | NEA | 71 | 69.7 | 68.6 | 68.3 | 68.8 | 69.0 | 68.6 | 2.84 | 0.98 | -0.90 | 0.94 | 0.98 | 0.50 |
| 421010048 | PA | NEW | 70 | 67.7 | 66.5 | 66.3 | 66.8 | 67.0 | 66.5 | 2.36 | 1.02 | -0.92 | 0.96 | 0.90 | 0.50 |
| 421119991 | PA | Laurel Hill | 59 | 59.0 | 57.6 | 57.5 | 57.6 | 57.6 | 57.6 | 4.37 | 0.15 | -0.06 | 0.08 | 0.11 | 0.09 |
| 421174000 | PA | TIOGA | 57 | | | | | | | 5.74 | 0.27 | -0.64 | 0.27 | 0.27 | 0.73 |
| 421250005 | PA | Charleroi | 62 | 61.1 | 60.3 | 60.3 | 60.3 | 60.3 | 60.3 | 2.05 | 0.11 | -0.09 | 0.11 | 0.09 | 0.08 |
| 421250200 | PA | Washington | | 57.7 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 1.73 | 0.06 | -0.07 | 0.04 | 0.04 | 0.05 |
| 421255001 | PA | FLOR | | 57.5 | 56.3 | 56.3 | 56.3 | 56.3 | 56.3 | 4.97 | 0.11 | -0.03 | 0.09 | 0.09 | 0.04 |
| 421290008 | PA | Greensburg | 55 | 61.0 | 59.2 | 59.2 | 59.2 | 59.2 | 59.2 | 4.71 | 0.09 | -0.07 | 0.09 | 0.08 | 0.09 |
| 421330008 | PA | York | 60 | 60.1 | 55.3 | 55.2 | 55.4 | 55.4 | 55.4 | 9.71 | 1.08 | -0.61 | 0.87 | 0.73 | 0.66 |
| 421330011 | PA | YOR1 | | 60.8 | 57.7 | 57.4 | 57.8 | 57.8 | 57.7 | 4.59 | 3.67 | -0.54 | 0.19 | 3.56 | 0.44 |
| 440030002 | RI | W Greenwich | 65 | 65.6 | 65.4 | 64.8 | 66.1 | 64.9 | 64.9 | 1.18 | 1.65 | -2.53 | 1.43 | 1.46 | 3.54 |
| 440071010 | RI | E Providence | 65 | 68.7 | 68.5 | 68.3 | 68.9 | 68.4 | 68.4 | 1.13 | 1.09 | -2.03 | 0.62 | 0.68 | 2.09 |
| 440090007 | RI | Narragansett | 67 | 68.7 | 68.7 | 68.6 | 69.1 | 68.7 | 68.6 | 1.45 | 0.85 | -1.55 | 0.69 | 0.70 | 2.06 |
| 500030004 | VT | Bennington | 57 | | | | | | | 2.13 | 0.48 | -0.48 | 0.39 | 0.36 | 0.78 |
| 500070007 | VT | Underhill | 57 | | | | | | | 1.14 | 0.26 | -0.07 | 0.25 | 0.25 | 0.15 |
| 500210002 | VT | Rutland | 53 | | | | | | | 1.92 | 0.35 | -0.29 | 0.30 | 0.31 | 0.29 |

# 13 Air Data Visualization Tools

To make data more understandable and easier to use, two interactive maps have been developed with visual elements such as charts and graphs. Both maps are publicly available and allow the user to explore measured or modeled ozone data at a particular monitoring site. One map, titled "$O_3$ DV Now," calculates and displays the most up-to-date preliminary ozone design values in the current year on a daily basis. The other map, titled "$O_3$ Source," displays a source apportionment analysis which includes the contribution of states and sectors in the projected year of 2023.

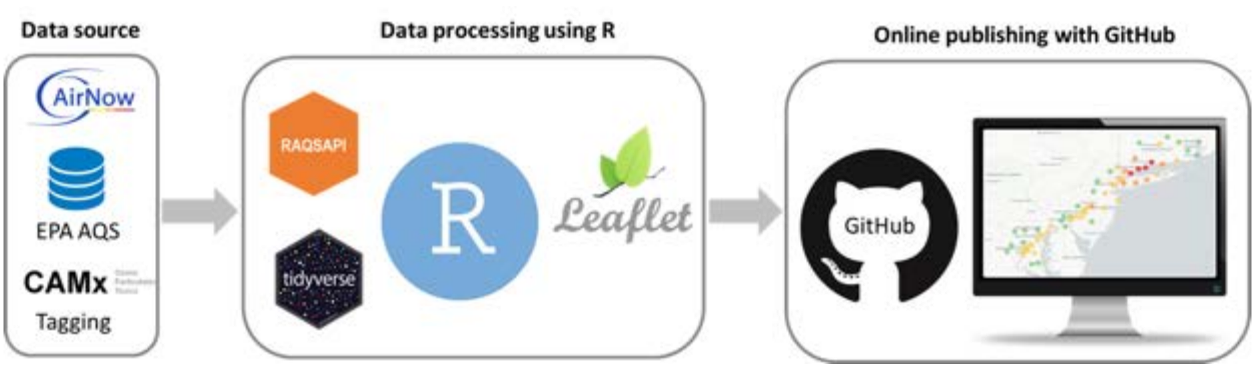
## 13.1 Data Sources

Data used in the two maps are derived from three main sources: EPA's AirNow, EPA's AQS, and CAMx modeling. Air Now's database provides current measured ozone data that are subject to preliminary quality assessment but are not fully certified. EPA's AQS database provides monitoring site location and hourly ozone monitoring data for previous years with quality assurance. Both the AirNow and AQS databases are publicly available and are the main data sources of the "$O_3$ DV Now" map. CAMx tagged modeling data were generated from modeling work described in **Section 10**. This source apportionment modeling dataset provides hourly contributions to the projected 2023 ozone concentrations from emissions in each state and sector. The "$O_3$ Source" map uses site location from the AQS database and maximum daily 8-hour (MDA8) ozone concentrations from the CAMx tagged modeling output.

## 13.2 Methodology

The general development process for both maps is similar and shown in **Figure 13-1**. The workflow starts with collecting data from the data sources. The data collection, analysis, and mapping were done using R program packages, including but not limited to RAQSAPI, Tidyverse, and Leaflet. The resulting maps were then published online with GitHub or personal ftp server for public access.

***Figure 13-1.*** *Workflow for Creating Interactive Maps*



The "$O_3$ DV Now" map covers ozone monitoring sites in the entire continental U.S. It reports the 4 highest MDA8 ozone concentrations in the current year from the AirNow database at each monitor. It also calculates the ozone design value of the current year by taking the average of the 4th highest MDA8 ozone concentrations in the most recent three years.

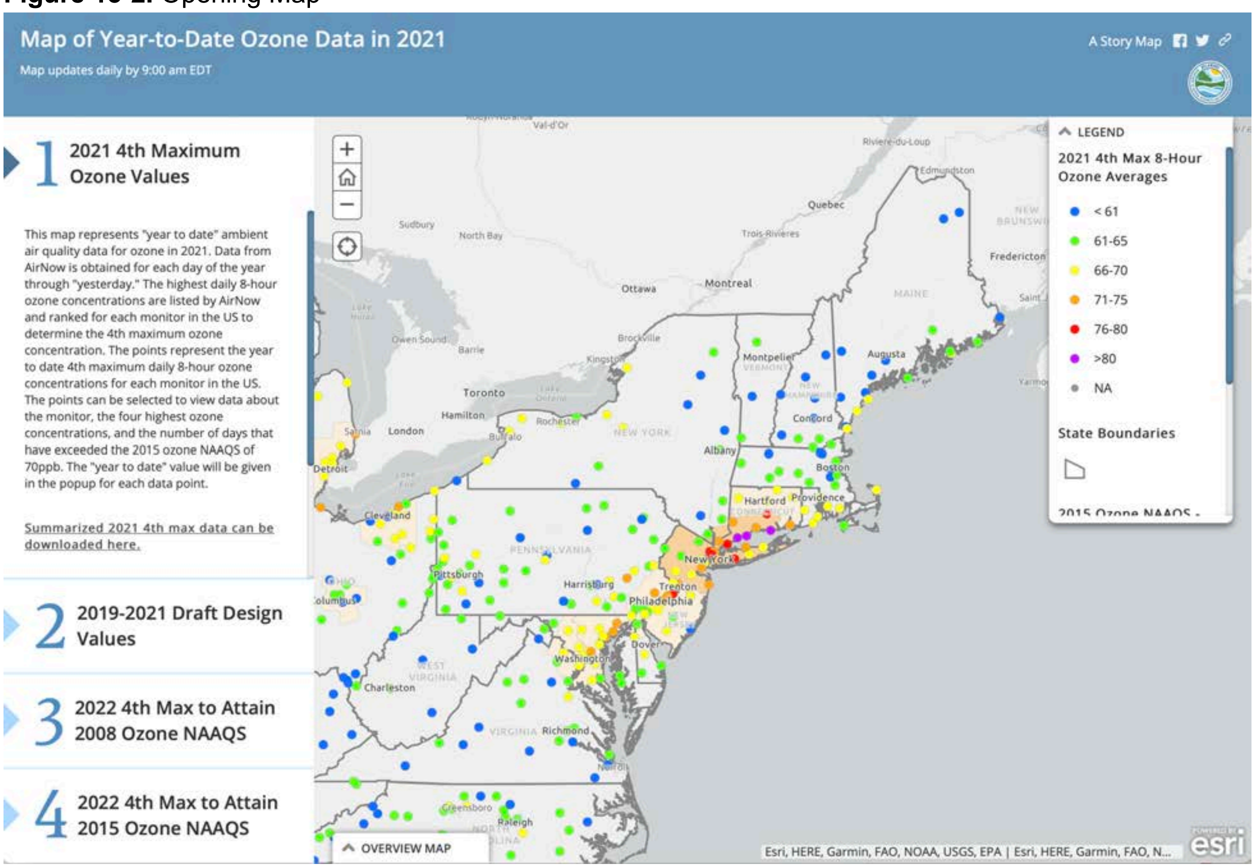
The "$O_3$ Source" map includes monitors located in the nonattainment areas of the OTC states. It calculates the average ozone contributions of states and sectors to each monitor using three metrics: average top four days, average top ten days, and average exceedance days. The overall calculation procedure is similar for each metric but differs in which days should be included. For average top four or ten days, the days with the four or ten highest MDA8 ozone concentration were selected. For average exceedance days, all days with a MDA8 ozone concentration higher than 70 ppb were included.

## 13.3 Quick Start Guide

*The "Ozone DV Now" Map*

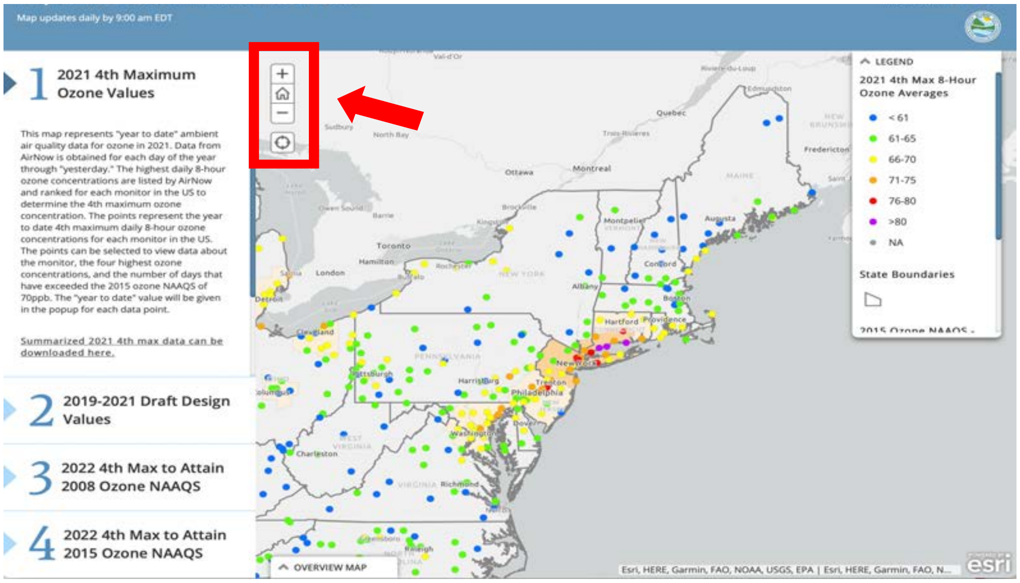
**Step 1**: Open the map by clicking on the following URL link: https://dnrec.maps.arcgis.com/apps/MapSeries/index.html?appid=38e6bc52a8ad4c06b8cabcca0fa0f66d.

**Figure 13-2.** Opening Map



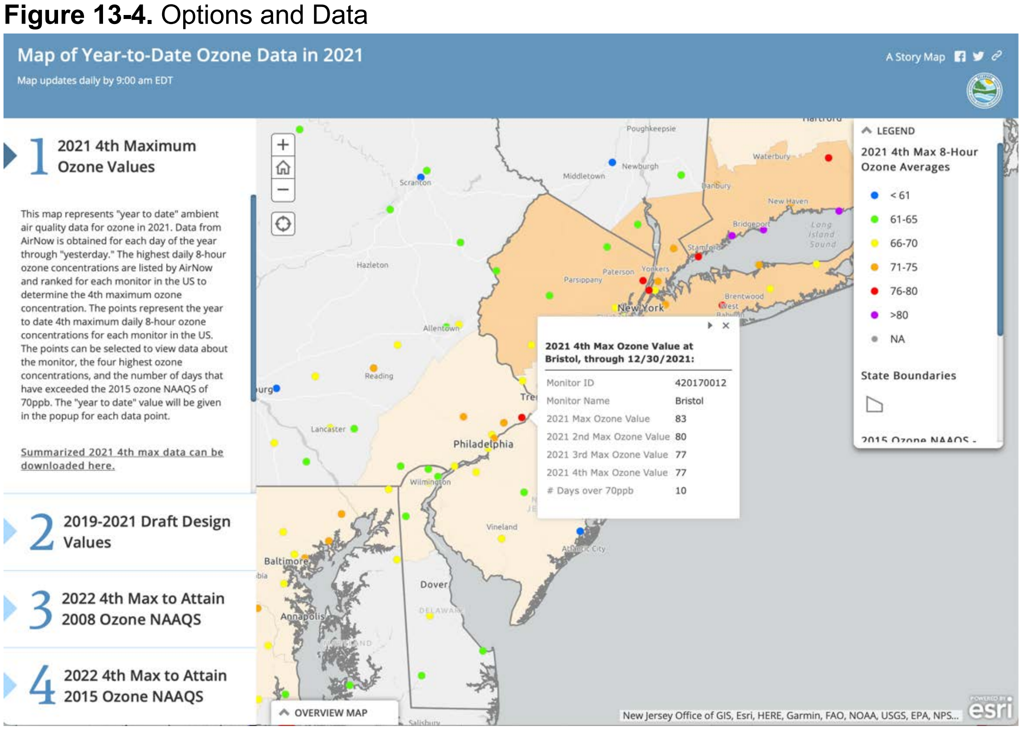
**Step 2**: Zoom in or out with + or - buttons on the top left corner or move the center wheel on the mouse.

**Figure 13-3.** Location of Zoom Buttons



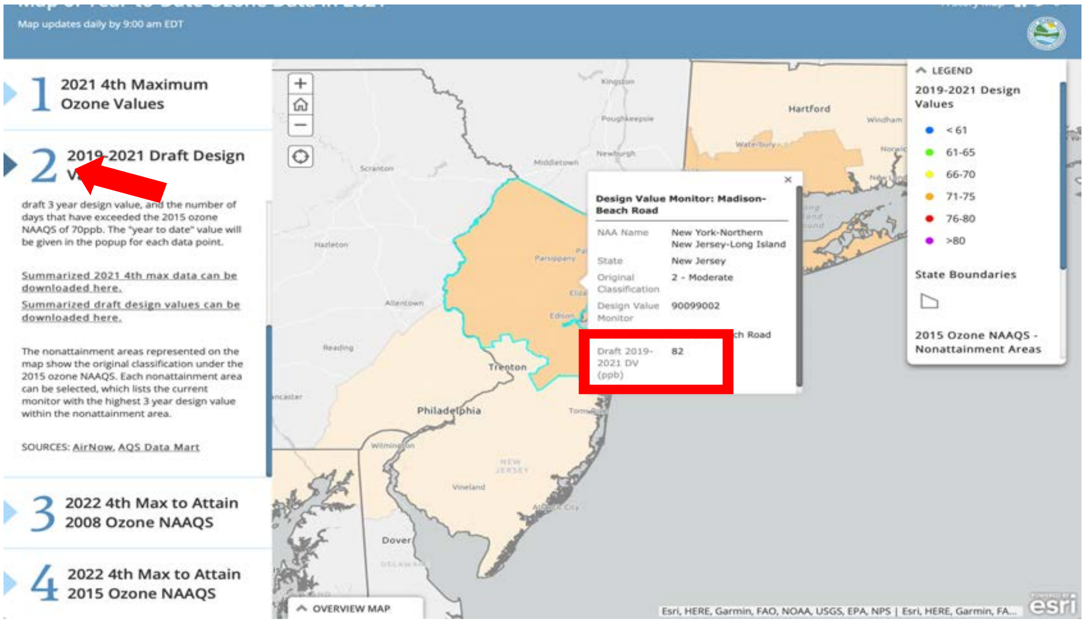

**Step 3**: View the top four highest ozone concentrations in the current year. The map shows these concentrations by default with the “2021 4th Max” button selected in the top right corner. Click on a dot, which represents an ozone monitoring site, to view the site ID, site name, highest MDA8 ozone concentration, and number of days with a MDA8 ozone concentration higher than 70 ppb.

**Figure 13-4.** Options and Data



**Step 4**: View the draft ozone design value of the current year. Navigate to the top right corner, select the '2021 DV' button, and click on a monitoring site to view its preliminary ozone design value. Note, the current iteration of this website selects a representative monitor for each nonattainment area.

**Figure 13-5.** Choosing between Design Values and 4th Maximum



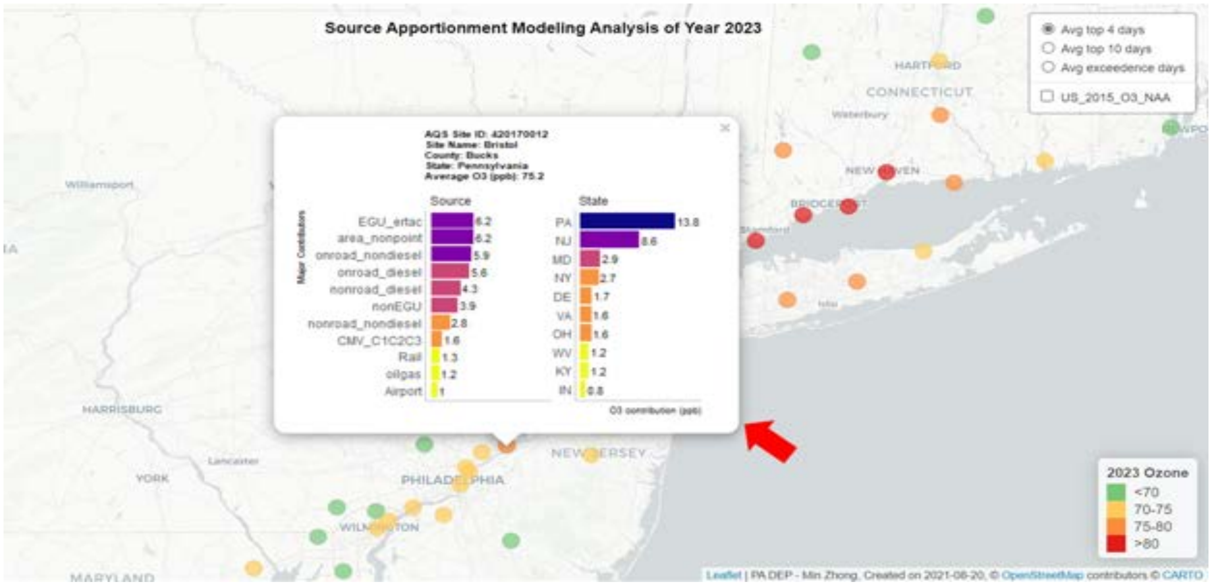

*The Ozone Source Map*

**Step 1:** Open the map by clicking on the following URL link: https://minair.github.io/tagging_o3/.

**Figure 13-6.** Opening the Map

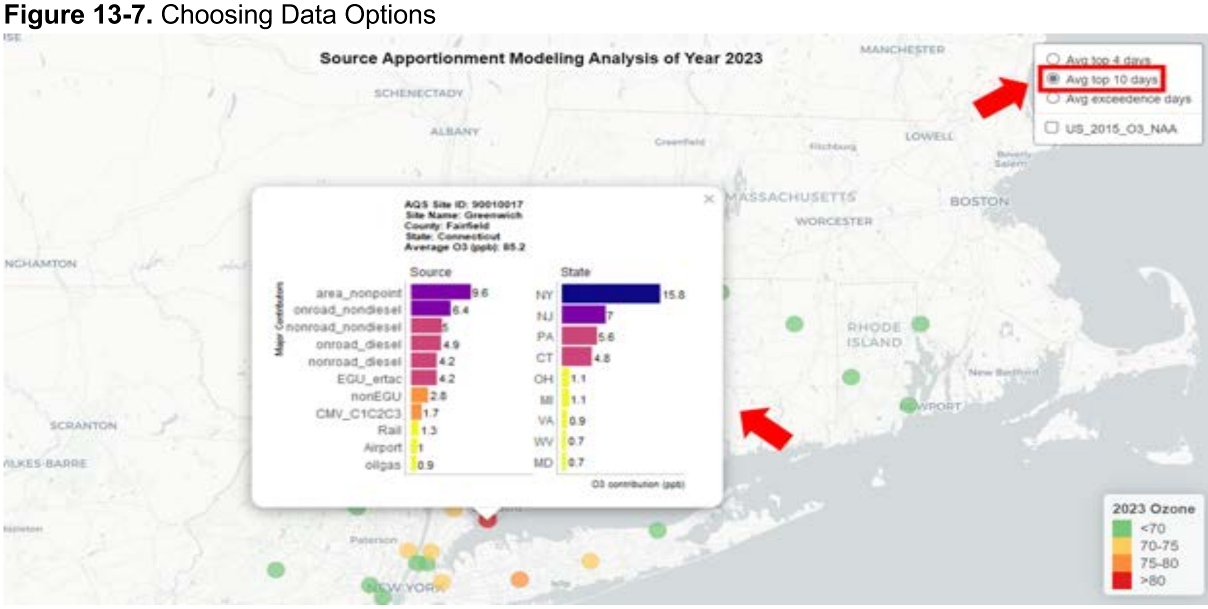
**Step 2:** View the average ozone contributions to a monitor calculated from the top four days, which the map shows by default as indicated by the button selected in the top right corner. After clicking on a monitoring site, a panel plot will pop up with the site ID, site name, county, state, and average MDA8 ozone concentration of the highest four days. The left bar chart shows sector contributions, and the right bar chart shows state contributions. Only contributions higher than 0.7 ppb are shown.

**Figure 13-6.** Detailed Data



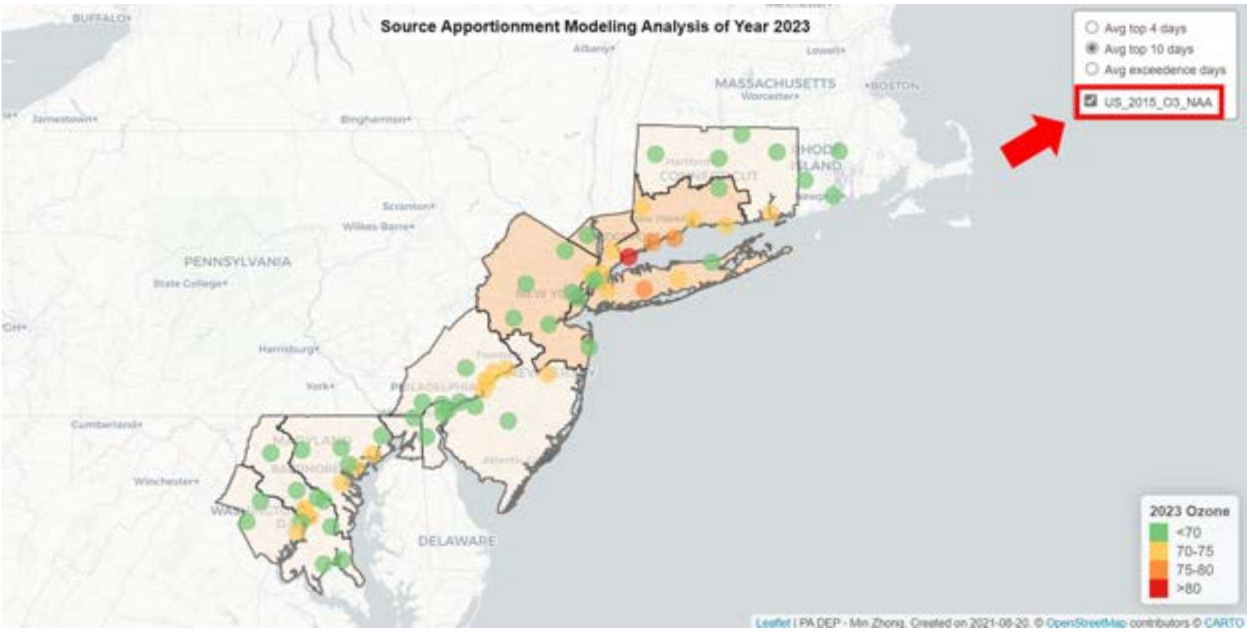

**Step 3:** View the average ozone contributions to a monitor based on top 10 or exceedance days. In the top right corner, select either the “Avg top 10 days” or “Avg exceedance days” button and click on a monitoring site to bring out the panel plot to view ozone contributions.

**Figure 13-7.** Choosing Data Options



**Step 4:** Display 2015 ozone nonattainment areas. In the top right corner, select the "US_2015_O3_NAA" button to show nonattainment areas in the OTC states.

**Figure 13-8.** Adding Nonattainment Area Overlay



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## Appendix A. *Emission Inventory Files*

This section lists the emission inventory sectors with a compilation of all of the SMOKE input files in the EMF system, in FF10 or ORL format, that were used for developing model ready emission files, for the Beta and V1 inventories for the base year of 2016 and the projected years of 2023 and 2028, though not every projected year has a corresponding inventory level developed for it. The categories are based on the ways sectors are combined when processed through SMOKE by New York.

# Agricultural (ag)

- 2016
  - Beta:
    2016fc_ag_nh3_fertilizer_monthly_11jul2017_v0.csv
    2016ff_proj_from_ag_nh3_2014NEIv2_NONPOINT_final_20180119_monthly_livestock_05oct2018_v0.csv2016ff_proj_from_ag_not_nh3_2014NEIv2_NONPOINT_final_20180119_monthly_05oct2018_v0.csv
  - Version 1:
    2016version1_ag_nh3_fertilizer_monthly_17jul2019_v0.csv
    2016fh_from_2017NEIdraft_ag_livestock_20190722_05aug2019_v1.csv
- 2023
  - Beta:
  - Version 1:
    2016version1_ag_nh3_fertilizer_monthly_12sep2019_nf_v1.csv
    2023fh_from_2017NEIdraft_ag_livestock_20190722_12sep2019_nf_v1.csv
    2023fh_proj_from_2016fh_ag_livestock_fertilizer_NConly_18sep2019_v0.csv
- 2028
  - Beta:
  - Version 1:
    2016version1_ag_nh3_fertilizer_monthly_12sep2019_nf_v1.csv
    2028fh_from_2017NEIdraft_ag_livestock_20190722_12sep2019_nf_v1.csv
    2028fh_proj_from_2016fh_ag_livestock_fertilizer_NConly_18sep2019_v0.csv

# Airport (airport)

- 2016
  - Beta:
    Included in ptnonipm sector
  - Version 1:
- 2023
  - Beta:
    Included in ptnonipm sector
  - Version 1:
- 2028

  - o Beta:
    Included in ptnonipm sector
  - o Version 1:

## Fugitive Dust (afdust)

- 2016
  - o Beta:
    2016ff_proj_from_afdust_pm_2014NEIv2_NONPOINT_penultimate_20171228_05oct2018_v0.cs
    v
  - o Version 1:
    2016fh_proj_from_afdust_pm_2014NEIv2_NONPOINT_penultimate_20171228_02aug2019_v0.c
    sv
- 2023
  - o Beta:
  - o Version 1:
    2023fh_proj_from_afdust_pm_2014NEIv2_NONPOINT_penultimate_20171228_13sep2019_v0.c
    sv
- 2028
  - o Beta:
  - o Version 1:
    2028fh_proj_from_afdust_pm_2014NEIv2_NONPOINT_penultimate_20171228_13sep2019_v0.c
    sv

## Area Source (nonpt)

- 2016
  - o Beta:
    2016ff_proj_from_2014NEIv2_NONPOINT_final_20180119_08oct2018_v0.csv
    2016ff_proj_from_pfc_2014NEIv2_NONPOINT_final_20180119_08oct2018_v0.csv
  - o Version 1:
    nonpt_2016_version1_Alaska_additions_08aug2019_nf_v1.csv
    2016fh_proj_from_pfc_2014NEIv2_NONPOINT_final_20180119_06aug2019_v0.csv
    2016fh_proj_from_2014NEIv2_NONPOINT_final_20180119_08aug2019_nf_v1.csv
- 2023
  - o Beta:
  - o Version 1:
    2023fh_proj_nonpt_2016_version1_Alaska_additions_27sep2019_v0.csv
    2023fh_proj_from_pfc_2014NEIv2_NONPOINT_final_20180119_27sep2019_v0.csv
    2023fh_proj_from_2014NEIv2_NONPOINT_final_20180119_27sep2019_v0.csv
    cellulosic_v1platform_2023fh_nonpt_fromVolpe_25sep2019_v0.csv
- 2028
  - o Beta:
  - o Version 1:

2028fh_proj_nonpt_2016_version1_Alaska_additions_25sep2019_v0.csv
2028fh_proj_from_pfc_2014NEIv2_NONPOINT_final_20180119_25sep2019_v0.csv
2028fh_proj_from_2014NEIv2_NONPOINT_final_20180119_25sep2019_v0.csv
cellulosic_v1platform_2028fh_nonpt_fromVolpe_17oct2019_v1.csv

## Category 1 & 2 Marine Vessels (cmv_c1c2)

- 2016
  - Beta:
    2016ff_proj_from_c1c2_onshore_2014NEIv2_NONPOINT_final_20180119_17oct2018_v0.csv
    2016ff_proj_from_c1c2_offshore_2014NEIv2_NONPOINT_final_20180119_17oct2018_v0.csv
  - Version 1:
    cmv_c1c2_2016_12US1_2017_US_annual_16jan2020_v0.csv
    cmv_c1c2_2016_12US1_2017_CA_annual_16jan2020_v0.csv
    canada_c1c2_point_2015_aisremoved_07aug2019_v0.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_1_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_2_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_3_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_4_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_5_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_6_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_7_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_8_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_9_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_10_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_11_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_12_US_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_12_US_nexthour.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_1_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_2_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_3_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_4_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_5_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_6_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_7_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_8_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_9_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_10_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_11_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_12_CA_hourly.csv
    cmv_c1c2_2016adjust_20200116_12US1_2017_12_CA_nexthour.csv
- 2023
  - Beta:
  - Version 1:

2023fh_proj_cmv_c1c2_2016adjust_2023_20200116_12US1_2017_US_annual_22jan2020_v0.csv
2023fh_proj_cmv_c1c2_2016adjust_2023_20200116_12US1_2017_CA_annual_22jan2020_v0.csv
2023fh_proj_canada_c1c2_point_2015_aisremoved_24sep2019_v0.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_1_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_2_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_3_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_4_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_5_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_6_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_7_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_8_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_9_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_10_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_11_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_12_US_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_12_US_nexthour.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_1_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_2_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_3_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_4_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_5_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_6_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_7_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_8_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_9_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_10_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_11_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_12_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20200116_12US1_2017_12_CA_nexthour.csv

- 2028
  - Beta:
  - Version 1:
    2028fh_proj_cmv_c1c2_2016adjust_2023_20200116_12US1_2017_US_annual_22jan2020_v0.csv
    2028fh_proj_cmv_c1c2_2016adjust_2023_20200116_12US1_2017_CA_annual_22jan2020_v0.csv
    2028fh_proj_canada_c1c2_point_2015_aisremoved_24sep2019_v0.csv
    cmv_c1c2_2016adjust_2028_20200116_12US1_2017_1_US_hourly.csv
    cmv_c1c2_2016adjust_2028_20200116_12US1_2017_2_US_hourly.csv
    cmv_c1c2_2016adjust_2028_20200116_12US1_2017_3_US_hourly.csv
    cmv_c1c2_2016adjust_2028_20200116_12US1_2017_4_US_hourly.csv
    cmv_c1c2_2016adjust_2028_20200116_12US1_2017_5_US_hourly.csv
    cmv_c1c2_2016adjust_2028_20200116_12US1_2017_6_US_hourly.csv
    cmv_c1c2_2016adjust_2028_20200116_12US1_2017_7_US_hourly.csv

cmv_c1c2_2016adjust_2028_20200116_12US1_2017_8_US_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_9_US_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_10_US_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_11_US_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_12_US_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_12_US_nexthour.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_1_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_2_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_3_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_4_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_5_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_6_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_7_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_8_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_9_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_10_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_11_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_12_CA_hourly.csv
cmv_c1c2_2016adjust_2028_20200116_12US1_2017_12_CA_nexthour.csv

## Category 3 Commercial Marine Vessels (cmv_c3)

- 2016
  - Beta:
    2016ff_proj_from_ptinv_c3_cmv_point_2014fd_ff10_18oct2018_v0.csv
    2016ff_proj_from_ptinv_c3_cmv_point_2014fd_akhiprvi_ff10_18oct2018_v0.csv
    2016ff_proj_from_ptinv_c3_cmv_point_2014fd_akhiprvi_ff10_offshore_fips85_18oct2018_v0.csv
    ptinv_2016ff_proj_from_eca_imo_nonUS_nonCANADA_caps_vochaps_2011_18oct2018_v0.csv
  - Version 1:
    cmv_c3_2016adjust_20200116_12US1_2017_US_annual_22jan2020_v0.csv
    cmv_c3_2016adjust_20200116_12US1_2017_CA_annual_22jan2020_v0.csv
    canada_c3_point_2015_aisremoved_05aug2019_v0.csv
    cmv_c3_2016adjust_20200116_12US1_2017_1_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_2_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_3_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_4_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_5_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_6_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_7_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_8_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_9_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_10_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_11_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_12_US_hourly.csv
    cmv_c3_2016adjust_20200116_12US1_2017_12_US_nexthour.csv
    cmv_c3_2016adjust_20200116_12US1_2017_1_CA_hourly.csv

cmv_c3_2016adjust_20200116_12US1_2017_2_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_3_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_4_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_5_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_6_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_7_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_8_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_9_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_10_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_11_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_12_CA_hourly.csv
cmv_c3_2016adjust_20200116_12US1_2017_12_CA_nexthour.csv

- 2023
  - Beta:
  - Version 1:

    2023fh_proj2_cmv_c3_2016adjust_2023_20200116_12US1_2017_US_annual_27jan2020_v0.csv
    2023fh_proj_cmv_c3_2016adjust_2023_20200116_12US1_2017_CA_annual_22jan2020_v0.csv
    2023fh_proj_canada_c3_point_2015_aisremoved_24sep2019_v0.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_1_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_2_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_3_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_4_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_5_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_6_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_7_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_8_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_9_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_10_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_11_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_12_US_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_12_US_nexthour.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_1_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_2_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_3_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_4_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_5_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_6_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_7_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_8_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_9_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_10_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_11_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_12_CA_hourly.csv
    cmv_c3_2016adjust_2023_20200116_12US1_2017_12_CA_nexthour.csv
- 2028

- Beta:
- Version 1:
  2028fh_proj2_cmv_c3_2016adjust_2028_20200116_12US1_2017_US_annual_27jan2020_v0.cs
  v
  2028fh_proj_cmv_c3_2016adjust_2028_20200116_12US1_2017_CA_annual_22jan2020_v0.csv
  2028fh_proj_canada_c3_point_2015_aisremoved_24sep2019_v0.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_1_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_2_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_3_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_4_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_5_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_6_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_7_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_8_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_9_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_10_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_11_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_12_US_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_12_US_nexthour.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_1_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_2_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_3_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_4_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_5_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_6_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_7_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_8_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_9_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_10_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_11_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_12_CA_hourly.csv
  cmv_c3_2016adjust_2028_20200116_12US1_2017_12_CA_nexthour.csv

## Nonroad (nonroad)

- 2016
  - Beta:
    2016beta_nonroad_from_MOVES2014b_forAQ_12nov2018_nf_v2.csv
    2016fc_california_nonroad_07jun2017_v1.csv
  - Version 1:
    2016version1_nonroad_from_MOVES2014b_forAQ_aggSCC_03sep2019_nf_v3.csv
    2016v1platform_2016_texas_nonroad_15jul2019_v0.csv
    2016v1platform_2016_california_nonroad_28may2019_v1.csv
- 2023
  - Beta:

- Version 1:
  2016version1_2023_nonroad_from_MOVES2014b_forAQ_aggSCC_10sep2019_nf_v2.csv
  2016v1platform_2023_texas_nonroad_28aug2019_v0.csv
  2016v1platform_2023_california_nonroad_28may2019_v1.csv

- 2028
  - Beta:
  - Version 1:
    2016version1_2028_nonroad_from_MOVES2014b_forAQ_aggSCC_10sep2019_nf_v3.csv
    2016v1platform_2028_texas_nonroad_09aug2019_v0.csv
    2016v1platform_2028_california_nonroad_28may2019_v1.csv

## Non-Point Oil & Gas (np_oilgas)

- 2016
  - Beta:
    2016fd_from_np_oilgas_2014NEIv2_NONPOINT_final_20180119_PAonly_04dec2018_nf_v1.csv
    2016ff_np_oilgas_including_state_inputs_20181116_04dec2018_nf_v2.csv
    2016ff_np_oilgas_Oklahoma_04dec2018_nf_v2.csv
    2016ff_np_oilgas_California_04dec2018_nf_v1.csv
    2016ff_Colorado_from_np_oilgas_2014NEIv2_NONPOINT_final_20180119_29oct2018_v1.csv
  - Version 1
    2016v1_np_oilgas_Illinois_08jun2019_v0.csv
    2016v1_np_oilgas_Pennsylvania_21aug2019_nf_v2.csv
    2016ff_np_oilgas_including_state_inputs_20181116_26jul2019_nf_v5.csv
    2016ff_np_oilgas_including_state_inputs_20181116_WRAPonly_from_v4_26jul2019_nf_v1.csv
    2016ff_np_oilgas_Oklahoma_21dec2018_v2.csv
    2016ff_np_oilgas_California_21dec2018_v1.csv
    2016ff_Colorado_from_np_oilgas_2014NEIv2_NONPOINT_final_20180119_29oct2018_v1.csv
- 2023
  - Beta:
  - Version 1:
    2023fh_proj_2016fh_np_oilgas_CoST_input_no_exploration_noWRAP_noCalif_18sep2019_v0.csv
    2023fh_proj_2016fh_np_oilgas_CoST_input_no_exploration_WRAP_18sep2019_v0.csv
    2023fh_proj_2016v1_np_oilgas_exploration_4yearaverage_16oct2019_nf_v1.csv
    2023fh_proj_2016v1_np_oilgas_exploration_4yearaverage_WRAP_18sep2019_v0.csv
    2023fh_proj_2016ff_np_oilgas_California_18sep2019_v0.csv
- 2028
  - Beta:
  - Version 1:
    2028fh_proj_2016fh_np_oilgas_CoST_input_no_exploration_noWRAP_noCalif_18sep2019_v0.csv
    2028fh_proj_2016fh_np_oilgas_CoST_input_no_exploration_WRAP_18sep2019_v0.csv
    2028fh_proj_2016v1_np_oilgas_exploration_4yearaverage_16oct2019_nf_v1.csv
    2028fh_proj_2016v1_np_oilgas_exploration_4yearaverage_WRAP_18sep2019_v0.csv

2028fh_proj_2016ff_np_oilgas_California_18sep2019_v0.csv

## Mobile Source (onroad)

- 2016
  - Beta:
    VMT_2016_beta_full_18sep2018_v4.csv
    VPOP_2016_beta_full_18sep2018_v3.csv
    SPEED_NEI_v2_2014_from_ERG_20170915_04oct2018_v3.csv
    HOTELLING_2016_beta_05sep2018_v1.csv
  - Version 1:
    VMT_2016_version1_full_26jul2019_nf_v1.csv
    VPOP_2016_version1_full_26jul2019_nf_v1.csv
    SPEED_NEI_v2_2014_from_ERG_20170915_04oct2018_v3.csv
    HOTELLING_2016_version1_26jul2019_nf_v1.csv
- 2023
  - Beta:
  - Version 1:
    VMT_2023fh_version1_projection_03aug2019_nf_v3.csv
    VPOP_2023fh_version1_projection_06sep2019_nf_v4.csv
    SPEED_NEI_v2_2014_from_ERG_20170915_04oct2018_v3.csv
    HOTELLING_2023fh_version1_projection_06sep2019_nf_v2.csv

## Mobile Source Canada (onroad_can)

- 2016
  - Beta:
    canada_2015_transport_onroad_refueling_svn70_27nov2018_v0.csv
    canada_2015_transport_onroad_monthly_svn70_27nov2018_v0.csv
  - Version 1:
    canada_2015_transport_onroad_refueling_svn70_27nov2018_v0.csv
    canada_2015_transport_onroad_monthly_svn70_27nov2018_v0.csv
- 2023
  - Beta:
  - Version 1:
    canada_2023proj_transport_onroad_refueling_svn70_09apr2019_v0.csv
    canada_2023proj_transport_onroad_monthly_svn70_09apr2019_v0.csv
- 2028
  - Beta:
  - Version 1:
    canada_2028proj_transport_onroad_refueling_svn70_09apr2019_v0.csv
    canada_2028proj_transport_onroad_monthly_svn70_09apr2019_v0.csv

## Mobile Source Mexico (onroad_mex)

- 2016
  - Beta:
    Mexico_2016_onroad_MOVES_interpolated_02mar2018_v0.csv
  - Version 1:
    Mexico_2016_onroad_MOVES_interpolated_02mar2018_v0.csv
- 2023
  - Beta:
  - Version 1:
    Mexico_2023_onroad_MOVES_aggSCC_21sep2016_v1.csv
- 2028
  - Beta:
  - Version 1:
    Mexico_2023_onroad_MOVES_aggSCC_21sep2016_v1.csv

## Area Fugitive Dust Canada (othafdust)

- 2016
  - Beta:
    canada_2015_area_afdust_svn70_27nov2018_v0.csv
  - Version 1:
    canada_2015_area_afdust_svn70_adj_construction_02may2019_v0.csv
- 2023
  - Beta:
  - Version 1:
    canada_2023_area_afdust_svn70_adj_construction_19sep2019_v0.csv
- 2028
  - Beta:
  - Version 1:
    canada_2028_area_afdust_svn70_adj_construction_02may2019_v0.csv
    canada_2023_area_afdust_svn70_adj_construction_19sep2019_v0.csv

## Point Source Fugitive Dust Canada (othptdust)

- 2016
  - Beta:
    canada_2015_ag_winderros_svn70_monthly_26nov2018_v0.csv
    canada_2015_ag_havest_svn70_monthly_26nov2018_v0.csv
    canada_2015_ag_tillage_svn70_monthly_26nov2018_v0.csv
  - Version 1:
    canada_2015_ag_havest_svn70_monthly_12km_24apr2019_v0.csv
    canada_2015_ag_tillage_svn70_monthly_12km_24apr2019_v0.csv

- 2023
  - Beta:
  - Version 1:
    canada_2023proj_ag_havest_svn70_monthly_12km_24apr2019_v0.csv
    canada_2023proj_ag_tillage_svn70_monthly_12km_24apr2019_v0.csv
- 2028
  - Beta:
  - Version 1:
    canada_2028proj_ag_havest_svn70_monthly_12km_24apr2019_v0.csv
    canada_2028proj_ag_tillage_svn70_monthly_12km_24apr2019_v0.csv

## Area Source – Canada & Mexico (othar)

- 2016
  - Beta:
    canada_2015_transport_rail_svn70_27nov2018_v0.csv
    canada_2015_area_other_svn70_27nov2018_v0.csv
    canada_2015_transport_marine_svn70_07dec2018_v1.csv
    canada_2015_transport_nonroad_monthly_svn70_27nov2018_v0.csv
    Mexico_2016fd_area_interpolated_01mar2018_v0.csv
    Mexico_2016fd_nonroad_interpolated_01mar2018_v0.csv
  - Version 1:
    canada_2015_transport_rail_svn70_27nov2018_v0.csv
    canada_2015_area_other_svn70_27nov2018_v0.csv
    canada_2015_transport_nonroad_monthly_svn70_27nov2018_v0.csv
    Mexico_2016fd_area_interpolated_01mar2018_v0.csv
    Mexico_2016fd_nonroad_interpolated_01mar2018_v0.csv
- 2023
  - Beta:
  - Version 1:
    canada_2023_area_other_svn70_05apr2019_v0.csv
    canada_2023proj_transport_nonroad_monthly_svn70_09apr2019_v0.csv
    canada_2023proj_transport_rail_svn70_09apr2019_v0.csv
    canada_2023_area_EPG_svn70_11apr2019_v1.csv
    Mexico_2023el_area_14sep2016_v1.csv
    Mexico_2023el_nonroad_05feb2019_v1.csv
- 2028
  - Beta:
  - Version 1:
    canada_2028_area_other_svn70_05apr2019_v0.csv
    canada_2028proj_transport_nonroad_monthly_svn70_09apr2019_v0.csv
    canada_2028proj_transport_rail_svn70_09apr2019_v0.csv
    canada_2028_area_EPG_svn70_11apr2019_v1.csv
    Mexico_2028el_area_30nov2016_v1.csv
    Mexico_2028el_nonroad_05feb2019_v1.csv

## Point Source – Canada & Mexico (othpt)

- 2016
  - Beta:
    canada_2015_ag_animal_VOC_svn70_monthly_26nov2018_v0.csv
    canada_2015_ag_animal_NH3_svn70_monthly_26nov2018_v0.csv
    canada_2015_ag_synth_fertilizer_NH3_svn70_monthly_26nov2018_v0.csv
    canada_c3_point_2015_07dec2018_v0.csv
    canada_2015_point_airport_LTO_monthly_svn70_27nov2018_v0.csv
    canada_2015_point_VOC_INV_svn70_26nov2018_v0.csv
    canada_2015_point_noVOC_svn70_11dec2018_nf_v1.csv
    canada_2015_point_CB6_svn70_28nov2018_v0.csv
    canada_2015_UOG_svn70_26nov2018_v0.csv
    Mexico_2014v1_CMV_point_27jul2016_v0.csv
    Mexico_2016_point_interpolated_02mar2018_v0.csv
  - Version 1:
    canada_2015_ag_animal_VOC_svn70_monthly_12km_24apr2019_v0.csv
    canada_2015_ag_animal_NH3_svn70_monthly_12km_24apr2019_v0.csv
    canada_2015_ag_synth_fertilizer_NH3_svn70_monthly_12km_24apr2019_v0.csv
    canada_2015_point_airport_LTO_monthly_svn70_27nov2018_v0.csv
    canada_2015_point_VOC_INV_svn70_02apr2019_v0.csv
    canada_2015_point_noVOC_svn70_02apr2019_v0.csv
    canada_2015_point_CB6_svn70_02apr2019_v0.csv
    canada_2015_UOG_svn70_26nov2018_v0.csv
    Mexico_2016_point_interpolated_02mar2018_v0.csv
- 2023
  - Beta:
  - Version 1:
    canada_2023proj_point_airport_LTO_monthly_svn70_09apr2019_v0.csv
    canada_2023_point_plusEPG_VOC_svn70_08apr2019_v0.csv
    canada_2023_point_plusEPG_noVOC_fixPMC_svn70_25apr2019_v0.csv
    canada_2023_point_plusEPG_CB6_svn70_08apr2019_v0.csv
    canada_2023_UOG_svn70_05apr2019_v1.csv
    canada_2023proj_ag_animal_NH3_svn70_monthly_12km_24apr2019_v0.csv
    canada_2023proj_ag_animal_VOC_svn70_monthly_12km_24apr2019_v0.csv
    canada_2023proj_ag_synth_fertilizer_NH3_svn70_monthly_12km_24apr2019_v0.csv
    Mexico_2023el_point_14sep2016_v0.csv
- 2028
  - Beta:
  - Version 1:
    canada_2028proj_point_airport_LTO_monthly_svn70_09apr2019_v0.csv
    canada_2028_point_plusEPG_VOC_svn70_08apr2019_v0.csv
    canada_2028_point_plusEPG_noVOC_fixPMC_svn70_25apr2019_v0.csv
    canada_2028_point_plusEPG_CB6_svn70_08apr2019_v0.csv

canada_2028_UOG_svn70_05apr2019_v1.csv
canada_2028proj_ag_animal_NH3_svn70_monthly_12km_24apr2019_v0.csv
canada_2028proj_ag_animal_VOC_svn70_monthly_12km_24apr2019_v0.csv
canada_2028proj_ag_synth_fertilizer_NH3_svn70_monthly_12km_24apr2019_v0.csv
Mexico_2028el_point_30nov2016_v0.csv

## Point Oil & Gas (pt_oilgas)

- 2016
  - Beta:
    2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_19oct2018_v0.csv
    oilgas_2016b_POINT_20180612_19oct2018_v2.csv
  - Version 1:
    2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_06sep2019_nf_v2.csv
    2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_WRAP_26jul2019_v0.csv
    oilgas_2016b_POINT_20180612_calcyear2014_06sep2019_nf_v5.csv
    oilgas_2016b_POINT_20180612_calcyear2014_WRAP_from_v2_26jul2019_v0.csv
- 2023
  - Beta:
  - Version 1:
    2023fh_from_2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_17sep2019_v0.csv
    2023fh_from_2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_WRAP_17sep2019_v0.csv
    2023fh_from_oilgas_2016b_POINT_20180612_17sep2019_v0.csv
    2023fh_from_oilgas_2016b_POINT_20180612_WRAP_from_v2_17sep2019_v0.csv
- 2028
  - Beta:
  - Version 1:
    2028fh_from_2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_17sep2019_v0.csv
    2028fh_from_2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_WRAP_17sep2019_v0.csv
    2028fh_from_oilgas_2016b_POINT_20180612_17sep2019_v0.csv
    2028fh_from_oilgas_2016b_POINT_20180612_WRAP_from_v2_17sep2019_v0.csv

## Agricultural burning (ptagfire)

- 2016
  - Beta:
    ptinv_2016beta_agburn_conus_caps_14nov2018_v1.csv
    ptinv_2016beta_agburn_ID_caps_17oct2018_v0.csv
    ptinv_agburn_GA_2016_14nov2018_v1.csv
    ptinv_2016beta_agburn_MN_caps_17oct2018_v0.csv

agburn_WA_2016_supplemental_01nov2018_v0.csv
ptday_2016beta_agburn_conus_noID_caps_17oct2018_v0
ptday_2016beta_agburn_ID_caps_17oct2018_v0
ptday_agburn_GA_2016_14nov2018_v1
ptday_2016beta_agburn_MN_caps_17oct2018_v0
ptday_agburn_WA_2016_supplemental_01nov2018_v0
ptday_2016beta_agburn_conus_noID_caps_prevdec_14nov2018_v0
ptday_agburn_GA_2016_prevdec_14nov2018_v0
ptday_agburn_WA_2016_supplemental_prevdec_14nov2018_v0

- Version 1:
  ptinv_agburn_2016_hi_05apr2019_v0.csv
  ptinv_2016v1_agburn_caps_16jul2019_v0.csv
  ptinv_2016v1_agburn_haps_16jul2019_v0.csv
  ptinv_2016beta_agburn_ID_caps_17oct2018_v0.csv
  ptinv_2016_GA_agburn_caps_reapportion_16jul2019_v0.csv
  ptinv_2016_GA_agburn_haps_reapportion_16jul2019_v0.csv
  ptinv_2016beta_agburn_MN_caps_17oct2018_v0.csv
  agburn_WA_2016_supplemental_01nov2018_v0.csv
  ptday_2016v1_agburn_caps_16jul2019_v0
  ptday_2016v1_agburn_haps_16jul2019_v0
  ptday_2016beta_agburn_ID_caps_17oct2018_v0
  ptday_2016_GA_agburn_caps_reapportion_19jul2019_v0
  ptday_2016_GA_agburn_haps_reapportion_19jul2019_v0
  ptday_2016beta_agburn_MN_caps_17oct2018_v0
  ptday_agburn_WA_2016_supplemental_01nov2018_v0
  ptday_2016v1_agburn_caps_prevdec_19jul2019_v0
  ptday_2016v1_agburn_haps_prevdec_19jul2019_v0
  ptday_2016_GA_agburn_caps_reapportion_prevdec_19jul2019_v0
  ptday_2016_GA_agburn_haps_reapportion_prevdec_19jul2019_v0
  ptday_agburn_WA_2016_supplemental_prevdec_14nov2018_v0
  ptday_agburn_2016_hi_05apr2019_v0

- 2023 & 2028
  - Beta:
    Use base year inventory
  - Version 1:
    Use base year inventory

## Prescribed Burning & Wildfires (ptfire)

- 2016
  - Beta:
    ptday_2016beta_all_prevdec_20nov2018_v0
    ptday_pfire_2016_ks_flinthills_15nov2018_v0
    ptday_pfire_2016_ks_flinthills_haps_15nov2018_v0
    ptday_ptfire_2016beta_GADNR_caps_02oct2018_v0

ptday_ptfire_2016beta_GADNR_haps_02oct2018_v0
ptday_ptfire_aug_2016ff_16j.lst
ptday_ptfire_jul_2016ff_16j.lst
ptday_ptfire_jun_2016ff_16j.lst
ptday_ptfire_may_2016ff_16j.lst
ptday_sf2_2016beta_20nov2018_v2
ptday_sf2_2016beta_ak_20nov2018_v1
ptday_sf2_2016beta_ak_haps_20nov2018_v1
ptday_sf2_2016beta_haps_20nov2018_v2
ptday_sf2_2016beta_nc_30oct2018_v0
ptday_sf2_2016beta_nc_haps_19nov2018_v0
ptinv_pfire_2016_ks_flinthills_15nov2018_v0.csv
ptinv_pfire_2016_ks_flinthills_haps_15nov2018_v0.csv
ptinv_ptfire_2016beta_GADNR_caps_02oct2018_v0.csv
ptinv_ptfire_2016beta_GADNR_haps_02oct2018_v0.csv
ptinv_ptfire_2016ff_16j.lst
ptinv_sf2_2016beta_27nov2018_v3.csv
ptinv_sf2_2016beta_ak_20nov2018_v1.csv
ptinv_sf2_2016beta_ak_haps_20nov2018_v1.csv
ptinv_sf2_2016beta_haps_20nov2018_v2.csv
ptinv_sf2_2016beta_nc_30oct2018_v0.csv
ptinv_sf2_2016beta_nc_haps_19nov2018_v0.csv

- Version 1:
  ptday_2016v1_ptfire_all_prevdec_19jul2019_v0
  ptday_ptfire_2016beta_GADNR_caps_ff10_reapportion_csv_19apr2019_v0
  ptday_ptfire_2016beta_GADNR_haps_ff10_reapportion_csv_12jul2019_v1
  ptday_ptfire_2016_ks_flinthills_haps_reapportion_ff10_26mar2019_v0
  ptday_ptfire_2016_ks_flinthills_reapportion_ff10_26mar2019_v0
  ptday_sf2_2016v1_22jul2019_nf_v1
  ptday_sf2_2016v1_ak_16jul2019_v0
  ptday_sf2_2016v1_ak_haps_16jul2019_v0
  ptday_sf2_2016v1_split_haps_22jul2019_nf_v2
  ptinv_ptfire_2016beta_GADNR_caps_ff10_reapportion_19apr2019_v0.csv
  ptinv_ptfire_2016beta_GADNR_haps_ff10_reapportion_26apr2019_v1.csv
  ptinv_ptfire_2016_ks_flinthills_haps_reapportion_ff10_26mar2019_v0.csv
  ptinv_ptfire_2016_ks_flinthills_reapportion_ff10_26mar2019_v0.csv
  ptinv_sf2_2016v1_ak_16jul2019_v0.csv
  ptinv_sf2_2016v1_ak_haps_16jul2019_v0.csv
  ptinv_sf2_2016v1_split_22jul2019_nf_v1.csv
  ptinv_sf2_2016v1_split_haps_22jul2019_nf_v2.csv

- 2023 & 2028
  - Beta:
    Use base year inventory
  - Version 1:
    Use base year inventory

## Rail (rail)

- 2016
  - Beta:
    2016beta_rail_passenger_ERTAC_10dec2018_v2.csv
    2016beta_rail_class2_class3_ERTAC_05dec2018_nf_v1.csv
    2016beta_rail_class1_ERTAC_19nov2018_nf_v1.csv
  - Version 1:
    2016beta_rail_passenger_ERTAC_15jul2019_v3.csv
    2016beta_rail_class1_ERTAC_15jul2019_v2.csv
    2016v1platform_2016_california_rail_19jul2019_v2.csv
    2016version1_rail_class2_class3_ERTAC_15jul2019_v1.csv
- 2023
  - Beta:
  - Version 1:
    2016v1platform_2023_california_rail_16sep2019_nf_v2.csv
    2016version1_2023_rail_class1_ERTAC_16sep2019_nf_v1.csv
    2016version1_2023_rail_class2_class3_ERTAC_16sep2019_nf_v1.csv
    2016version1_2023_rail_passenger_ERTAC_16sep2019_nf_v1.csv
    2023fh_proj_from_2016version1_2016_rail_allNC_16sep2019_v0.csv
- 2028
  - Beta:
  - Version 1:
    2016v1platform_2028_california_rail_16sep2019_nf_v2.csv
    2016version1_2028_rail_class1_ERTAC_16sep2019_nf_v1.csv
    2016version1_2028_rail_class2_class3_ERTAC_16sep2019_nf_v1.csv
    2016version1_2028_rail_passenger_ERTAC_16sep2019_nf_v1.csv
    2028fh_proj_from_2016version1_2016_rail_allNC_16sep2019_v0.csv

## Electric Generating Unit Emissions (ptegu)

- 2016
  - Beta:
    egucems_2016b_POINT_20180612_30nov2018_v3.csv
    egunoncems_2016b_POINT_20180612_03dec2018_v5.csv
    nonconus_egu_2016b_POINT_20180612_27nov2018_v0.csv
    HOUR_UNIT_2015_12_31dec_2016fd.txt
  - Version 1:
    2016fh_proj_from_egunoncems_2016b_POINT_20180612_2016v1_calcyear2014_05aug2019_v0.csv
    egucems_2016b_POINT_20180612_08jul2020_nf_v7.csv
    egunoncems_2016b_POINT_20180612_17sep2019_nf_v11.csv
    HOUR_UNIT_2015_12_31dec_2016fd.txt
    cemsum_2016v1_3_14_2018.txt

- 2023
  - Beta:
  - Version 1:
    egucems_epa617_2023_20200105_summer_26mar2020_v0.csv
    egucems_epa617_2023_20200105_winter_26mar2020_v0.csv
    egunoncems_epa617_2023_20200105_summer_26mar2020_v0.csv
    egunoncems_epa617_2023_20200105_winter_26mar2020_v0.csv
    HOUR_UNIT_2015_12_31dec_2023_adj_final.txt
    cemsum_2023_3_14_2018_final_summer.txt.fh1
    cemsum_2023_3_14_2018_final_winter.txt.fh1
- 2028
  - Beta:
  - Version 1:
    egucems_epa617_2028_20200117_summer_14apr2020_v0.csv
    egucems_epa617_2028_20200117_winter_14apr2020_v0.csv
    egunoncems_epa617_2028_20200117_summer_14apr2020_v0.csv
    egunoncems_epa617_2028_20200117_winter_14apr2020_v0.csv
    HOUR_UNIT_2015_12_31dec_2028_adj_final.txt
    cemsum_2028_3_14_2018_final_summer.txt.fh1
    cemsum_2028_3_14_2018_final_winter.txt.fh1

## Electric Generating Unit Emissions (ptertac)

- 2016
  - Beta:
    CONUSv16.0_BYFY_T6_ALL_ff10_future.csv
    CONUSv16.0_BYFY_T6_ALL_ff10_hourly_future.csv
    MARAMA_2016beta_POINT_SMALLEGU_25feb2019.csv
  - Version 1:
    C2.1.1CONUSv16.0_BYFYHRLY_NCD_fs_ff10_future.csv
    C2.1.1CONUSv16.0_BYFYHRLY_NCD_fs_ff10_hourly_future.csv
    egunoncems_2016version1_ERTAC_Platform_POINT_27oct2019.csv
    2016fh_proj_from_egunoncems_2016version1_ERTAC_Platform_POINT_calcyear2014_27oct2019.csv
- 2023
  - Beta:
  - Version 1:
    C2.1.3CONUSv16.1_2023_fs_ff10_future.csv
    C2.1.3CONUSv16.1_2023_fs_ff10_hourly_future.csv
    egunoncems_epa617_2023_20190612_summer_19sep2019_ERTAC_Platform_15feb2020.csv
    egunoncems_epa617_2023_20190612_winter_19sep2019_ERTAC_Platform_15feb2020.csv
- 2028
  - Beta:
  - Version 1:
    C2.1.3CONUSv16.1_2028_fs_ff10_future.csv

C2.1.3CONUSv16.1_2028_fs_ff10_hourly_future.csv
egunoncems_epa617_2030_20190611_summer_13jun2019_ERTAC_Platform_31may2020.csv
egunoncems_epa617_2030_20190611_winter_13jun2019_ERTAC_Platform_31may2020.csv

## Industrial Point Sources (ptnonipm)

- 2016
  - Beta:
    nonegu_2016b_POINT_20180612_07dec2018_v3.csv
    point_railyards_2016beta_11dec2018_v0.csv
    airports_nonegu_2016b_POINT_20180612_proj_2016_07dec2018_nf_v2.csv
  - Version 1:
    2016fh_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_22jul2019_v0.csv
    2016fh_proj_from_nonegu_2016version1_POINT_20180612_calcyear2014_09aug2019_nf_v1.csv
    nonegu_2016version1_POINT_20180612_17sep2019_nf_v2.csv
    point_railyards_2016version1_19jul2019_nf_v2.csv
    pt_biorefinery_OTAQ_supplemental_2016version1_12aug2019_nf_v1.csv
- 2023
  - Beta:
  - Version 1:
    2023fh_proj_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_27sep2019_v0.csv
    2023fh_proj_from_nonegu_2016version1_POINT_20180612_calcyear2014_27sep2019_v0.csv
    2023fh_proj_nonegu_2016version1_POINT_20180612_27sep2019_v0.csv
    2023fh_proj_pt_biorefinery_OTAQ_supplemental_2016version1_27sep2019_v0.csv
    point_railyards_2016version1_2023fh_24sep2019_nf_v1.csv
- 2028
  - Beta:
  - Version 1:
    2028fh_proj_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_26sep2019_v0.csv
    2028fh_proj_from_nonegu_2016version1_POINT_20180612_calcyear2014_26sep2019_v0.csv
    2028fh_proj_nonegu_2016version1_POINT_20180612_26sep2019_v0.csv
    2028fh_proj_pt_biorefinery_OTAQ_supplemental_2016version1_26sep2019_v0.csv
    point_railyards_2016version1_2028fh_24sep2019_nf_v1.csv

## Industrial Point Sources (ptnonertac)

- 2016
  - Beta:
  - Version 1:

2016fh_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_22jul2019_v0.csv
2016fh_proj_from_nonegu_2016version1_ERTAC_Platform_POINT_calcyear2014_27oct2019.csv
nonegu_2016version1_ERTAC_Platform_POINT_27oct2019.csv
nonEGUs_hourlyCEM_2016_v1.csv
point_railyards_2016version1_19jul2019_nf_v2.csv
pt_biorefinery_OTAQ_supplemental_2016version1_12aug2019_nf_v1.csv

- 2023
  - Beta:
  - Version 1:
    2023fh_proj_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_27sep2019_v0.csv
    2023fh_proj_from_nonegu_2016version1_POINT_20180612_calcyear2014_27sep2019_ERTAC_Platform_07aug2020.csv
    2023fh_proj_nonegu_2016version1_POINT_20180612_27sep2019_ERTAC_PLATFORM_07aug2020.csv
    2023fh_proj_pt_biorefinery_OTAQ_supplemental_2016version1_27sep2019_v0.csv
    point_railyards_2016version1_2023fh_24sep2019_nf_v1.csv
- 2028
  - Beta:
  - Version 1:
    2028fh_proj_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_26sep2019_v0.csv
    2028fh_proj_from_nonegu_2016version1_POINT_20180612_calcyear2014_26sep2019_ERTAC_Platform_31may2020.csv
    2028fh_proj_nonegu_2016version1_POINT_20180612_26sep2019_ERTAC_Platform_31may2020.csv
    2028fh_proj_pt_biorefinery_OTAQ_supplemental_2016version1_26sep2019_v0.csv
    point_railyards_2016version1_2028fh_24sep2019_nf_v1.csv

## Residential Wood Combustion (rwc)

- 2016
  - Beta:
    2016ff_proj_from_rwc_2014NEIv2_NONPOINT_penultimate_20171228_30oct2018_v0.csv
  - Version 1:
    2016fh_proj_from_rwc_2014NEIv2_NONPOINT_penultimate_20171228_06aug2019_v0.csv
- 2023
  - Beta:
  - Version 1:
    2023fh_proj_from_rwc_2014NEIv2_NONPOINT_penultimate_20171228_12sep2019_v0.csv
- 2028
  - Beta:
  - Version 1:

2028fh_proj_from_rwc_2014NEIv2_NONPOINT_penultimate_20171228_12sep2019_v0.csv

## Appendix B. *Model Evaluation Statistic Formulae*

The statistical formulations that have been computed for each species are as follows:
$P_i$ and $O_i$ are the individual (daily maximum 8-hour ozone or daily average for the other species) predicted and observed concentrations respectively, $\overline{P}$ and $\overline{O}$ are the average concentrations, respectively, and N is the sample size.

Observed average, in ppb:

$$\overline{O} = \frac{1}{N}\sum O_i$$

Predicted average, in ppb (only use $P_i$ when $O_i$ is valid):

$$\overline{P} = \frac{1}{N}\sum P_i$$

Correlation coefficient, $R^2$:

$$R^2 = \frac{\left[\sum (P_i - \overline{P})(O_i - \overline{O})\right]^2}{\sum (P_i - \overline{P})^2 \sum (O_i - \overline{O})^2}$$

Normalized mean error (NME), in %:

$$NME = \frac{\sum |P_i - O_i|}{\sum O_i} \times 100\%$$

Root mean square error (RMSE), in ppb:

$$RMSE = \left[\frac{1}{N}\sum (P_i - O_i)^2\right]^{1/2}$$

Fractional error (FE), in %:

$$FE = \frac{2}{N}\sum \left|\frac{P_i - O_i}{P_i + O_i}\right| \times 100\%$$

Mean absolute gross error (MAGE), in ppb:

$$MAGE = \frac{1}{N}\sum \left|P_i - O_i\right|$$

Mean normalized gross error (MNGE), in %:

$$MNGE = \frac{1}{N}\sum \frac{\left|P_i - O_i\right|}{O_i} \times 100\%$$

Mean bias (MB), in ppb:

$$MB = \frac{1}{N}\sum (P_i - O_i)$$

Mean normalized bias (MNB), in %:

$$MNB = \frac{1}{N}\sum \frac{(P_i - O_i)}{O_i} \times 100\%$$

Mean fractionalized bias (MFB), in %:

$$MFB = \frac{2}{N}\sum \left[\frac{P_i - O_i}{P_i + O_i}\right] \times 100\%$$

Normalized mean bias (NMB), in %:

$$NMB = \frac{\sum (P_i - O_i)}{\sum O_i} \times 100\%$$

## Appendix C. *Baseline (2014-2018) and projected 2023 O3 design values*

Baseline (2014-2018) and projected 2023 $O_3$ design values from CAMx and CMAQ, using the standard 3x3 method and the 3x3 No Water 1 method. Future design values that exceed 65 ppb are highlighted in yellow, values that exceed 70 ppb are highlighted in orange, and values that exceed 75 ppb are highlighted in dark red. OTR monitors only.

| | | | 2014-2018 DVB | | CAMx v7.10 | | | | CMAQ v5.3.1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3x3 | | 3x3 No Water 1 | | 3x3 | | 3x3 No Water 1 | |
| **Site ID** | **State** | **County** | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 90019003 | CT | Fairfield | 82.7 | 83 | 78 | 78 | 76 | 76 | 80 | 80 | 75 | 75 |
| 90013007 | CT | Fairfield | 82 | 83 | 75 | 76 | 75 | 75 | 74 | 75 | 75 | 76 |
| 90099002 | CT | New Haven | 79.7 | 82 | 71 | 73 | 72 | 74 | 71 | 73 | 71 | 73 |
| 420170012 | PA | Bucks | 79.3 | 81 | 71 | 72 | 71 | 72 | 69 | 70 | 69 | 70 |
| 90010017 | CT | Fairfield | 79.3 | 80 | 74 | 74 | 74 | 75 | 71 | 72 | 78 | 79 |
| 90079007 | CT | Middlesex | 78.7 | 79 | 70 | 70 | 70 | 70 | 69 | 69 | 69 | 69 |
| 90011123 | CT | Fairfield | 77 | 78 | 69 | 70 | 69 | 70 | 69 | 70 | 69 | 70 |
| 421010024 | PA | Philadelphia | 77.7 | 78 | 69 | 69 | 69 | 69 | 68 | 68 | 68 | 68 |
| 90090027 | CT | New Haven | 75.7 | 77 | 69 | 70 | 68 | 69 | 69 | 70 | 68 | 69 |
| 340070002 | NJ | Camden | 75.3 | 77 | 67 | 69 | 67 | 69 | 66 | 67 | 66 | 67 |
| 90110124 | CT | New London | 74.3 | 76 | 67 | 68 | 68 | 69 | 67 | 69 | 71 | 73 |
| 360850067 | NY | Richmond | 76 | 76 | 71 | 71 | 70 | 70 | 74 | 74 | 70 | 70 |
| 361030002 | NY | Suffolk | 74 | 76 | 69 | 71 | 68 | 70 | 68 | 70 | 67 | 69 |
| 361030004 | NY | Suffolk | 74.3 | 76 | 68 | 69 | 67 | 68 | 66 | 67 | 66 | 68 |
| 421010048 | PA | Philadelphia | 75.3 | 76 | 67 | 68 | 67 | 68 | 66 | 66 | 66 | 66 |
| 240251001 | MD | Harford | 74 | 75 | 65 | 66 | 64 | 65 | 63 | 64 | 64 | 64 |
| 340030006 | NJ | Bergen | 74.3 | 75 | 69 | 69 | 69 | 69 | 68 | 68 | 68 | 68 |
| 340230011 | NJ | Middlesex | 74.7 | 75 | 66 | 66 | 66 | 66 | 65 | 66 | 65 | 66 |
| 361192004 | NY | Westchester | 74 | 75 | 70 | 70 | 67 | 68 | 66 | 67 | 68 | 68 |
| 90031003 | CT | Hartford | 71.7 | 74 | 63 | 65 | 63 | 65 | 62 | 64 | 62 | 64 |
| 100031010 | DE | New Castle | 73.7 | 74 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| 240031003 | MD | Anne Arundel | 74 | 74 | 64 | 64 | 64 | 64 | 65 | 65 | 63 | 63 |
| 240150003 | MD | Cecil | 74 | 74 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 |
| 250051004 | MA | Bristol | 71.7 | 74 | 64 | 66 | 64 | 66 | 68 | 70 | 63 | 65 |
| 340150002 | NJ | Gloucester | 73.7 | 74 | 66 | 66 | 66 | 66 | 65 | 66 | 65 | 66 |
| 340219991 | NJ | Mercer | 73.3 | 74 | 65 | 66 | 65 | 66 | 65 | 65 | 65 | 65 |
| 360810124 | NY | Queens | 72.3 | 74 | 67 | 69 | 68 | 69 | 66 | 68 | 65 | 67 |
| 90131001 | CT | Tolland | 71.7 | 73 | 63 | 64 | 63 | 64 | 62 | 63 | 62 | 63 |
| 240053001 | MD | Baltimore | 72.7 | 73 | 64 | 64 | 63 | 64 | 64 | 64 | 62 | 63 |
| 240259001 | MD | Harford | 73 | 73 | 63 | 63 | 63 | 63 | 62 | 62 | 63 | 63 |
| 340290006 | NJ | Ocean | 72.7 | 73 | 65 | 65 | 65 | 65 | 64 | 64 | 64 | 64 |
| 361030009 | NY | Suffolk | 71 | 73 | 66 | 67 | 64 | 66 | 66 | 68 | 64 | 66 |
| 420290100 | PA | Chester | 72.7 | 73 | 64 | 64 | 64 | 64 | 63 | 64 | 63 | 64 |
| 440030002 | RI | Kent | 71.3 | 73 | 64 | 65 | 64 | 65 | 62 | 64 | 62 | 64 |
| 440071010 | RI | Providence | 69.7 | 73 | 62 | 65 | 62 | 64 | 67 | 70 | 61 | 63 |
| 90050005 | CT | Litchfield | 71.3 | 72 | 63 | 63 | 63 | 63 | 62 | 63 | 62 | 63 |
| 100031013 | DE | New Castle | 71 | 72 | 63 | 64 | 63 | 64 | 62 | 63 | 62 | 63 |
| 100032004 | DE | New Castle | 71.3 | 72 | 63 | 64 | 63 | 64 | 63 | 63 | 63 | 63 |
| 110010043 | DC | District of Columbia | 71 | 72 | 61 | 62 | 61 | 62 | 60 | 61 | 60 | 61 |

| | | | 2014-2018 DVB | | CAMx v7.10 | | | | CMAQ v5.3.1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3x3 | | 3x3 No Water 1 | | 3x3 | | 3x3 No Water 1 | |
| **Site ID** | **State** | **County** | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 240051007 | MD | Baltimore | 72 | 72 | 62 | 62 | 62 | 62 | 61 | 61 | 61 | 61 |
| 340170006 | NJ | Hudson | 71 | 72 | 66 | 66 | 65 | 65 | 68 | 69 | 64 | 65 |
| 340190001 | NJ | Hunterdon | 71.3 | 72 | 63 | 64 | 63 | 64 | 62 | 63 | 62 | 63 |
| 340210005 | NJ | Mercer | 71.3 | 72 | 63 | 64 | 63 | 64 | 62 | 63 | 62 | 63 |
| 360050133 | NY | Bronx | 70.7 | 72 | 67 | 68 | 66 | 67 | 63 | 65 | 65 | 66 |
| 360610135 | NY | New York | 70.3 | 72 | 66 | 67 | 66 | 68 | 64 | 66 | 65 | 67 |
| 360870005 | NY | Rockland | 71.3 | 72 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 |
| 420450002 | PA | Delaware | 71.3 | 72 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 |
| 420910013 | PA | Montgomery | 71.3 | 72 | 64 | 65 | 64 | 65 | 63 | 64 | 63 | 64 |
| 510130020 | VA | Arlington | 71 | 72 | 61 | 62 | 61 | 62 | 60 | 61 | 60 | 61 |
| 90159991 | CT | Windham | 69.7 | 71 | 61 | 62 | 61 | 62 | 60 | 61 | 60 | 61 |
| 230090102 | ME | Hancock | 69 | 71 | 60 | 62 | 60 | 62 | 61 | 63 | 61 | 63 |
| 240338003 | MD | Prince George's | 70.7 | 71 | 61 | 61 | 61 | 61 | 59 | 60 | 59 | 60 |
| 240339991 | MD | Prince George's | 69.3 | 71 | 60 | 61 | 60 | 61 | 59 | 60 | 59 | 60 |
| 250130008 | MA | Hampden | 70 | 71 | 61 | 62 | 61 | 62 | 60 | 61 | 60 | 61 |
| 420030067 | PA | Allegheny | 69.7 | 71 | 62 | 63 | 62 | 63 | 60 | 61 | 60 | 61 |
| 420950025 | PA | Northampton | 70 | 71 | 62 | 63 | 62 | 63 | 60 | 61 | 60 | 61 |
| 440090007 | RI | Washington | 69.3 | 71 | 63 | 64 | 62 | 63 | 66 | 67 | 65 | 66 |
| 510590030 | VA | Fairfax | 70 | 71 | 60 | 60 | 60 | 60 | 59 | 60 | 59 | 60 |
| 110010050 | DC | District of Columbia | 70 | 70 | 60 | 60 | 60 | 60 | 59 | 59 | 59 | 59 |
| 240170010 | MD | Charles | 69.3 | 70 | 60 | 60 | 60 | 60 | 59 | 60 | 59 | 60 |
| 240290002 | MD | Kent | 69.3 | 70 | 60 | 60 | 60 | 60 | 59 | 60 | 59 | 60 |
| 240330030 | MD | Prince George's | 69.3 | 70 | 59 | 60 | 59 | 60 | 58 | 59 | 58 | 59 |
| 245100054 | MD | Baltimore (City) | 68.3 | 70 | 60 | 61 | 59 | 61 | 60 | 62 | 59 | 61 |
| 250070001 | MA | Dukes | 70 | 70 | 63 | 63 | 62 | 62 | 62 | 62 | 62 | 62 |
| 250154002 | MA | Hampshire | 69 | 70 | 60 | 61 | 60 | 61 | 59 | 60 | 59 | 60 |
| 250213003 | MA | Norfolk | 69 | 70 | 62 | 63 | 60 | 61 | 64 | 64 | 60 | 61 |
| 340130003 | NJ | Essex | 68.3 | 70 | 61 | 63 | 61 | 63 | 61 | 63 | 61 | 63 |
| 340273001 | NJ | Morris | 69 | 70 | 61 | 62 | 61 | 62 | 61 | 62 | 61 | 62 |
| 360290002 | NY | Erie | 69.3 | 70 | 63 | 64 | 63 | 63 | 65 | 66 | 62 | 63 |
| 360790005 | NY | Putnam | 69 | 70 | 62 | 63 | 62 | 63 | 62 | 62 | 62 | 62 |
| 420031008 | PA | Allegheny | 69 | 70 | 62 | 63 | 62 | 63 | 61 | 62 | 61 | 62 |
| 420050001 | PA | Armstrong | 69 | 70 | 61 | 62 | 61 | 62 | 61 | 62 | 61 | 62 |
| 420070002 | PA | Beaver | 68.7 | 70 | 57 | 59 | 57 | 59 | 54 | 56 | 54 | 56 |
| 420110011 | PA | Berks | 70 | 70 | 62 | 62 | 62 | 62 | 60 | 60 | 60 | 60 |
| 420630004 | PA | Indiana | 69.7 | 70 | 62 | 63 | 62 | 63 | 61 | 61 | 61 | 61 |
| 420710007 | PA | Lancaster | 69.3 | 70 | 60 | 61 | 60 | 61 | 60 | 60 | 60 | 60 |
| 420750100 | PA | Lebanon | 69 | 70 | 60 | 61 | 60 | 61 | 60 | 60 | 60 | 60 |
| 420770004 | PA | Lehigh | 69.7 | 70 | 62 | 62 | 62 | 62 | 61 | 61 | 61 | 61 |
| 421330011 | PA | York | 69 | 70 | 61 | 61 | 61 | 61 | 59 | 60 | 59 | 60 |
| 100031007 | DE | New Castle | 68 | 69 | 59 | 60 | 59 | 60 | 59 | 60 | 59 | 60 |
| 100051003 | DE | Sussex | 67.7 | 69 | 59 | 60 | 60 | 61 | 55 | 56 | 59 | 60 |
| 240090011 | MD | Calvert | 67.7 | 69 | 59 | 60 | 59 | 60 | 59 | 60 | 58 | 59 |
| 240130001 | MD | Carroll | 68.3 | 69 | 58 | 59 | 58 | 59 | 57 | 58 | 57 | 58 |
| 240210037 | MD | Frederick | 68 | 69 | 59 | 60 | 59 | 60 | 58 | 59 | 58 | 59 |
| 250010002 | MA | Barnstable | 69 | 69 | 61 | 61 | 61 | 61 | 60 | 60 | 59 | 59 |

| | | | 2014-2018 DVB | | CAMx v7.10 3x3 | | CAMx v7.10 3x3 No Water 1 | | CMAQ v5.3.1 3x3 | | CMAQ v5.3.1 3x3 No Water 1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site ID | State | County | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 250051006 | MA | Bristol | 67.3 | 69 | 61 | 62 | 60 | 62 | 60 | 61 | 59 | 61 |
| 250230005 | MA | Plymouth | 67 | 69 | 59 | 61 | 59 | 61 | 58 | 59 | 58 | 59 |
| 250270024 | MA | Worcester | 66.3 | 69 | 58 | 61 | 58 | 61 | 58 | 60 | 58 | 60 |
| 340250005 | NJ | Monmouth | 67.3 | 69 | 60 | 62 | 60 | 61 | 61 | 63 | 59 | 60 |
| 360050110 | NY | Bronx | 67.7 | 69 | 63 | 65 | 63 | 65 | 62 | 63 | 63 | 64 |
| 420030008 | PA | Allegheny | 68 | 69 | 61 | 62 | 61 | 62 | 60 | 61 | 60 | 61 |
| 420850100 | PA | Mercer | 68.7 | 69 | 60 | 60 | 60 | 60 | 58 | 59 | 58 | 59 |
| 420958000 | PA | Northampton | 69 | 69 | 61 | 61 | 61 | 61 | 60 | 60 | 60 | 60 |
| 240313001 | MD | Montgomery | 67.7 | 68 | 59 | 59 | 59 | 59 | 57 | 57 | 57 | 57 |
| 250092006 | MA | Essex | 66.3 | 68 | 60 | 62 | 59 | 60 | 61 | 62 | 59 | 60 |
| 330074001 | NH | Coos | 67.3 | 68 | | | | | | | | |
| 330115001 | NH | Hillsborough | 67 | 68 | 58 | 59 | 58 | 59 | | | | |
| 340071001 | NJ | Camden | 67.3 | 68 | 59 | 60 | 59 | 60 | 58 | 59 | 58 | 59 |
| 340315001 | NJ | Passaic | 67.7 | 68 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 360130006 | NY | Chautauqua | 68 | 68 | 62 | 62 | 61 | 61 | 61 | 61 | 61 | 61 |
| 360270007 | NY | Dutchess | 67 | 68 | 59 | 60 | 59 | 60 | 59 | 60 | 59 | 60 |
| 360551007 | NY | Monroe | 65.7 | 68 | 59 | 62 | 59 | 62 | 59 | 61 | 59 | 61 |
| 420070005 | PA | Beaver | 67.3 | 68 | 56 | 57 | 56 | 57 | 51 | 52 | 51 | 52 |
| 420590002 | PA | Greene | 67 | 68 | 61 | 62 | 61 | 62 | 61 | 62 | 61 | 62 |
| 420730015 | PA | Lawrence | 66.3 | 68 | 57 | 58 | 57 | 58 | 56 | 57 | 56 | 57 |
| 420890002 | PA | Monroe | 66.7 | 68 | 58 | 59 | 58 | 59 | 58 | 59 | 58 | 59 |
| 421250005 | PA | Washington | 67 | 68 | 60 | 61 | 60 | 61 | 60 | 61 | 60 | 61 |
| 421255001 | PA | Washington | 68 | 68 | 58 | 58 | 58 | 58 | 55 | 55 | 55 | 55 |
| 421290008 | PA | Westmoreland | 67 | 68 | 61 | 61 | 61 | 61 | 59 | 60 | 59 | 60 |
| 511071005 | VA | Loudoun | 67 | 68 | 58 | 59 | 58 | 59 | 57 | 58 | 57 | 58 |
| 100010002 | DE | Kent | 66.3 | 67 | 58 | 58 | 57 | 58 | 58 | 59 | 57 | 58 |
| 230312002 | ME | York | 66.5 | 67 | 58 | 59 | 58 | 58 | 58 | 58 | 57 | 58 |
| 240430009 | MD | Washington | 66.7 | 67 | 58 | 59 | 58 | 59 | 58 | 58 | 58 | 58 |
| 330150016 | NH | Rockingham | 66.7 | 67 | 58 | 59 | 58 | 58 | 59 | 60 | 57 | 58 |
| 340110007 | NJ | Cumberland | 65.7 | 67 | 57 | 59 | 57 | 59 | 57 | 58 | 57 | 58 |
| 360631006 | NY | Niagara | 66.3 | 67 | 61 | 61 | 60 | 61 | 61 | 62 | 60 | 60 |
| 361173001 | NY | Wayne | 65 | 67 | 59 | 60 | 59 | 60 | 59 | 61 | 58 | 60 |
| 420010001 | PA | Adams | 66.5 | 67 | 59 | 59 | 59 | 59 | 58 | 59 | 58 | 59 |
| 420019991 | PA | Adams | 66.3 | 67 | 59 | 59 | 59 | 59 | 58 | 59 | 58 | 59 |
| 420070014 | PA | Beaver | 65.7 | 67 | 55 | 56 | 55 | 56 | 51 | 52 | 51 | 52 |
| 420431100 | PA | Dauphin | 66 | 67 | 58 | 58 | 58 | 58 | 57 | 58 | 57 | 58 |
| 420690101 | PA | Lackawanna | 66 | 67 | 58 | 59 | 58 | 59 | | | | |
| 100051002 | DE | Sussex | 65.3 | 66 | 57 | 58 | 57 | 58 | 57 | 57 | 57 | 57 |
| 240190004 | MD | Dorchester | 64.7 | 66 | 56 | 58 | 57 | 58 | 58 | 59 | 57 | 58 |
| 240199991 | MD | Dorchester | 65.7 | 66 | 58 | 58 | 57 | 57 | 59 | 59 | 57 | 58 |
| 240230002 | MD | Garrett | 65.3 | 66 | 59 | 60 | 59 | 60 | | | | |
| 250112005 | MA | Franklin | 64.7 | 66 | 56 | 58 | 56 | 58 | | | | |
| 250270015 | MA | Worcester | 65 | 66 | 57 | 57 | 57 | 57 | 56 | 57 | 56 | 57 |
| 330150018 | NH | Rockingham | 65.3 | 66 | 57 | 57 | 57 | 57 | | | | |
| 360310002 | NY | Essex | 64 | 66 | | | | | | | | |
| 360715001 | NY | Orange | 64.3 | 66 | 57 | 58 | 57 | 58 | 56 | 57 | 56 | 57 |
| 420110006 | PA | Berks | 65.7 | 66 | 58 | 58 | 58 | 58 | 57 | 57 | 57 | 57 |
| 420334000 | PA | Clearfield | 64.7 | 66 | 58 | 59 | 58 | 59 | 57 | 58 | 57 | 58 |

| | | | 2014-2018 DVB | | CAMx v7.10 | | | | CMAQ v5.3.1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3x3 | | 3x3 No Water 1 | | 3x3 | | 3x3 No Water 1 | |
| Site ID | State | County | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 420430401 | PA | Dauphin | 65.3 | 66 | 62 | 57 | 57 | 57 | 56 | 57 | 56 | 57 |
| 420479991 | PA | Elk | 65.7 | 66 | 61 | 59 | 59 | 59 | | | | |
| 420490003 | PA | Erie | 65 | 66 | 61 | 60 | 59 | 59 | 59 | 60 | 57 | 58 |
| 420710012 | PA | Lancaster | 65 | 66 | 61 | 58 | 57 | 58 | 57 | 58 | 57 | 58 |
| 420859991 | PA | Mercer | 65.3 | 66 | 65 | 58 | 57 | 58 | 56 | 57 | 56 | 57 |
| 421330008 | PA | York | 65.7 | 66 | 62 | 57 | 57 | 57 | 56 | 56 | 56 | 56 |
| 510870014 | VA | Henrico | 65.5 | 66 | 60 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| 511530009 | VA | Prince William | 65.3 | 66 | 61 | 58 | 57 | 58 | 56 | 57 | 56 | 57 |
| 230052003 | ME | Cumberland | 64.7 | 65 | 59 | 57 | 57 | 57 | 56 | 57 | | |
| 250094005 | MA | Essex | 64.5 | 65 | 60 | 57 | 56 | 57 | 57 | 57 | 56 | 56 |
| 250170009 | MA | Middlesex | 64 | 65 | | 56 | 56 | 56 | 55 | 56 | 55 | 56 |
| 330150014 | NH | Rockingham | 63.3 | 65 | 59 | 57 | 55 | 57 | 56 | 58 | 54 | 56 |
| 340410007 | NJ | Warren | 64.3 | 65 | 60 | 57 | 57 | 57 | 56 | 56 | 56 | 56 |
| 360310003 | NY | Essex | 64.7 | 65 | 60 | | | | | | | |
| 360671015 | NY | Onondaga | 64.3 | 65 | 61 | 59 | 58 | 59 | | | | |
| 420279991 | PA | Centre | 64.7 | 65 | 60 | 58 | 58 | 58 | | | | |
| 421119991 | PA | Somerset | 65 | 65 | 62 | 59 | 59 | 59 | 58 | 58 | 58 | 58 |
| 421250200 | PA | Washington | 65 | 65 | 57 | 58 | 58 | 58 | 57 | 57 | 57 | 57 |
| 500030004 | VT | Bennington | 64.3 | 65 | 62 | 57 | 57 | 57 | | | | |
| 510850003 | VA | Hanover | 63.3 | 65 | 58 | 53 | 51 | 53 | 49 | 51 | 49 | 51 |
| 516500008 | VA | Hampton City | 64.3 | 65 | 59 | 56 | 54 | 55 | 55 | 55 | 53 | 53 |
| 230090103 | ME | Hancock | 63 | 64 | 61 | 56 | 55 | 56 | 56 | 57 | | |
| 230130004 | ME | Knox | 63.3 | 64 | 58 | 56 | 55 | 56 | 55 | 56 | 55 | 55 |
| 250095005 | MA | Essex | 62.7 | 64 | 61 | 56 | 55 | 56 | 55 | 56 | 55 | 56 |
| 250250042 | MA | Suffolk | 60.3 | 64 | 59 | 58 | 53 | 56 | 55 | 58 | 53 | 56 |
| 330111011 | NH | Hillsborough | 63 | 64 | 58 | 56 | 55 | 56 | | | | |
| 340010006 | NJ | Atlantic | 63.7 | 64 | 58 | 57 | 56 | 56 | 57 | 57 | 56 | 56 |
| 360010012 | NY | Albany | 64 | 64 | 59 | 57 | 57 | 57 | 56 | 56 | 56 | 56 |
| 360910004 | NY | Saratoga | 63 | 64 | 58 | 57 | 56 | 57 | | | | |
| 420130801 | PA | Blair | 63.5 | 64 | 59 | 57 | 56 | 57 | 56 | 56 | 56 | 56 |
| 420692006 | PA | Lackawanna | 62.5 | 64 | 61 | 56 | 55 | 56 | | | | |
| 420791101 | PA | Luzerne | 64 | 64 | 60 | 56 | 56 | 56 | 55 | 55 | 55 | 55 |
| 420810100 | PA | Lycoming | 63.7 | 64 | 59 | 57 | 56 | 57 | | | | |
| 421174000 | PA | Tioga | 63.7 | 64 | 59 | 57 | 56 | 57 | | | | |
| 230112005 | ME | Kennebec | 61.3 | 63 | 56 | 54 | 53 | 54 | | | | |
| 330050007 | NH | Cheshire | 62.3 | 63 | 58 | 54 | 54 | 54 | | | | |
| 330131007 | NH | Merrimack | 62 | 63 | 59 | 55 | 54 | 55 | | | | |
| 360430005 | NY | Herkimer | 63 | 63 | 58 | | | | | | | |
| 360450002 | NY | Jefferson | 63 | 63 | 58 | 57 | 57 | 57 | 57 | 57 | 57 | 57 |
| 360750003 | NY | Oswego | 61 | 63 | 57 | 57 | | | 55 | 57 | 54 | 56 |
| 361099991 | NY | Tompkins | 62.7 | 63 | 60 | | | | | | | |
| 420210011 | PA | Cambria | 62.3 | 63 | 58 | 56 | 56 | 56 | 54 | 55 | 54 | 55 |
| 420270100 | PA | Centre | 62.3 | 63 | 57 | 56 | 56 | 56 | | | | |
| 500210002 | VT | Rutland | 63 | 63 | 57 | | | | | | | |
| 510360002 | VA | Charles | 62.3 | 63 | | 50 | 50 | 50 | 49 | 49 | 49 | 49 |
| 511130003 | VA | Madison | 63 | 63 | 58 | 55 | 55 | 55 | | | | |
| 511790001 | VA | Stafford | 62.3 | 63 | 58 | 54 | 53 | 54 | 53 | 53 | 53 | 53 |
| 230310040 | ME | York | 61.3 | 62 | 59 | 53 | 53 | 53 | | | | |

| | | | 2014-2018 DVB | | CAMx v7.10 | | | | CMAQ v5.3.1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3x3 | | 3x3 No Water 1 | | 3x3 | | 3x3 No Water 1 | |
| **Site ID** | **State** | **County** | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 360410005 | NY | Hamilton | 61.3 | 62 | | | | | | | | |
| 500070007 | VT | Chittenden | 61 | 62 | | | | | | | | |
| 510410004 | VA | Chesterfield | 61.3 | 62 | 50 | 50 | 50 | 50 | 49 | 49 | 49 | 49 |
| 510690010 | VA | Frederick | 61.3 | 62 | 54 | 54 | 54 | 54 | 53 | 54 | 53 | 54 |
| 510719991 | VA | Giles | 62 | 62 | 55 | 55 | 55 | 55 | | | | |
| 511611004 | VA | Roanoke | 61.3 | 62 | 53 | 54 | 53 | 54 | | | | |
| 518000004 | VA | Suffolk City | 61 | 62 | 53 | 54 | 53 | 54 | 53 | 54 | 52 | 53 |
| 230290019 | ME | Washington | 59.3 | 61 | 52 | 53 | 52 | 53 | | | | |
| 361010003 | NY | Steuben | 59.7 | 61 | | | | | | | | |
| 421010004 | PA | Philadelphia | 61 | 61 | 54 | 54 | 54 | 54 | 53 | 53 | 53 | 53 |
| 510030001 | VA | Albemarle | 60.5 | 61 | 53 | 54 | 53 | 54 | | | | |
| 510330001 | VA | Caroline | 61 | 61 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| 511970002 | VA | Wythe | 60.7 | 61 | 54 | 54 | 54 | 54 | | | | |
| 518000005 | VA | Suffolk City | 59.7 | 61 | 52 | 53 | 52 | 53 | | | | |
| 230010014 | ME | Androscoggin | 59.3 | 60 | 52 | 52 | 51 | 52 | 52 | 53 | 50 | 51 |
| 230194008 | ME | Penobscot | 58.3 | 60 | | | | | | | | |
| 420550001 | PA | Franklin | 59.3 | 60 | 53 | 53 | 53 | 53 | 52 | 52 | 52 | 52 |
| 511479991 | VA | Prince Edward | 59.3 | 60 | 49 | 49 | 49 | 49 | | | | |
| 511650003 | VA | Rockingham | 60 | 60 | 53 | 53 | 53 | 53 | | | | |
| 230310038 | ME | York | 58.7 | 59 | | | | | | | | |
| 330012004 | NH | Belknap | 58.7 | 59 | 50 | 50 | 50 | 50 | 49 | 50 | | |
| 330074002 | NH | Coos | 58.3 | 59 | | | | | | | | |
| 330090010 | NH | Grafton | 57.7 | 59 | | | | | | | | |
| 420150011 | PA | Bradford | 57.3 | 59 | 50 | 51 | 50 | 51 | | | | |
| 510610002 | VA | Fauquier | 58.7 | 59 | 51 | 51 | 51 | 51 | 50 | 51 | 50 | 51 |
| 511630003 | VA | Rockbridge | 58 | 59 | 50 | 51 | 50 | 51 | | | | |
| 360319991 | NY | Essex | 57 | 58 | | | | | | | | |
| 360337003 | NY | Franklin | 58 | 58 | | | | | | | | |
| 110010041 | DC | District of Columbia | 57 | 57 | 49 | 49 | 49 | 49 | 48 | 48 | 48 | 48 |
| 330099991 | NH | Grafton | 54.7 | 56 | | | | | | | | |
| 230039991 | ME | Aroostook | 52 | 52 | | | | | | | | |

## Appendix D. *List of Air Quality Monitors in the OTC Modeling Domain Used for Base Year DV Calculations*

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| AL | Baldwin | 010030010 | FAIRHOPE: Alabama | 30.497478 | -87.880258 |
| AL | Colbert | 010331002 | MUSCLE SHOALS | 34.762619 | -87.638097 |
| AL | DeKalb | 010499991 | Sand Mountain | 34.289001 | -85.970065 |
| AL | Etowah | 010550011 | SOUTHSIDE | 33.904039 | -86.053867 |
| AL | Houston | 010690004 | DOTHAN | 31.188933 | -85.423094 |
| AL | Jefferson | 010730023 | North Birmingham | 33.553056 | -86.815 |
| AL | Jefferson | 010731003 | Fairfield | 33.485556 | -86.915 |
| AL | Jefferson | 010731005 | McAdory | 33.331111 | -87.003611 |
| AL | Jefferson | 010731010 | Leeds | 33.545278 | -86.549167 |
| AL | Jefferson | 010732006 | Hoover | 33.386389 | -86.816667 |
| AL | Jefferson | 010735003 | Corner | 33.801667 | -86.9425 |
| AL | Jefferson | 010736002 | Tarrant Elementary School | 33.578333 | -86.773889 |
| AL | Madison | 010890014 | HUNTSVILLE OLD AIRPORT | 34.687761 | -86.586362 |
| AL | Madison | 010890022 | HUNTSVILLE CAPSHAW ROAD | 34.772727 | -86.756174 |
| AL | Mobile | 010970003 | CHICKASAW | 30.770181 | -88.087761 |
| AL | Mobile | 010972005 | BAY ROAD | 30.474305 | -88.141022 |
| AL | Montgomery | 011011002 | MOMS: ADEM | 32.412811 | -86.263394 |
| AL | Morgan | 011030011 | DECATUR: Alabama | 34.530717 | -86.967536 |
| AL | Russell | 011130002 | LADONIA: PHENIX CITY | 32.46735 | -85.083447 |
| AL | Shelby | 011170004 | HELENA | 33.317142 | -86.825754 |
| AL | Sumter | 011190003 | Ward: Sumter Co. | 32.362606 | -88.277992 |
| AL | Tuscaloosa | 011250010 | DUNCANVILLE: TUSCALOOSA | 33.089772 | -87.459733 |
| AR | Clark | 050199991 | Caddo Valley | 34.1795 | -93.0988 |
| AR | Crittenden | 050350005 | MARION | 35.197288 | -90.193141 |
| AR | Newton | 051010002 | DEER | 35.832726 | -93.20826 |
| AR | Polk | 051130003 | EAGLE MOUNTAIN | 34.454514 | -94.143521 |
| AR | Pulaski | 051190007 | PARR | 34.756189 | -92.281296 |
| AR | Pulaski | 051191002 | NLR AIRPORT | 34.835721 | -92.260581 |
| AR | Washington | 051430005 | SPRINGDALE | 36.1797 | -94.116827 |
| AR | Washington | 051430006 | Fayetteville Airport | 36.011703 | -94.167436 |
| CO | Adams | 080013001 | Welby | 39.838119 | -104.94984 |
| CO | Arapahoe | 080050002 | HIGHLAND RESERVOIR | 39.567887 | -104.957193 |
| CO | Arapahoe | 080050006 | Aurora East | 39.638522 | -104.569335 |
| CO | Denver | 080310002 | DENVER - CAMP | 39.751184 | -104.987625 |
| CO | Denver | 080310026 | La Casa | 39.77949 | -105.00518 |
| CO | Douglas | 080350004 | Chatfield State Park | 39.534488 | -105.070358 |
| CO | El Paso | 080410013 | U.S. AIR FORCE ACADEMY | 38.958341 | -104.817215 |
| CO | El Paso | 080410016 | MANITOU SPRINGS | 38.853097 | -104.901289 |
| CO | Garfield | 080450012 | Rifle-Health Dept | 39.54182 | -107.784125 |
| CO | Gunnison | 080519991 | Gothic | 38.9564 | -106.9858 |
| CO | Jefferson | 080590005 | WELCH | 39.638781 | -105.13948 |
| CO | Jefferson | 080590006 | ROCKY FLATS-N | 39.912799 | -105.188587 |
| CO | Jefferson | 080590011 | NATIONAL RENEWABLE ENERGY LABS - NREL | 39.743724 | -105.177989 |
| CO | Jefferson | 080590013 | Aspen Park | 39.541515 | -105.29841 |
| CO | La Plata | 080671004 | | 37.30389 | -107.484167 |
| CO | La Plata | 080677001 | LOCATED IN PINE RIVER VALLEY: THE MOST DENSELY POPULATED AREA. | 37.13678 | -107.62863 |
| CO | Larimer | 080690007 | Rocky Mountain NP - Long's Peak | 40.27813 | -105.54564 |
| CO | Larimer | 080690011 | FORT COLLINS - WEST | 40.592543 | -105.141122 |
| CO | Larimer | 080691004 | Fort Collins - CSU - S. Mason | 40.57747 | -105.07892 |
| CO | Rio Blanco | 081030005 | | 40.038889 | -107.8475 |
| CO | Weld | 081230009 | Greeley - Weld County Tower | 40.386368 | -104.73744 |
| CT | Fairfield | 090010017 | Greenwich Point Park - Greenwich | 41.004657 | -73.585128 |
| CT | Fairfield | 090011123 | Western Conn State Univ - Danbury | 41.399167 | -73.443056 |
| CT | Fairfield | 090013007 | Lighthouse - Stratford | 41.1525 | -73.103056 |
| CT | Fairfield | 090019003 | Sherwood Island State Park - Westport | 41.118333 | -73.336667 |
| CT | Hartford | 090031003 | McAuliffe Park | 41.784722 | -72.631667 |
| CT | Litchfield | 090050005 | Mohawk Mt-Cornwall | 41.821342 | -73.297257 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| CT | Middlesex | 090079007 | Connecticut Valley Hospital - Middletown | 41.55 | -72.626 |
| CT | New Haven | 090090027 | Criscuolo Park-New Haven | 41.3014 | -72.902871 |
| CT | New Haven | 090099002 | Hammonasset State Park - Madison | 41.256788 | -72.55327 |
| CT | New London | 090110124 | Fort Griswold Park - Groton | 41.35362 | -72.07882 |
| CT | Tolland | 090131001 | | 41.976389 | -72.388056 |
| CT | Windham | 090159991 | Abington | 41.84046 | -72.010368 |
| DE | Kent | 100010002 | PROPERTY OF KILLENS POND STATE PARK; BEHIND FARM BUILDINGS | 38.986672 | -75.5568 |
| DE | New Castle | 100031007 | Lums Pond | 39.5513 | -75.732 |
| DE | New Castle | 100031010 | BCSP | 39.817222 | -75.563889 |
| DE | New Castle | 100031013 | BELLEVUE STATE PARK: FIELD IN SE PORTION OF PARK | 39.773889 | -75.496389 |
| DE | New Castle | 100032004 | MLK CORNER OF MLK BLVD AND JUSTISON ST | 39.739444 | -75.558056 |
| DE | Sussex | 100051002 | Seaford Shipley State Service Center | 38.6539 | -75.6106 |
| DE | Sussex | 100051003 | Lewes SPM SITE: NEAR UD ACID RAIN/MERCURY COLLECTORS | 38.7791 | -75.16323 |
| DC | District of Columbia | 110010041 | RIVER TERRACE | 38.895572 | -76.958072 |
| DC | District of Columbia | 110010043 | MCMILLAN NCore-PAMS | 38.921847 | -77.013178 |
| DC | District of Columbia | 110010050 | Takoma Rec Center | 38.970092 | -77.016715 |
| FL | Baker | 120030002 | OLUSTEE | 30.201111 | -82.441111 |
| FL | Bay | 120050006 | ST.ANDREWS STATE PARK: PANAMA CITY BEACH | 30.130433 | -85.731517 |
| FL | Brevard | 120090007 | Melbourne | 28.053611 | -80.628611 |
| FL | Brevard | 120094001 | Cocoa Beach | 28.310841 | -80.61533 |
| FL | Broward | 120110033 | Vista View Park | 26.073536 | -80.33845 |
| FL | Broward | 120110034 | Daniela Banu NCORE | 26.053889 | -80.256944 |
| FL | Broward | 120112003 | Pompano Highlands | 26.292025 | -80.09647 |
| FL | Broward | 120118002 | Dr. Von Mizell-Eula Johnson State Park (prev. John U Lloyd State Park) | 26.088421 | -80.111193 |
| FL | Collier | 120210004 | LAURAL OAKS ELEMENTARY | 26.270083 | -81.710959 |
| FL | Columbia | 120230002 | Lake City - Veteran's Domicile | 30.178056 | -82.619167 |
| FL | Duval | 120310077 | Sheffield | 30.477725 | -81.587339 |
| FL | Duval | 120310100 | Mayo Clinic | 30.260278 | -81.453611 |
| FL | Duval | 120310106 | Cisco Drive | 30.378217 | -81.8409 |
| FL | Escambia | 120330004 | Ellyson Industrial Park | 30.525367 | -87.20355 |
| FL | Escambia | 120330018 | Pensacola NAS | 30.36805 | -87.270967 |
| FL | Flagler | 120350004 | Flagler | 29.489083 | -81.276833 |
| FL | Highlands | 120550003 | Archbold Biological Station | 27.189215 | -81.34035 |
| FL | Hillsborough | 120570081 | Simmons Park | 27.740033 | -82.465146 |
| FL | Hillsborough | 120571035 | Davis Island | 27.928356 | -82.454539 |
| FL | Hillsborough | 120571065 | USMC Reserve Center (Gandy) | 27.892523 | -82.538429 |
| FL | Hillsborough | 120573002 | SYDNEY | 27.96565 | -82.2304 |
| FL | Holmes | 120590004 | Bonifay | 30.848611 | -85.603889 |
| FL | Indian River | 120619991 | Indian River Lagoon | 27.8492 | -80.4554 |
| FL | Lake | 120690002 | Clermont | 28.523889 | -81.723333 |
| FL | Lee | 120712002 | Cape Coral - Rotary Park | 26.548212 | -81.981523 |
| FL | Lee | 120713002 | Bay Oaks Park | 26.449247 | -81.939256 |
| FL | Leon | 120730012 | Tallahassee Community College | 30.439722 | -84.346389 |
| FL | Liberty | 120779991 | Sumatra | 30.1103 | -84.9903 |
| FL | Manatee | 120813002 | Port Manatee | 27.633089 | -82.54593 |
| FL | Manatee | 120814012 | G.T. BRAY PARK | 27.480873 | -82.618709 |
| FL | Manatee | 120814013 | 39TH STREET SITE | 27.449763 | -82.522041 |
| FL | Marion | 120830003 | Ocala YMCA | 29.170533 | -82.100646 |
| FL | Marion | 120830004 | Marion County Sheriff | 29.192754 | -82.173149 |
| FL | Martin | 120850007 | Stuart | 27.172458 | -80.240689 |
| FL | Miami-Dade | 120860027 | Rosenstiel | 25.732878 | -80.16175 |
| FL | Miami-Dade | 120860029 | Perdue | 25.587327 | -80.325922 |
| FL | Okaloosa | 120910002 | Ft. Walton Beach | 30.426533 | -86.666217 |
| FL | Orange | 120950008 | Winegard Elementary School | 28.45445 | -81.381181 |
| FL | Orange | 120952002 | WINTER PARK | 28.596389 | -81.3625 |
| FL | Osceola | 120972002 | Osceola County Fire Station | 28.347509 | -81.636464 |
| FL | Pasco | 121010005 | San Antonio | 28.332225 | -82.305643 |
| FL | Pasco | 121012001 | Holiday | 28.195574 | -82.756264 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| FL | Pinellas | 121030004 | St. Petersburg College | 27.946688 | -82.731767 |
| FL | Pinellas | 121030018 | Azalea Park | 27.785866 | -82.739875 |
| FL | Pinellas | 121035002 | John Chesnut Sr. Park - East Lake | 28.090299 | -82.700707 |
| FL | Polk | 121056005 | Sikes Elementary School | 27.939746 | -82.000084 |
| FL | Polk | 121056006 | Baptist Childrens' Home | 28.028889 | -81.972222 |
| FL | St. Lucie | 121110013 | Savannas | 27.389079 | -80.311033 |
| FL | Santa Rosa | 121130015 | Woodlawn Beach Middle School | 30.394133 | -87.008033 |
| FL | Sarasota | 121151005 | Lido Park | 27.307268 | -82.570376 |
| FL | Sarasota | 121151006 | Paw Park | 27.350278 | -82.479722 |
| FL | Sarasota | 121152002 | Jackson Road | 27.089194 | -82.362583 |
| FL | Seminole | 121171002 | Sanford (Seminole Community College) | 28.746111 | -81.310556 |
| FL | Volusia | 121272001 | Port Orange | 29.109151 | -80.993666 |
| FL | Volusia | 121275002 | DAYTONA BLIND SERVICES | 29.206667 | -81.0525 |
| FL | Wakulla | 121290001 | St. Marks Wildlife Refuge | 30.0925 | -84.161111 |
| GA | Bibb | 130210012 | Macon-Forestry | 32.805264 | -83.543493 |
| GA | Chatham | 130510021 | Savannah-E. President | 32.06848 | -81.04942 |
| GA | Chattooga | 130550001 | Summerville | 34.474526 | -85.408847 |
| GA | Clarke | 130590002 | Athens | 33.918137 | -83.344385 |
| GA | Cobb | 130670003 | Kennesaw | 34.015436 | -84.607423 |
| GA | Columbia | 130730001 | Evans | 33.582044 | -82.131249 |
| GA | Coweta | 130770002 | Newnan | 33.40405 | -84.745728 |
| GA | Dawson | 130850001 | Dawsonville | 34.376227 | -84.059506 |
| GA | DeKalb | 130890002 | South DeKalb | 33.6878 | -84.2905 |
| GA | Douglas | 130970004 | Douglasville | 33.741242 | -84.776429 |
| GA | Fulton | 131210055 | United Avenue | 33.720742 | -84.357316 |
| GA | Glynn | 131270006 | Brunswick | 31.169805 | -81.495035 |
| GA | Gwinnett | 131350002 | Gwinnett | 33.9632 | -84.0691 |
| GA | Henry | 131510002 | McDonough | 33.433949 | -84.161811 |
| GA | Murray | 132130003 | Fort Mountain | 34.785219 | -84.626423 |
| GA | Muscogee | 132150008 | Columbus-Airport | 32.521272 | -84.944635 |
| GA | Paulding | 132230003 | Yorkville: King Farm | 33.9285 | -85.04534 |
| GA | Pike | 132319991 | Georgia Station | 33.1787 | -84.4052 |
| GA | Richmond | 132450091 | Augusta | 33.4339 | -82.0224 |
| GA | Rockdale | 132470001 | Conyers | 33.588545 | -84.069608 |
| GA | Sumter | 132611001 | Leslie | 31.954286 | -84.08101 |
| IL | Adams | 170010007 | JOHN WOOD COMMUNITY COLLEGE | 39.915409 | -91.335868 |
| IL | Champaign | 170190007 | Thomasboro | 40.244913 | -88.188519 |
| IL | Champaign | 170191001 | ISWS CLIMATE STATION | 40.05278 | -88.37251 |
| IL | Clark | 170230001 | 416 S. State St. Hwy 1- West Union | 39.210857 | -87.668297 |
| IL | Cook | 170310001 | VILLAGE GARAGE | 41.670992 | -87.732457 |
| IL | Cook | 170310032 | SOUTH WATER FILTRATION PLANT | 41.755832 | -87.54535 |
| IL | Cook | 170310076 | COM ED MAINTENANCE BLDG | 41.7514 | -87.713488 |
| IL | Cook | 170311003 | TAFT HS | 41.984332 | -87.792002 |
| IL | Cook | 170311601 | COOK COUNTY TRAILER | 41.66812 | -87.99057 |
| IL | Cook | 170313103 | IEPA TRAILER | 41.965193 | -87.876265 |
| IL | Cook | 170314002 | COOK COUNTY TRAILER | 41.855243 | -87.75247 |
| IL | Cook | 170314007 | REGIONAL OFFICE BUILDING | 42.060285 | -87.863225 |
| IL | Cook | 170314201 | NORTHBROOK WATER PLANT | 42.139996 | -87.799227 |
| IL | Cook | 170317002 | WATER PLANT | 42.062053 | -87.675254 |
| IL | DuPage | 170436001 | MORTON ARBORETUM | 41.813049 | -88.072827 |
| IL | Effingham | 170491001 | CENTRAL JR HIGH | 39.067159 | -88.548934 |
| IL | Hamilton | 170650002 | TEN MILE CREEK DNR OFFICE | 38.082155 | -88.624943 |
| IL | Jersey | 170831001 | ILLINI JR HIGH | 39.110539 | -90.32408 |
| IL | Jo Daviess | 170859991 | Stockton | 42.2869 | -89.9997 |
| IL | Kane | 170890005 | LARSEN JUNIOR HIGH | 42.049148 | -88.273029 |
| IL | Lake | 170971007 | CAMP LOGAN TRAILER | 42.467573 | -87.810047 |
| IL | McHenry | 171110001 | CARY GROVE HS | 42.221442 | -88.242207 |
| IL | McLean | 171132003 | ISU HARRIS PHYSICAL PLANT | 40.518735 | -88.996896 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| IL | Macon | 171150013 | IEPA TRAILER | 39.866834 | -88.925594 |
| IL | Macoupin | 171170002 | IEPA TRAILER | 39.396075 | -89.809739 |
| IL | Madison | 171190008 | CLARA BARTON SCHOOL | 38.890186 | -90.148031 |
| IL | Madison | 171191009 | SOUTHWEST CABLE TV | 38.726573 | -89.959963 |
| IL | Madison | 171193007 | WATER PLANT | 38.860669 | -90.105851 |
| IL | Madison | 171199991 | Alhambra | 38.869001 | -89.622816 |
| IL | Peoria | 171430024 | FIRESTATION | 40.68742 | -89.606943 |
| IL | Peoria | 171431001 | PEORIA HEIGHTS HS | 40.745504 | -89.585869 |
| IL | Randolph | 171570001 | IEPA TRAILER | 38.176278 | -89.788459 |
| IL | Rock Island | 171613002 | ROCK ISLAND ARSENAL | 41.514727 | -90.51735 |
| IL | Saint Clair | 171630010 | IEPA-RAPS TRAILER | 38.612034 | -90.160477 |
| IL | Sangamon | 171670014 | Illinois Building State Fairgrounds | 39.831522 | -89.640926 |
| IL | Will | 171971011 | COM ED TRAINING CENTER | 41.221537 | -88.190967 |
| IL | Winnebago | 172012001 | MAPLE ELEMENTARY SCHOOL | 42.334982 | -89.037775 |
| IN | Allen | 180030002 | Leo High School | 41.221418 | -85.016821 |
| IN | Allen | 180030004 | Ft. Wayne- Beacon St. | 41.094965 | -85.101816 |
| IN | Bartholomew | 180050007 | Hope- Hauser Jr-Sr High School | 39.294322 | -85.766816 |
| IN | Boone | 180110001 | Perry Worth ELEMENTRY SCHOOL: WEST OF WHITESTOWN | 39.997732 | -86.395394 |
| IN | Carroll | 180150002 | Flora-Flora Airport | 40.540455 | -86.553035 |
| IN | Clark | 180190008 | Charlestown State Park- 1051.8 meters East of SR 62/ Indiana armory | 38.393822 | -85.664118 |
| IN | Delaware | 180350010 | Albany- Albany Elem. Sch. | 40.300385 | -85.245862 |
| IN | Elkhart | 180390007 | Bristol- Bristol Elem. Sch. | 41.716959 | -85.824696 |
| IN | Floyd | 180431004 | New Albany- Green Valley Elem. Sch. | 38.307913 | -85.834313 |
| IN | Greene | 180550001 | Plummer: 2500 S. W- Citizens gas Plummer maintenance faciliy | 38.985578 | -86.99012 |
| IN | Hamilton | 180570006 | Our Lady of Grace- Noblesville | 40.068297 | -85.992451 |
| IN | Hendricks | 180630004 | AVON- 255 S. SR 267 (also 255 S. Avon Ave.) Avon: IN | 39.758889 | -86.398611 |
| IN | Huntington | 180690002 | Roanoke- Roanoke Elem. School | 40.959604 | -85.37961 |
| IN | Jackson | 180710001 | Brownstown- 225 W & 200 N. Water facility | 38.920835 | -86.080523 |
| IN | Johnson | 180810002 | Indian Creek Elementary School in Trafalgar: DUE SOUTH OF INDIANAPOLIS | 39.417243 | -86.152363 |
| IN | Knox | 180839991 | Vincennes | 38.7408 | -87.4853 |
| IN | Lake | 180890022 | Gary-IITRI/ 1219.5 meters east of Tennessee St.- old ammuntion bunker | 41.606667 | -87.304722 |
| IN | Lake | 180892008 | HAMMOND CAAP- Hammond- 141st St. | 41.639444 | -87.493611 |
| IN | LaPorte | 180910010 | LAPORTE OZONE SITE AT WATER TREATMENT PLANT | 41.629167 | -86.684444 |
| IN | Madison | 180950010 | SCHOOL LOCATED ON THE SW CORNER OF US 36 AND IND 109 | 40.002511 | -85.656391 |
| IN | Marion | 180970050 | Indpls.- Ft. Harrison | 39.858889 | -86.021389 |
| IN | Marion | 180970057 | Indpls- Harding St. | 39.749027 | -86.186269 |
| IN | Marion | 180970073 | Indpls.- E. 16th St. | 39.789486 | -86.06085 |
| IN | Marion | 180970078 | Indpls- Washington Park/ in parking lot next to police station | 39.810833 | -86.114444 |
| IN | Marion | 180970087 | Indpls.- I 70 | 39.787933 | -86.13088 |
| IN | Morgan | 181090005 | Monrovia- Monrovia HS. | 39.575634 | -86.477893 |
| IN | Perry | 181230009 | Leopold- Perry Central HS | 38.115152 | -86.60325 |
| IN | Porter | 181270024 | Ogden Dunes- Water Treatment Plant | 41.6175 | -87.199167 |
| IN | Porter | 181270026 | VALPARAISO | 41.512118 | -87.036236 |
| IN | Posey | 181290003 | ST. PHILLIPS- St. Phillips road CAAP trailer | 38.00641 | -87.718354 |
| IN | St. Joseph | 181410010 | Potato Creek State Park | 41.551667 | -86.370556 |
| IN | St. Joseph | 181410015 | South Bend-Shields Dr. | 41.69666 | -86.214722 |
| IN | St. Joseph | 181410016 | Granger-Beckley St. | 41.754722 | -86.11 |
| IN | Shelby | 181450001 | TRITON Middle SCHOOL: NORTH OF FAIRLAND | 39.613367 | -85.870669 |
| IN | Vanderburgh | 181630013 | Inglefield/ Scott School | 38.113889 | -87.536667 |
| IN | Vanderburgh | 181630021 | Evansville- Buena Vista | 38.013333 | -87.577222 |
| IN | Vigo | 181670018 | TERRE HAUTE CAAP/ McLean High School | 39.485987 | -87.401312 |
| IN | Vigo | 181670024 | Sandcut/ SITE LOCATED BY HOME BEHIND SHED. | 39.558525 | -87.312883 |
| IN | Wabash | 181699991 | Salamonie Reservoir | 40.816038 | -85.661408 |
| IN | Warrick | 181730008 | Boonville- Boonville HS | 38.051667 | -87.278056 |
| IN | Warrick | 181730009 | Lynnville- Tecumseh HS | 38.194501 | -87.341396 |
| IN | Warrick | 181730011 | Dayville | 37.954444 | -87.321667 |
| IA | Bremer | 190170011 | WAVERLY AIRPORT SITE | 42.743036 | -92.513241 |
| IA | Clinton | 190450021 | CLINTON: RAINBOW PARK | 41.874999 | -90.177574 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| IA | Harrison | 190850007 | | 41.832256 | -95.928185 |
| IA | Harrison | 190851101 | PISGAH: HIGHWAY MAINTENANCE | 41.780261 | -95.948435 |
| IA | Linn | 191130028 | KIRKWOOD | 41.91056 | -91.652121 |
| IA | Linn | 191130033 | COGGON ELEMENTARY SCHOOL BLDG. NORTHERN LIMITS OF LINN COUNTY | 42.281013 | -91.526879 |
| IA | Linn | 191130040 | Public Health | 41.97677 | -91.68766 |
| IA | Montgomery | 191370002 | VIKING LAKE STATE PARK | 40.969112 | -95.044951 |
| IA | Palo Alto | 191471002 | EMMETSBURG: IOWA LAKES COMMUNITY COLL. | 43.123704 | -94.693518 |
| IA | Polk | 191530030 | CARPENTER | 41.603159 | -93.643118 |
| IA | Scott | 191630014 | SCOTT COUNTY PARK | 41.699174 | -90.521944 |
| IA | Scott | 191630015 | DAVENPORT: JEFFERSON SCH. | 41.530011 | -90.587611 |
| IA | Story | 191690011 | SLATER CITY HALL | 41.882867 | -93.6878 |
| IA | Van Buren | 191770006 | LAKE SUGEMA STATE PARK II | 40.695078 | -92.006318 |
| IA | Warren | 191810022 | GRAVEL ROAD IN LAKE AQUABI STATE PARK | 41.285533 | -93.583983 |
| KS | Johnson | 200910010 | HERITAGE PARK | 38.838575 | -94.746424 |
| KS | Leavenworth | 201030003 | Leavenworth | 39.327391 | -94.95102 |
| KS | Neosho | 201330003 | CHANUTE | 37.67696 | -95.47594 |
| KS | Sedgwick | 201730010 | WICHITA HD | 37.702066 | -97.314847 |
| KS | Sedgwick | 201730018 | Sedgwick Ozone | 37.897506 | -97.492083 |
| KS | Shawnee | 201770013 | KNI | 39.024265 | -95.711275 |
| KS | Sumner | 201910002 | PECK | 37.47689 | -97.366399 |
| KS | Trego | 201950001 | CEDAR BLUFF | 38.770081 | -99.763424 |
| KS | Wyandotte | 202090021 | JFK | 39.117219 | -94.635605 |
| KY | Bell | 210130002 | MIDDLESBORO | 36.60843 | -83.73694 |
| KY | Boone | 210150003 | EAST BEND | 38.91833 | -84.852637 |
| KY | Boyd | 210190017 | ASHLAND PRIMARY (FIVCO) | 38.45934 | -82.64041 |
| KY | Bullitt | 210290006 | SHEPHERDSVILLE | 37.98629 | -85.71192 |
| KY | Campbell | 210373002 | NORTHERN KENTUCKY UNIVERSITY (NKU) | 39.021881 | -84.47445 |
| KY | Carter | 210430500 | GRAYSON LAKE | 38.23887 | -82.9881 |
| KY | Christian | 210470006 | HOPKINSVILLE | 36.91171 | -87.323337 |
| KY | Daviess | 210590005 | OWENSBORO PRIMARY | 37.780776 | -87.075307 |
| KY | Edmonson | 210610501 | Mammoth Cave NP - Houchin Meadow | 37.13179 | -86.142953 |
| KY | Fayette | 210670012 | LEXINGTON PRIMARY | 38.06503 | -84.49761 |
| KY | Greenup | 210890007 | WORTHINGTON | 38.548136 | -82.731163 |
| KY | Hancock | 210910012 | LEWISPORT | 37.93829 | -86.89719 |
| KY | Hardin | 210930006 | ELIZABETHTOWN | 37.705612 | -85.852629 |
| KY | Henderson | 211010014 | BASKETT | 37.8712 | -87.46375 |
| KY | Jefferson | 211110027 | Bates | 38.13784 | -85.57648 |
| KY | Jefferson | 211110051 | Watson Lane | 38.06091 | -85.89804 |
| KY | Jefferson | 211110067 | CANNONS LANE | 38.22876 | -85.65452 |
| KY | Jessamine | 211130001 | NICHOLASVILLE | 37.89147 | -84.58825 |
| KY | Livingston | 211390003 | SMITHLAND | 37.155392 | -88.394024 |
| KY | McCracken | 211451024 | JACKSON PURCHASE (PADUCAH PRIMARY) | 37.05822 | -88.57251 |
| KY | Morgan | 211759991 | Crockett | 37.9214 | -83.0662 |
| KY | Oldham | 211850004 | BUCKNER | 38.4002 | -85.44428 |
| KY | Perry | 211930003 | HAZARD | 37.28329 | -83.20932 |
| KY | Pike | 211950002 | PIKEVILLE PRIMARY | 37.4826 | -82.53532 |
| KY | Pulaski | 211990003 | SOMERSET | 37.09798 | -84.61152 |
| KY | Simpson | 212130004 | FRANKLIN | 36.708607 | -86.566284 |
| KY | Trigg | 212219991 | Cadiz | 36.7841 | -87.8499 |
| KY | Warren | 212270009 | ED SPEAR PARK (SMITHS GROVE) | 37.04926 | -86.21487 |
| KY | Washington | 212299991 | Mackville | 37.7046 | -85.0485 |
| LA | Ascension | 220050004 | Dutchtown | 30.229653 | -90.965628 |
| LA | Bossier | 220150008 | Shreveport / Airport | 32.536273 | -93.74894 |
| LA | Caddo | 220170001 | Dixie | 32.68336 | -93.861582 |
| LA | Calcasieu | 220190002 | Carlyss | 30.140265 | -93.368448 |
| LA | Calcasieu | 220190009 | Vinton | 30.227798 | -93.579965 |
| LA | East Baton Rouge | 220330003 | LSU | 30.419805 | -91.182016 |
| LA | East Baton Rouge | 220330009 | Capitol | 30.461981 | -91.179219 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| LA | Iberville | 220470009 | Bayou Plaquemine | 30.221255 | -91.315418 |
| LA | Jefferson | 220511001 | Kenner | 30.041238 | -90.272826 |
| LA | Lafayette | 220550007 | Lafayette / USGS | 30.22611 | -92.042908 |
| LA | Lafourche | 220570004 | Thibodaux | 29.764098 | -90.765275 |
| LA | Livingston | 220630002 | French Settlement | 30.315406 | -90.811383 |
| LA | Ouachita | 220730004 | Monroe / Airport | 32.509959 | -92.046196 |
| LA | Pointe Coupee | 220770001 | New Roads | 30.681718 | -91.366247 |
| LA | St. Bernard | 220870004 | Meraux | 29.939614 | -89.923883 |
| LA | St. James | 220930002 | Convent | 29.99497 | -90.817415 |
| LA | St. John the Baptist | 220950002 | Garyville | 30.057515 | -90.619286 |
| LA | St. Martin | 220990001 | St.Martinville | 30.088872 | -91.869595 |
| LA | St. Tammany | 221030002 | Madisonville | 30.429381 | -90.199678 |
| LA | West Baton Rouge | 221210001 | Port Allen | 30.500642 | -91.213556 |
| ME | Androscoggin | 230010014 | DURHAM FIRE STATION | 43.974622 | -70.124608 |
| ME | Aroostook | 230039991 | Ashland | 46.6041 | -68.4135 |
| ME | Cumberland | 230052003 | CETL - Cape Elizabeth Two Lights (State Park) | 43.561043 | -70.207324 |
| ME | Hancock | 230090102 | TOP OF CADILLAC MTN (FENCED ENCLOSURE) | 44.351697 | -68.22698 |
| ME | Hancock | 230090103 | MCFARLAND HILL Air Pollutant Research Site | 44.37705 | -68.2609 |
| ME | Kennebec | 230112005 | Gardiner: Pray Street School (GPSS) | 44.230622 | -69.785 |
| ME | Knox | 230130004 | Marshall Point Lighthouse | 43.917955 | -69.26059 |
| ME | Penobscot | 230194008 | WLBZ TV Transmitter Building - Summit of Rider Bluff | 44.735978 | -68.670752 |
| ME | Washington | 230290019 | Harbor Masters Office; Jonesport Public Landing | 44.531907 | -67.59587 |
| ME | York | 230310038 | WBFD - West Buxton (Hollis) Fire Department | 43.656764 | -70.629138 |
| ME | York | 230310040 | SBP - Shapleigh Ball Park | 43.58889 | -70.87734 |
| ME | York | 230312002 | KPW - Kennebunkport Parson'd Way | 43.343167 | -70.471034 |
| MD | Anne Arundel | 240031003 | GLEN BURNIE | 39.169533 | -76.627933 |
| MD | Baltimore | 240051007 | Padonia | 39.460478 | -76.633543 |
| MD | Baltimore | 240053001 | Essex | 39.310833 | -76.474444 |
| MD | Calvert | 240090011 | Calvert | 38.536722 | -76.617194 |
| MD | Carroll | 240130001 | South Carroll | 39.444294 | -77.042252 |
| MD | Cecil | 240150003 | Fair Hill Natural Resource Management Area | 39.701444 | -75.860051 |
| MD | Charles | 240170010 | Southern Maryland | 38.508547 | -76.811864 |
| MD | Dorchester | 240190004 | Horn Point | 38.587525 | -76.141006 |
| MD | Dorchester | 240199991 | Blackwater NWR | 38.444971 | -76.111274 |
| MD | Frederick | 240210037 | Frederick Airport | 39.42276 | -77.37519 |
| MD | Garrett | 240230002 | Piney Run | 39.70595 | -79.012 |
| MD | Harford | 240251001 | Edgewood | 39.410191 | -76.296946 |
| MD | Harford | 240259001 | Aldino | 39.563333 | -76.203889 |
| MD | Kent | 240290002 | Millington | 39.305021 | -75.797317 |
| MD | Montgomery | 240313001 | Rockville | 39.114313 | -77.106876 |
| MD | Prince George's | 240330030 | HU-Beltsville | 39.055277 | -76.878333 |
| MD | Prince George's | 240338003 | PG Equestrian Center | 38.81194 | -76.74417 |
| MD | Prince George's | 240339991 | Beltsville | 39.0284 | -76.8171 |
| MD | Washington | 240430009 | Hagerstown | 39.564178 | -77.720244 |
| MD | Baltimore (City) | 245100054 | Furley | 39.328807 | -76.553075 |
| MA | Barnstable | 250010002 | TRURO NATIONAL SEASHORE | 41.975804 | -70.023598 |
| MA | Bristol | 250051004 | FALL RIVER | 41.685707 | -71.169235 |
| MA | Bristol | 250051006 | FAIRHAVEN2 | 41.645381 | -70.897504 |
| MA | Dukes | 250070001 | 1 HERRING CREEK RD: AQUINNAH (WAMPANOAG TRIBAL SITE) | 41.330469 | -70.785225 |
| MA | Essex | 250092006 | LYNN WATER TREATMENT PLANT | 42.474642 | -70.970816 |
| MA | Essex | 250094005 | NEWBURYPORT HARBOR ST PARKING LOT | 42.814412 | -70.817783 |
| MA | Essex | 250095005 | CONSENTINO SCHOOL. | 42.770837 | -71.10229 |
| MA | Franklin | 250112005 | Greenfield 16 Barr Ave | 42.605816 | -72.596689 |
| MA | Hampden | 250130008 | WESTOVER AFB | 42.19438 | -72.555112 |
| MA | Hampshire | 250154002 | QUABBIN RES | 42.298493 | -72.334079 |
| MA | Middlesex | 250170009 | USEPA REGION 1 LAB | 42.62668 | -71.362068 |
| MA | Norfolk | 250213003 | BLUE HILL OBSERVATORY | 42.211774 | -71.11397 |
| MA | Plymouth | 250230005 | Brockton Buckley | 42.065106 | -71.012129 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| MA | Suffolk | 250250042 | DUDLEY SQUARE ROXBURY | 42.3295 | -71.0826 |
| MA | Worcester | 250270015 | WORCESTER AIRPORT | 42.274319 | -71.875511 |
| MA | Worcester | 250270024 | UXBRIDGE | 42.099699 | -71.619399 |
| MI | Allegan | 260050003 | Holland | 42.767786 | -86.148577 |
| MI | Benzie | 260190003 | | 44.616943 | -86.109408 |
| MI | Berrien | 260210014 | Coloma | 42.19779 | -86.309694 |
| MI | Cass | 260270003 | Cassopolis | 41.89557 | -86.001629 |
| MI | Chippewa | 260330901 | NORTH OF EASTERDAY AVENUE | 46.493633 | -84.364207 |
| MI | Clinton | 260370001 | ROSE LAKE: STOLL RD.(8562 E.) | 42.798339 | -84.393795 |
| MI | Genesee | 260490021 | | 43.047224 | -83.670159 |
| MI | Genesee | 260492001 | Otisville | 43.168336 | -83.461541 |
| MI | Huron | 260630007 | RURAL THUMB AREA OZONE SITE | 43.836388 | -82.6429 |
| MI | Ingham | 260650012 | | 42.738618 | -84.534633 |
| MI | Kalamazoo | 260770008 | KALAMAZOO FAIRGROUNDS | 42.278067 | -85.54189 |
| MI | Kent | 260810020 | GR-Monroe | 42.984173 | -85.671339 |
| MI | Kent | 260810022 | APPROXIMATELY 1/4 MILE SOUTH OF 14 MILE RD | 43.176672 | -85.416608 |
| MI | Lenawee | 260910007 | 6792 RAISIN CENTER HWY: LENAWEE CO.RD.COMM.OWNER: TECUMSEH | 41.995568 | -83.946559 |
| MI | Macomb | 260990009 | New Haven | 42.731394 | -82.793463 |
| MI | Macomb | 260991003 | | 42.51334 | -83.005971 |
| MI | Manistee | 261010922 | | 44.307 | -86.242649 |
| MI | Mason | 261050007 | LOCATED 550 FT NORTH OF US10 | 43.953334 | -86.294415 |
| MI | Missaukee | 261130001 | LOCATED ABOUT 1/4 MILE WEST OF SITE | 44.310555 | -84.891865 |
| MI | Muskegon | 261210039 | | 43.278061 | -86.311083 |
| MI | Oakland | 261250001 | Oak Park | 42.463063 | -83.183199 |
| MI | Ottawa | 261390005 | Jenison | 42.894451 | -85.852734 |
| MI | St. Clair | 261470005 | Port Huron | 42.953336 | -82.456229 |
| MI | Schoolcraft | 261530001 | Seney | 46.288877 | -85.950227 |
| MI | Tuscola | 261579991 | Unionville | 43.6138 | -83.3591 |
| MI | Washtenaw | 261610008 | TOWNER ST: SOUTH; 2 LANE RESIDENIAL - HOSPITAL | 42.240565 | -83.599602 |
| MI | Washtenaw | 261619991 | Ann Arbor | 42.416636 | -83.902185 |
| MI | Wayne | 261630001 | Allen Park | 42.22862 | -83.2082 |
| MI | Wayne | 261630019 | East 7 Mile | 42.43084 | -83.000138 |
| MI | Wexford | 261659991 | Hoxeyville | 44.18089 | -85.738985 |
| MN | Anoka | 270031001 | Cedar Creek | 45.40184 | -93.20306 |
| MN | Anoka | 270031002 | Anoka County Airport | 45.13768 | -93.207615 |
| MN | Becker | 270052013 | FWS Wetland Management District | 46.851811 | -95.846272 |
| MN | Carlton | 270177417 | Fond du Lac Band | 46.713694 | -92.511722 |
| MN | Crow Wing | 270353204 | Brainerd Lakes Regional Airport | 46.39674 | -94.1303 |
| MN | Goodhue | 270495302 | Stanton Air Field | 44.473754 | -93.012611 |
| MN | Hennepin | 270530962 | Near Road I-35/I-94 | 44.965242 | -93.254759 |
| MN | Lake | 270750005 | Boundary Waters | 47.948622 | -91.495574 |
| MN | Lyon | 270834210 | Southwest Minnesota Regional Airport | 44.4438 | -95.81789 |
| MN | Mille Lacs | 270953051 | Mille Lacs Band | 46.2053 | -93.75945 |
| MN | Olmsted | 271095008 | Ben Franklin School | 43.996908 | -92.450366 |
| MN | Saint Louis | 271370034 | Voyageurs NP - Sullivan Bay | 48.41252 | -92.829225 |
| MN | Saint Louis | 271377550 | U of M - Duluth | 46.81826 | -92.08936 |
| MN | Scott | 271390505 | B.F. Pearson School | 44.791437 | -93.512534 |
| MN | Stearns | 271453052 | Talahi School | 45.549839 | -94.13345 |
| MN | Washington | 271636016 | St. Croix Watershed Research Station | 45.168004 | -92.765136 |
| MN | Wright | 271713201 | St. Michael Elementary School | 45.20916 | -93.66921 |
| MS | Bolivar | 280110001 | Cleveland | 33.746056 | -90.723028 |
| MS | DeSoto | 280330002 | Hernando | 34.82166 | -89.98783 |
| MS | Hancock | 280450003 | Waveland | 30.300833 | -89.395916 |
| MS | Harrison | 280470008 | Gulfport Youth Court | 30.390369 | -89.049778 |
| MS | Hinds | 280490020 | Jackson NCORE | 32.329111 | -90.182722 |
| MS | Hinds | 280490021 | Hinds CC | 32.346722 | -90.225667 |
| MS | Jackson | 280590006 | Pascagoula | 30.378287 | -88.53393 |
| MS | Lauderdale | 280750003 | Meridian | 32.364565 | -88.731491 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| MS | Lee | 280810005 | TUPELO AIRPORT NEAR OLD NWS OFFICE | 34.264917 | -88.766222 |
| MS | Yalobusha | 281619991 | Coffeeville | 34.002747 | -89.799183 |
| MO | Andrew | 290030001 | Savannah | 39.9544 | -94.849 |
| MO | Boone | 290190011 | Finger Lakes | 39.07807 | -92.31626 |
| MO | Callaway | 290270002 | New Bloomfield | 38.70608 | -92.09308 |
| MO | Cass | 290370003 | Richard Gebaur-South | 38.75961 | -94.57983 |
| MO | Cedar | 290390001 | El Dorado Springs | 37.69 | -94.035 |
| MO | Clay | 290470003 | Watkins Mill State Park | 39.407452 | -94.265373 |
| MO | Clay | 290470005 | Liberty | 39.303174 | -94.377014 |
| MO | Clay | 290470006 | Rocky Creek | 39.331913 | -94.580931 |
| MO | Clinton | 290490001 | Trimble | 39.53063 | -94.55594 |
| MO | Greene | 290770036 | Hillcrest High School | 37.256137 | -93.299894 |
| MO | Greene | 290770042 | Fellows Lake | 37.319186 | -93.204411 |
| MO | Jasper | 290970004 | Alba | 37.2385 | -94.42468 |
| MO | Jefferson | 290990019 | Arnold West | 38.448572 | -90.398704 |
| MO | Lincoln | 291130003 | Foley | 39.04512 | -90.86633 |
| MO | Monroe | 291370001 | MTSP | 39.474976 | -91.788991 |
| MO | Perry | 291570001 |  | 37.70264 | -89.69864 |
| MO | Saint Charles | 291831002 | West Alton | 38.872546 | -90.226488 |
| MO | Saint Charles | 291831004 | Orchard Farm | 38.8994 | -90.44917 |
| MO | Sainte Genevieve | 291860005 | Bonne Terre | 37.90084 | -90.42388 |
| MO | Saint Louis | 291890005 | Pacific | 38.49015 | -90.70509 |
| MO | Saint Louis | 291890014 | Maryland Heights | 38.71085 | -90.47606 |
| MO | Taney | 292130004 | Branson | 36.707727 | -93.222 |
| MO | St. Louis City | 295100085 | Blair Street | 38.656429 | -90.198348 |
| MT | Phillips | 300710010 | Malta | 48.317507 | -107.862471 |
| MT | Powder River | 300750001 | BROADUS | 45.440295 | -105.370283 |
| MT | Richland | 300830001 | Sidney Oil Field | 47.803392 | -104.485552 |
| MT | Rosebud | 300870001 | Birney - Tongue river | 45.366151 | -106.48982 |
| NE | Douglas | 310550019 | 4102 Woolworth Ave. on Healthcenter Warehouse | 41.247486 | -95.973142 |
| NE | Douglas | 310550028 |  | 41.207958 | -95.945897 |
| NE | Douglas | 310550053 | Whitmore | 41.322508 | -95.938593 |
| NE | Knox | 311079991 | Santee Sioux | 42.829154 | -97.854129 |
| NE | Lancaster | 311090016 |  | 40.984723 | -96.677513 |
| NH | Belknap | 330012004 | FIELD OFFICE ON THE GROUNDS OF THE FORMER STATE PRISON | 43.566122 | -71.496335 |
| NH | Cheshire | 330050007 | WATER STREET | 42.930521 | -72.272332 |
| NH | Coos | 330074001 |  | 44.270093 | -71.303821 |
| NH | Coos | 330074002 | CAMP DODGE: GREENS GRANT | 44.308132 | -71.217639 |
| NH | Grafton | 330090010 | LEBANON AIRPORT ROAD | 43.629605 | -72.309499 |
| NH | Grafton | 330099991 | Woodstock | 43.944519 | -71.700788 |
| NH | Hillsborough | 330111011 | GILSON ROAD | 42.718653 | -71.522416 |
| NH | Hillsborough | 330115001 | MILLER STATE PARK | 42.86183 | -71.878626 |
| NH | Merrimack | 330131007 | HAZEN DRIVE | 43.2185 | -71.5145 |
| NH | Rockingham | 330150014 | PORTSMOUTH - PEIRCE ISLAND | 43.075371 | -70.748017 |
| NH | Rockingham | 330150016 | SEACOAST SCIENCE CENTER | 43.045269 | -70.713958 |
| NH | Rockingham | 330150018 | MOOSEHILL SCHOOL | 42.862531 | -71.38014 |
| NJ | Atlantic | 340010006 | Brigantine | 39.464872 | -74.448736 |
| NJ | Bergen | 340030006 | Leonia | 40.870436 | -73.991994 |
| NJ | Camden | 340070002 | Camden Spruce Street | 39.934559 | -75.125219 |
| NJ | Camden | 340071001 | Ancora State Hospital | 39.68425 | -74.861491 |
| NJ | Cumberland | 340110007 | Millville | 39.422273 | -75.025204 |
| NJ | Essex | 340130003 | Newark Firehouse | 40.720989 | -74.192892 |
| NJ | Gloucester | 340150002 | Clarksboro | 39.800339 | -75.212119 |
| NJ | Hudson | 340170006 | Bayonne | 40.67025 | -74.126081 |
| NJ | Hunterdon | 340190001 | Flemington | 40.515262 | -74.806671 |
| NJ | Mercer | 340210005 | Rider University | 40.283092 | -74.742613 |
| NJ | Mercer | 340219991 | Wash. Crossing | 40.3125 | -74.8729 |
| NJ | Middlesex | 340230011 | Rutgers University | 40.462182 | -74.429439 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| NJ | Monmouth | 340250005 | Monmouth University | 40.277647 | -74.0051 |
| NJ | Morris | 340273001 | Chester | 40.787628 | -74.676301 |
| NJ | Ocean | 340290006 | Colliers Mills | 40.06483 | -74.44405 |
| NJ | Passaic | 340315001 | Ramapo | 41.058617 | -74.255544 |
| NJ | Warren | 340410007 | Columbia | 40.92458 | -75.067815 |
| NM | Bernalillo | 350010023 | DEL NORTE HIGH SCHOOL | 35.1343 | -106.5852 |
| NM | Bernalillo | 350010029 | SOUTH VALLEY | 35.01708 | -106.65739 |
| NM | Bernalillo | 350011012 | Foothills | 35.1852 | -106.50815 |
| NM | Dona Ana | 350130008 | 6O La Union | 31.930659 | -106.631103 |
| NM | Dona Ana | 350130020 | 6ZK Chaparral | 32.041212 | -106.40971 |
| NM | Dona Ana | 350130021 | 6ZM Desert View | 31.796218 | -106.584434 |
| NM | Dona Ana | 350130022 | 6ZN Santa Teresa | 31.787885 | -106.683324 |
| NM | Dona Ana | 350130023 | 6ZQ Solano | 32.317593 | -106.768337 |
| NM | Eddy | 350151005 | 5ZR ON BLM LAND BORDERING RESIDENTIAL AREA OUTSIDE CARLSBAD CITY LIM | 32.380118 | -104.262726 |
| NM | Eddy | 350153001 | Carlsbad Caverns NP - Maintenance Area | 32.1783 | -104.4406 |
| NM | Lea | 350250008 | 5ZS Hobbs Jefferson | 32.726656 | -103.122917 |
| NM | Rio Arriba | 350390026 | 3CRD Coyote Ranger District | 36.187742 | -106.698369 |
| NM | Sandoval | 350431001 |  | 35.299484 | -106.548914 |
| NM | Santa Fe | 350490021 |  | 35.61975 | -106.07968 |
| NM | Valencia | 350610008 |  | 34.8147 | -106.7396 |
| NY | Albany | 360010012 | LOUDONVILLE | 42.68075 | -73.75733 |
| NY | Bronx | 360050110 | IS 52 | 40.816 | -73.902 |
| NY | Bronx | 360050133 | PFIZER LAB SITE | 40.8679 | -73.87809 |
| NY | Chautauqua | 360130006 | DUNKIRK | 42.49963 | -79.31881 |
| NY | Dutchess | 360270007 | MILLBROOK | 41.78555 | -73.74136 |
| NY | Erie | 360290002 | AMHERST | 42.99328 | -78.77153 |
| NY | Essex | 360310002 | WHITEFACE SUMMIT | 44.36608 | -73.90312 |
| NY | Essex | 360310003 | WHITEFACE BASE | 44.39308 | -73.8589 |
| NY | Essex | 360319991 | Huntington Wildlife Forest | 43.9731 | -74.2232 |
| NY | Franklin | 360337003 | Y001 | 44.980577 | -74.695005 |
| NY | Hamilton | 360410005 | PISECO LAKE | 43.44957 | -74.51625 |
| NY | Herkimer | 360430005 | NICKS LAKE | 43.68578 | -74.98538 |
| NY | Jefferson | 360450002 | PERCH RIVER | 44.08747 | -75.97316 |
| NY | Monroe | 360551007 | ROCHESTER 2 | 43.14618 | -77.54817 |
| NY | New York | 360610135 | CCNY | 40.81976 | -73.94825 |
| NY | Niagara | 360631006 | MIDDLEPORT | 43.22386 | -78.47888 |
| NY | Onondaga | 360671015 | EAST SYRACUSE | 43.05235 | -76.05921 |
| NY | Orange | 360715001 | VALLEY CENTRAL HIGH SCHOOL | 41.52375 | -74.21534 |
| NY | Oswego | 360750003 | FULTON | 43.28428 | -76.46324 |
| NY | Putnam | 360790005 | MT NINHAM | 41.45589 | -73.70977 |
| NY | Queens | 360810124 | QUEENS COLLEGE 2 | 40.73614 | -73.82153 |
| NY | Richmond | 360850067 | SUSAN WAGNER HS | 40.59664 | -74.12525 |
| NY | Rockland | 360870005 | Rockland County | 41.18208 | -74.02819 |
| NY | Saratoga | 360910004 | STILLWATER | 43.01209 | -73.6489 |
| NY | Steuben | 361010003 | PINNACLE STATE PARK | 42.09142 | -77.20978 |
| NY | Suffolk | 361030002 | BABYLON | 40.74529 | -73.41919 |
| NY | Suffolk | 361030004 | RIVERHEAD | 40.96078 | -72.71238 |
| NY | Suffolk | 361030009 | HOLTSVILLE | 40.82799 | -73.05754 |
| NY | Tompkins | 361099991 | Connecticut Hill | 42.4006 | -76.6538 |
| NY | Wayne | 361173001 | WILLIAMSON | 43.23086 | -77.17136 |
| NY | Westchester | 361192004 | WHITE PLAINS | 41.05192 | -73.76366 |
| NC | Alexander | 370030005 | Taylorsville Liledoun | 35.9138 | -81.191 |
| NC | Avery | 370110002 | Linville Falls | 35.972347 | -81.933072 |
| NC | Avery | 370119991 | Cranberry | 36.1058 | -82.0454 |
| NC | Buncombe | 370210030 | Bent Creek | 35.500102 | -82.59986 |
| NC | Caldwell | 370270003 | Lenoir (city) | 35.9359 | -81.5306 |
| NC | Caswell | 370330001 | Cherry Grove | 36.307033 | -79.467417 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| NC | Cumberland | 370510008 | Wade | 35.158686 | -78.728035 |
| NC | Cumberland | 370510010 | Honeycutt School | 35.002304 | -78.991692 |
| NC | Durham | 370630015 | Durham Armory | 36.032955 | -78.904037 |
| NC | Edgecombe | 370650099 | Leggett | 35.988278 | -77.5843 |
| NC | Forsyth | 370670022 | Hattie Avenue | 36.110693 | -80.226438 |
| NC | Forsyth | 370670030 | Clemmons Middle | 36.026 | -80.342 |
| NC | Forsyth | 370671008 | Union Cross | 36.05097 | -80.143657 |
| NC | Graham | 370750001 | Joanna Bald | 35.25793 | -83.79562 |
| NC | Granville | 370770001 | Butner | 36.141111 | -78.768056 |
| NC | Guilford | 370810013 | Mendenhall School | 36.109006 | -79.802314 |
| NC | Haywood | 370870008 | Waynesville School | 35.50716 | -82.96337 |
| NC | Haywood | 370870035 | Frying Pan Mountain | 35.379167 | -82.7925 |
| NC | Haywood | 370870036 | Purchase Knob | 35.587144 | -83.074156 |
| NC | Johnston | 371010002 | West Johnston Co. | 35.59095 | -78.4622 |
| NC | Lee | 371050002 | Blackstone | 35.4325 | -79.2887 |
| NC | Lenoir | 371070004 | Lenoir Co. Comm. Coll. | 35.231459 | -77.568792 |
| NC | Lincoln | 371090004 | Crouse | 35.438556 | -81.27675 |
| NC | Macon | 371139991 | Coweeta | 35.0608 | -83.4306 |
| NC | Martin | 371170001 | Jamesville School | 35.81066 | -76.906249 |
| NC | Mecklenburg | 371190041 | Garinger High School | 35.2401 | -80.785683 |
| NC | Mecklenburg | 371190046 | University Meadows | 35.314158 | -80.713469 |
| NC | Montgomery | 371239991 | Candor | 35.2632 | -79.8365 |
| NC | New Hanover | 371290002 | Castle Hayne | 34.364167 | -77.838611 |
| NC | Person | 371450003 | Bushy Fork | 36.306965 | -79.09197 |
| NC | Pitt | 371470006 | Pitt Agri. Center | 35.641276 | -77.360126 |
| NC | Rockingham | 371570099 | Bethany sch. | 36.308889 | -79.859167 |
| NC | Rowan | 371590021 | Rockwell | 35.551868 | -80.395039 |
| NC | Swain | 371730002 | Bryson City | 35.434767 | -83.442133 |
| NC | Swain | 371730007 |  | 35.498711 | -83.310242 |
| NC | Union | 371790003 | Monroe School | 34.974039 | -80.540622 |
| NC | Wake | 371830014 | Millbrook School | 35.856111 | -78.574167 |
| NC | Yancey | 371990004 | Mt. Mitchell | 35.765413 | -82.264944 |
| ND | Billings | 380070002 | PAINTED CANYON | 46.8943 | -103.37853 |
| ND | Burke | 380130004 | LOSTWOOD NWR | 48.64193 | -102.4018 |
| ND | Cass | 380171004 | FARGO NW | 46.933754 | -96.85535 |
| ND | Dunn | 380250003 | DUNN CENTER | 47.3132 | -102.5273 |
| ND | McKenzie | 380530002 | TRNP-NU | 47.5812 | -103.2995 |
| ND | Mercer | 380570004 | BEULAH NORTH | 47.298611 | -101.766944 |
| ND | Oliver | 380650002 | HANNOVER | 47.185833 | -101.428056 |
| ND | Williams | 381050003 | Williston | 48.15278 | -103.63951 |
| OH | Allen | 390030009 | Lima | 40.770944 | -84.0539 |
| OH | Ashtabula | 390071001 | Conneaut | 41.959695 | -80.572808 |
| OH | Butler | 390170004 | HAMILTON | 39.383382 | -84.544413 |
| OH | Butler | 390170018 | Middletown Airport | 39.529444 | -84.393453 |
| OH | Butler | 390179991 | Oxford | 39.5327 | -84.7286 |
| OH | Clark | 390230001 | Springfield Well Fd | 40.00103 | -83.80456 |
| OH | Clark | 390230003 | Mud Run | 39.85567 | -83.99773 |
| OH | Clermont | 390250022 | Batavia | 39.0828 | -84.1441 |
| OH | Clinton | 390271002 | Wilmington | 39.430038 | -83.788502 |
| OH | Cuyahoga | 390350034 | District 6 | 41.55523 | -81.575256 |
| OH | Cuyahoga | 390350060 | GT Craig NCore | 41.492117 | -81.678449 |
| OH | Cuyahoga | 390350064 | Berea BOE | 41.361856 | -81.86463 |
| OH | Cuyahoga | 390355002 | Mayfield | 41.537069 | -81.45879 |
| OH | Delaware | 390410002 | Delaware | 40.356694 | -83.063971 |
| OH | Fayette | 390479991 | Deer Creek | 39.6359 | -83.2605 |
| OH | Franklin | 390490029 | New Albany | 40.084514 | -82.815585 |
| OH | Franklin | 390490037 | FRANKLIN_PK | 39.96523 | -82.95549 |
| OH | Franklin | 390490081 | Maple Canyon | 40.0877 | -82.959773 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| OH | Geauga | 390550004 | Notre Dame | 41.515051 | -81.249906 |
| OH | Greene | 390570006 | Xenia | 39.66575 | -83.94268 |
| OH | Hamilton | 390610006 | Sycamore | 39.2787 | -84.36625 |
| OH | Hamilton | 390610010 | Colerain | 39.21487 | -84.69086 |
| OH | Hamilton | 390610040 | Taft NCore | 39.12886 | -84.50404 |
| OH | Jefferson | 390810017 | Stuebenville | 40.36644 | -80.61558 |
| OH | Knox | 390830002 | CENTERBURG | 40.310025 | -82.691724 |
| OH | Lake | 390850003 | Eastlake | 41.673006 | -81.422455 |
| OH | Lake | 390850007 | Painesville | 41.726811 | -81.242156 |
| OH | Lawrence | 390870011 | Wilgus | 38.62901 | -82.45886 |
| OH | Lawrence | 390870012 | ODOT Ironton | 38.508075 | -82.659241 |
| OH | Licking | 390890005 | Heath | 40.026037 | -82.432996 |
| OH | Lorain | 390930018 | Sheffield | 41.420882 | -82.095729 |
| OH | Lucas | 390950024 | Erie | 41.644067 | -83.54616 |
| OH | Lucas | 390950027 | Waterville | 41.4942 | -83.718949 |
| OH | Madison | 390970007 | London | 39.78819 | -83.47606 |
| OH | Mahoning | 390990013 | Oakhill | 41.096188 | -80.658867 |
| OH | Medina | 391030004 | Chippewa | 41.0604 | -81.9239 |
| OH | Miami | 391090005 | Miami East HS | 40.08502 | -84.113808 |
| OH | Montgomery | 391130037 | Eastwood | 39.785644 | -84.134412 |
| OH | Noble | 391219991 | Quaker City | 39.9428 | -81.3373 |
| OH | Portage | 391331001 | Lake Rockwell | 41.182466 | -81.330486 |
| OH | Preble | 391351001 | Preble NCore | 39.83562 | -84.720524 |
| OH | Stark | 391510016 | Malone Univ | 40.82812 | -81.3785 |
| OH | Stark | 391510022 | Brewster | 40.712778 | -81.598333 |
| OH | Stark | 391514005 | Alliance | 40.93133 | -81.123519 |
| OH | Summit | 391530020 | Patterson Park | 41.106486 | -81.503547 |
| OH | Trumbull | 391550011 | TCSE | 41.240453 | -80.66272 |
| OH | Trumbull | 391550013 | Kinsman Maintenance | 41.454597 | -80.589612 |
| OH | Warren | 391650007 | Lebanon | 39.42689 | -84.20077 |
| OH | Washington | 391670004 | Marietta WTP | 39.432117 | -81.460443 |
| OH | Wood | 391730003 | Bowling Green | 41.377685 | -83.611104 |
| OK | Adair | 400019009 | STILWELL | 35.750735 | -94.669697 |
| OK | Canadian | 400170101 | OKC WEST-(YUKON) | 35.479215 | -97.751503 |
| OK | Cherokee | 400219002 | TAHLEQUAH SHELTER | 35.85408 | -94.985964 |
| OK | Cleveland | 400270049 | MOORE WATER TOWER | 35.320105 | -97.484099 |
| OK | Comanche | 400310651 | LAWTON NORTH | 34.63298 | -98.42879 |
| OK | Creek | 400370144 | MANNFORD | 36.105481 | -96.361196 |
| OK | Dewey | 400430860 | SEILING MUNICIPAL AIRPORT | 36.158414 | -98.931973 |
| OK | Kay | 400719010 | NEWKIRK IMPROVE | 36.956222 | -97.03135 |
| OK | McClain | 400871073 | GOLDSBY | 35.159649 | -97.473794 |
| OK | Mayes | 400979014 | CHEROKEE HEIGHTS | 36.228408 | -95.249943 |
| OK | Oklahoma | 401090033 | OKC CENTRAL-OSDH | 35.477036 | -97.494309 |
| OK | Oklahoma | 401090096 | CHOCTAW | 35.477801 | -97.303044 |
| OK | Oklahoma | 401091037 | OKC NORTH | 35.614131 | -97.475083 |
| OK | Ottawa | 401159004 | QUAPAW SHELTER | 36.922222 | -94.838889 |
| OK | Pittsburg | 401210415 | McALESTER MUNICIPAL AIRPORT | 34.885608 | -95.78441 |
| OK | Sequoyah | 401359021 | | 35.40814 | -94.524413 |
| OK | Tulsa | 401430174 | TULSA SOUTH | 35.953708 | -96.004975 |
| OK | Tulsa | 401430178 | TULSA EAST | 36.133802 | -95.764537 |
| OK | Tulsa | 401431127 | NORTH TULSA - FIRE STATION#24 | 36.204902 | -95.976537 |
| PA | Adams | 420010001 | NARSTO SITE ARENDTSVILLE | 39.92002 | -77.30968 |
| PA | Adams | 420019991 | Arendtsville | 39.9231 | -77.3078 |
| PA | Allegheny | 420030008 | Lawrenceville | 40.46542 | -79.960757 |
| PA | Allegheny | 420030067 | South Fayette | 40.375644 | -80.169943 |
| PA | Allegheny | 420031008 | Harrison | 40.617488 | -79.727664 |
| PA | Armstrong | 420050001 | LAT/LON IS CENTER OF TRAILER | 40.814183 | -79.56475 |
| PA | Beaver | 420070002 | | 40.56252 | -80.503948 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| PA | Beaver | 420070005 | DRIVEWAY TO BAKEY RESIDENCE | 40.684722 | -80.359722 |
| PA | Beaver | 420070014 | | 40.747796 | -80.316442 |
| PA | Berks | 420110006 | Kutztown | 40.51408 | -75.789721 |
| PA | Berks | 420110011 | Reading Airport | 40.38335 | -75.9686 |
| PA | Blair | 420130801 | | 40.535278 | -78.370833 |
| PA | Bradford | 420150011 | Towanda | 41.705226 | -76.512726 |
| PA | Bucks | 420170012 | A420170012LAT/LONG POINT IS OF SAMPLING INLET | 40.107222 | -74.882222 |
| PA | Cambria | 420210011 | | 40.309722 | -78.915 |
| PA | Centre | 420270100 | LAT/LON=POINT SW CORNER OF TRAILER | 40.811389 | -77.877028 |
| PA | Centre | 420279991 | Penn State | 40.7208 | -77.9319 |
| PA | Chester | 420290100 | CHESTER COUNTY TRANSPORT SITE INTO PHILADELPHIA | 39.834461 | -75.768242 |
| PA | Clearfield | 420334000 | MOSHANNON STATE FOREST | 41.1175 | -78.526194 |
| PA | Dauphin | 420430401 | A420430401LAT/LON POINT IS AT CORNER OF TRAILER | 40.246992 | -76.846988 |
| PA | Dauphin | 420431100 | A420431100LAT/LON POINT IS AT CORNER OF TRAILER | 40.272222 | -76.681389 |
| PA | Delaware | 420450002 | A420450002LAT/LON POINT IS OF CORNER OF TRAILER | 39.835556 | -75.3725 |
| PA | Elk | 420479991 | Kane Exp. Forest | 41.598119 | -78.767867 |
| PA | Erie | 420490003 | | 42.14175 | -80.038611 |
| PA | Franklin | 420550001 | HIGH ELEVATION OZONE SITE | 39.961111 | -77.475556 |
| PA | Greene | 420590002 | 75 KM SSW OF PITTSBURGH RURAL SITE ON A KNOLL WITHIN A LARGE CLEARIN | 39.80933 | -80.26567 |
| PA | Indiana | 420630004 | | 40.56333 | -78.919972 |
| PA | Lackawanna | 420690101 | A420690101LAT/LON POINT IS AT CORNER OF TRAILER | 41.479116 | -75.578186 |
| PA | Lackawanna | 420692006 | A420692006LAT/LON POINT IS AT CORNER OF TRAILER | 41.442778 | -75.623056 |
| PA | Lancaster | 420710007 | A420710007LAT/LON POINT AT CORNER OF TRAILER | 40.046667 | -76.283333 |
| PA | Lancaster | 420710012 | Lancaster DW | 40.043833 | -76.1124 |
| PA | Lawrence | 420730015 | | 40.995848 | -80.346442 |
| PA | Lebanon | 420750100 | Lebanon | 40.337328 | -76.383447 |
| PA | Lehigh | 420770004 | A420770004LAT/LONG POINT IS OF SAMPLING INLET | 40.611944 | -75.4325 |
| PA | Luzerne | 420791101 | A420791101LAT/LON POINT IS AT CORNER OF TRAILER | 41.265556 | -75.846389 |
| PA | Lycoming | 420810100 | MONTOURSVILLE | 41.2508 | -76.9238 |
| PA | Mercer | 420850100 | | 41.215014 | -80.484779 |
| PA | Mercer | 420859991 | M.K. Goddard | 41.4271 | -80.1451 |
| PA | Monroe | 420890002 | SWIFTWATER | 41.08306 | -75.32328 |
| PA | Montgomery | 420910013 | A420910013LAT/LON POINT IS OF CORNER OF TRAILER | 40.112222 | -75.309167 |
| PA | Northampton | 420950025 | LAT/LON POINT IS CENTER OF TRAILER | 40.628056 | -75.341111 |
| PA | Northampton | 420958000 | COMBINED EASTON SITE (420950100) AND EASTON H2S SPECIAL STUDY SITES | 40.692224 | -75.237156 |
| PA | Philadelphia | 421010004 | Air Management Services Laboratory (AMS LAB) | 40.008889 | -75.09778 |
| PA | Philadelphia | 421010024 | North East Airport (NEA) | 40.076389 | -75.011944 |
| PA | Philadelphia | 421010048 | North East Waste (NEW) | 39.991389 | -75.080833 |
| PA | Somerset | 421119991 | Laurel Hill | 39.9878 | -79.2515 |
| PA | Tioga | 421174000 | PENN STATE OZONE MONITORING SITE | 41.644722 | -76.939167 |
| PA | Washington | 421250005 | | 40.146667 | -79.902222 |
| PA | Washington | 421250200 | | 40.170556 | -80.261389 |
| PA | Washington | 421255001 | | 40.445278 | -80.420833 |
| PA | Westmoreland | 421290008 | LAT/LON POINT IS TRAILER | 40.304694 | -79.505667 |
| PA | York | 421330008 | A421330008LAT/LON POINT AT CORNER OF TRAILER | 39.965278 | -76.699444 |
| PA | York | 421330011 | York DW | 39.86097 | -76.462055 |
| RI | Kent | 440030002 | AJ | 41.615237 | -71.72 |
| RI | Providence | 440071010 | FRANCIS SCHOOL East Providence | 41.841039 | -71.36097 |
| RI | Washington | 440090007 | US-EPA Laboratory | 41.49511 | -71.423705 |
| SC | Abbeville | 450010001 | DUE WEST | 34.325318 | -82.386376 |
| SC | Aiken | 450030003 | JACKSON MIDDLE SCHOOL | 33.342226 | -81.788731 |
| SC | Anderson | 450070005 | Big Creek | 34.623236 | -82.532059 |
| SC | Berkeley | 450150002 | BUSHY PARK PUMP STATION | 32.987252 | -79.9367 |
| SC | Charleston | 450190046 | CAPE ROMAIN | 32.941023 | -79.657187 |
| SC | Chesterfield | 450250001 | CHESTERFIELD | 34.615367 | -80.198787 |
| SC | Colleton | 450290002 | ASHTON | 33.007866 | -80.965038 |
| SC | Darlington | 450310003 | Pee Dee Experimental Station | 34.285696 | -79.744859 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| SC | Edgefield | 450370001 | TRENTON | 33.739963 | -81.853635 |
| SC | Greenville | 450450016 | Hillcrest Middle School | 34.751848 | -82.256701 |
| SC | Oconee | 450730001 | LONG CREEK | 34.805261 | -83.2377 |
| SC | Pickens | 450770002 | CLEMSON CMS | 34.653606 | -82.838659 |
| SC | Pickens | 450770003 | Wolf Creek | 34.851537 | -82.744576 |
| SC | Richland | 450790007 | PARKLANE | 34.093959 | -80.962304 |
| SC | Richland | 450790021 | CONGAREE BLUFF | 33.81468 | -80.781135 |
| SC | Richland | 450791001 | SANDHILL EXPERIMENTAL STATION | 34.131262 | -80.868318 |
| SC | Spartanburg | 450830009 | NORTH SPARTANBURG FIRE STATION #2 | 34.988706 | -82.075802 |
| SC | York | 450910008 | YORK (LANDFILL) | 34.977 | -81.207 |
| SC | York | 450918801 |  | 34.9127 | -80.8745 |
| SD | Brookings | 460110003 | Research Farm | 44.348604 | -96.807299 |
| SD | Custer | 460330132 | Wind Cave NP - Visitor Center | 43.55764 | -103.48386 |
| SD | Jackson | 460710001 | SOUTH OF BADLANDS NP HEADQUARTERS | 43.74561 | -101.941218 |
| SD | Meade | 460930001 | BLACK HAWK ELEMENTARY SCHOOL GROUNDS | 44.155636 | -103.315765 |
| SD | Minnehaha | 460990008 | SD School for the Deaf | 43.54792 | -96.700769 |
| SD | Union | 461270001 | Union County #1 Jensen | 42.751518 | -96.707208 |
| TN | Anderson | 470010101 | Freel's Bend O3 and SO2 monitoring | 35.964969 | -84.22317 |
| TN | Blount | 470090101 | Great Smoky Mountains NP - Look Rock | 35.63348 | -83.941606 |
| TN | Blount | 470090102 | Great Smoky Mountains NP - Cade's Cove | 35.603056 | -83.783611 |
| TN | Claiborne | 470259991 | Speedwell | 36.46983 | -83.826511 |
| TN | Davidson | 470370011 | East Health | 36.205055 | -86.74472 |
| TN | Davidson | 470370026 | Percy Priest Dam | 36.150799 | -86.623297 |
| TN | DeKalb | 470419991 | Edgar Evans | 36.0388 | -85.7331 |
| TN | Hamilton | 470651011 | Soddy-Daisy High School | 35.233476 | -85.181581 |
| TN | Hamilton | 470654003 | Eastside Utility | 35.102638 | -85.162194 |
| TN | Jefferson | 470890002 | New Market ozone monitor | 36.105629 | -83.602077 |
| TN | Knox | 470930021 | East Knox Elementary School | 36.085508 | -83.764806 |
| TN | Knox | 470931020 | Spring Hill Elementary School | 36.019186 | -83.87381 |
| TN | Loudon | 471050109 | Loudon Middle School ozone monitor | 35.721095 | -84.343035 |
| TN | Sevier | 471550101 | Great Smoky Mountains NP - Cove Mountain | 35.696758 | -83.609612 |
| TN | Shelby | 471570021 | Frayser Ozone Monitor | 35.217501 | -90.019707 |
| TN | Shelby | 471570075 | Memphis NCORE site | 35.151699 | -89.850249 |
| TN | Shelby | 471571004 | Edmund Orgill Park Ozone | 35.378153 | -89.83447 |
| TN | Sullivan | 471632002 | Blountville Ozone Monitor | 36.541365 | -82.424555 |
| TN | Sullivan | 471632003 | Kingsport ozone monitor | 36.58211 | -82.485742 |
| TN | Sumner | 471650007 | Hendersonville Ozone Site at Old Hickory Dam | 36.29756 | -86.653137 |
| TN | Williamson | 471870106 | FAIRVIEW MIDDLE SCHOOL ozone monitor | 35.949765 | -87.138246 |
| TN | Wilson | 471890103 | Cedars of Lebanon Ozone Monitor | 36.060895 | -86.286291 |
| TX | Bell | 480271045 | Temple Georgia | 31.122419 | -97.431052 |
| TX | Bell | 480271047 | Killeen Skylark Field | 31.088002 | -97.679734 |
| TX | Bexar | 480290032 | San Antonio Northwest | 29.51509 | -98.620166 |
| TX | Bexar | 480290052 | Camp Bullis | 29.632058 | -98.564936 |
| TX | Bexar | 480290059 | Calaveras Lake | 29.275381 | -98.311692 |
| TX | Brazoria | 480391004 | Manvel Croix Park | 29.520443 | -95.392509 |
| TX | Brazoria | 480391016 | Lake Jackson | 29.043759 | -95.472946 |
| TX | Brewster | 480430101 | Big Bend NP - K-Bar Ranch Road | 29.30265 | -103.17781 |
| TX | Cameron | 480610006 | Brownsville | 25.892518 | -97.49383 |
| TX | Cameron | 480611023 | Harlingen Teege | 26.200335 | -97.712684 |
| TX | Collin | 480850005 | Frisco | 33.1324 | -96.786419 |
| TX | Dallas | 481130069 | Dallas Hinton | 32.820061 | -96.860117 |
| TX | Dallas | 481130075 | Dallas North #2 | 32.919206 | -96.808498 |
| TX | Dallas | 481130087 | Dallas Redbird Airport Executive | 32.676451 | -96.87206 |
| TX | Denton | 481210034 | Denton Airport South | 33.219069 | -97.196284 |
| TX | Denton | 481211032 | Pilot Point | 33.410648 | -96.94459 |
| TX | Ellis | 481390016 | Midlothian OFW | 32.482083 | -97.026899 |
| TX | Ellis | 481391044 | Italy | 32.175417 | -96.870189 |
| TX | El Paso | 481410029 | Ivanhoe | 31.785769 | -106.323578 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| TX | El Paso | 481410037 | El Paso UTEP | 31.768291 | -106.50126 |
| TX | El Paso | 481410044 | El Paso Chamizal | 31.765685 | -106.455227 |
| TX | El Paso | 481410055 | Ascarate Park SE | 31.746775 | -106.402806 |
| TX | El Paso | 481410057 | Socorro Hueco | 31.6675 | -106.288 |
| TX | El Paso | 481410058 | Skyline Park | 31.893913 | -106.425827 |
| TX | Galveston | 481671034 | Galveston 99th Street | 29.254474 | -94.861289 |
| TX | Gregg | 481830001 | Longview | 32.378682 | -94.711811 |
| TX | Harris | 482010024 | Houston Aldine | 29.901036 | -95.326137 |
| TX | Harris | 482010026 | Channelview | 29.802707 | -95.125495 |
| TX | Harris | 482010029 | Northwest Harris County | 30.039524 | -95.673951 |
| TX | Harris | 482010046 | Houston North Wayside | 29.828086 | -95.284096 |
| TX | Harris | 482010047 | Lang | 29.834167 | -95.489167 |
| TX | Harris | 482010051 | Houston Croquet | 29.623889 | -95.474167 |
| TX | Harris | 482010055 | Houston Bayland Park | 29.695729 | -95.499219 |
| TX | Harris | 482010062 | Houston Monroe | 29.625556 | -95.267222 |
| TX | Harris | 482010066 | Houston Westhollow | 29.723333 | -95.635833 |
| TX | Harris | 482010416 | Park Place | 29.686389 | -95.294722 |
| TX | Harris | 482011015 | Lynchburg Ferry | 29.758889 | -95.079444 |
| TX | Harris | 482011017 | Baytown Garth | 29.823319 | -94.983786 |
| TX | Harris | 482011034 | Houston East | 29.767997 | -95.220582 |
| TX | Harris | 482011035 | Clinton | 29.733726 | -95.257593 |
| TX | Harris | 482011039 | Houston Deer Park #2 | 29.670025 | -95.128508 |
| TX | Harris | 482011050 | Seabrook Friendship Park | 29.583047 | -95.015544 |
| TX | Harrison | 482030002 | Karnack | 32.668987 | -94.167457 |
| TX | Hidalgo | 482150043 | Mission | 26.22621 | -98.291069 |
| TX | Hood | 482210001 | Granbury | 32.442304 | -97.803529 |
| TX | Hunt | 482311006 | Greenville | 33.153088 | -96.115572 |
| TX | Jefferson | 482450009 | Beaumont Downtown | 30.036422 | -94.071061 |
| TX | Jefferson | 482450011 | Port Arthur West | 29.897516 | -93.991084 |
| TX | Jefferson | 482450022 | Hamshire | 29.863957 | -94.317802 |
| TX | Jefferson | 482450101 | SETRPC 40 Sabine Pass | 29.727931 | -93.894081 |
| TX | Jefferson | 482450102 | SETRPC 43 Jefferson Co Airport | 29.9425 | -94.000556 |
| TX | Jefferson | 482451035 | Nederland High School | 29.978926 | -94.010872 |
| TX | Johnson | 482510003 | Cleburne Airport | 32.353595 | -97.436742 |
| TX | Kaufman | 482570005 | Kaufman | 32.564968 | -96.317687 |
| TX | McLennan | 483091037 | Waco Mazanec | 31.653074 | -97.070698 |
| TX | Montgomery | 483390078 | Conroe Relocated | 30.350302 | -95.425128 |
| TX | Navarro | 483491051 | Corsicana Airport | 32.031934 | -96.399141 |
| TX | Nueces | 483550025 | Corpus Christi West | 27.76534 | -97.434262 |
| TX | Nueces | 483550026 | Corpus Christi Tuloso | 27.832409 | -97.55538 |
| TX | Orange | 483611001 | West Orange | 30.085263 | -93.761341 |
| TX | Parker | 483670081 | Parker County | 32.868773 | -97.905931 |
| TX | Polk | 483739991 | Alabama-Coushatta | 30.7017 | -94.6742 |
| TX | Randall | 483819991 | Palo Duro | 34.8803 | -101.6649 |
| TX | Rockwall | 483970001 | Rockwall Heath | 32.936523 | -96.459211 |
| TX | Smith | 484230007 | Tyler Airport Relocated | 32.344008 | -95.415752 |
| TX | Tarrant | 484390075 | Eagle Mountain Lake | 32.987891 | -97.477175 |
| TX | Tarrant | 484391002 | Fort Worth Northwest | 32.805818 | -97.356568 |
| TX | Tarrant | 484392003 | Keller | 32.922474 | -97.282088 |
| TX | Tarrant | 484393009 | Grapevine Fairway | 32.98426 | -97.063721 |
| TX | Tarrant | 484393011 | Arlington Municipal Airport | 32.656357 | -97.088585 |
| TX | Travis | 484530014 | Austin Northwest | 30.354436 | -97.760255 |
| TX | Travis | 484530020 | Austin Audubon Society | 30.483168 | -97.872301 |
| TX | Victoria | 484690003 | Victoria | 28.83617 | -97.00553 |
| TX | Webb | 484790016 | Laredo Vidaurri | 27.517456 | -99.515222 |
| VT | Bennington | 500030004 | Morse Airport - State of Vermont Property | 42.88759 | -73.24984 |
| VT | Chittenden | 500070007 | PROCTOR MAPLE RESEARCH CTR | 44.52839 | -72.86884 |
| VT | Rutland | 500210002 | State of Vermont District Court Parking Lot | 43.608056 | -72.982778 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| VA | Albemarle | 510030001 | Albemarle High School | 38.07657 | -78.50397 |
| VA | Arlington | 510130020 | Aurora Hills Visitors Center | 38.8577 | -77.05922 |
| VA | Caroline | 510330001 | USGS Geomagnetic Center: Corbin | 38.20087 | -77.37742 |
| VA | Charles | 510360002 | Shirley Plantation | 37.34438 | -77.25925 |
| VA | Chesterfield | 510410004 | VDOT Chesterfield Residency Shop | 37.35748 | -77.59355 |
| VA | Fairfax | 510590030 | Lee District Park | 38.77335 | -77.10468 |
| VA | Fauquier | 510610002 | Chester Phelps Wildlife Management Area: Sumerduck | 38.47367 | -77.76772 |
| VA | Frederick | 510690010 | Rest | 39.28102 | -78.08157 |
| VA | Giles | 510719991 | Horton Station | 37.3297 | -80.5578 |
| VA | Hanover | 510850003 | Turner Property: Old Church | 37.60613 | -77.2188 |
| VA | Henrico | 510870014 | MathScience Innovation Center | 37.55652 | -77.40027 |
| VA | Loudoun | 511071005 | Broad Run High School: Ashburn | 39.02473 | -77.48925 |
| VA | Madison | 511130003 | Shenandoah NP - Big Meadows | 38.5231 | -78.43471 |
| VA | Prince Edward | 511479991 | Prince Edward | 37.1655 | -78.3069 |
| VA | Prince William | 511530009 | James S. Long Park | 38.85287 | -77.63462 |
| VA | Roanoke | 511611004 | East Vinton Elementary School | 37.28342 | -79.88452 |
| VA | Rockbridge | 511630003 | Natural Bridge Ranger Station | 37.62668 | -79.51257 |
| VA | Rockingham | 511650003 | ROCKINGHAM CO. VDOT | 38.47753 | -78.81952 |
| VA | Stafford | 511790001 | Widewater Elementary School | 38.48123 | -77.3704 |
| VA | Wythe | 511970002 | Rural Retreat Sewage Treatment Plant | 36.89117 | -81.25423 |
| VA | Hampton City | 516500008 | NASA Langley Research Center | 37.103733 | -76.387017 |
| VA | Suffolk City | 518000004 | Tidewater Community College | 36.90118 | -76.43808 |
| VA | Suffolk City | 518000005 | VA Tech Agricultural Research Station: Holland | 36.66525 | -76.73078 |
| WV | Berkeley | 540030003 | MARTINSBURG BALL FIELD | 39.448105 | -77.963845 |
| WV | Cabell | 540110006 | HENDERSON CENTER/MARSHALL UNIVERSITY - MOVED FROM WATER CO. 5/98 | 38.424133 | -82.4259 |
| WV | Gilmer | 540219991 | Cedar Creek | 38.8795 | -80.8477 |
| WV | Greenbrier | 540250003 | SAM BLACK CHURCH - DOH GARAGE - GREENBRIER COUNTY | 37.908533 | -80.632633 |
| WV | Hancock | 540290009 | | 40.427372 | -80.592318 |
| WV | Kanawha | 540390020 | | 38.346258 | -81.621161 |
| WV | Monongalia | 540610003 | | 39.649367 | -79.920867 |
| WV | Ohio | 540690010 | | 40.114876 | -80.700972 |
| WV | Tucker | 540939991 | Parsons | 39.0905 | -79.6617 |
| WV | Wood | 541071002 | Neale Elementary School | 39.323533 | -81.552367 |
| WI | Ashland | 550030010 | BAD RIVER TRIBAL SCHOOL - ODANAH | 46.602248 | -90.656141 |
| WI | Brown | 550090026 | GREEN BAY - UW | 44.53098 | -87.90799 |
| WI | Columbia | 550210015 | COLUMBUS | 43.3156 | -89.1089 |
| WI | Dane | 550250041 | MADISON EAST | 43.100838 | -89.357298 |
| WI | Dodge | 550270001 | HORICON WILDLIFE AREA | 43.466111 | -88.621111 |
| WI | Door | 550290004 | NEWPORT PARK | 45.2384 | -86.994 |
| WI | Eau Claire | 550350014 | EAU CLAIRE - DOT SIGN SHOP | 44.7614 | -91.143 |
| WI | Fond du Lac | 550390006 | FOND DU LAC | 43.687402 | -88.422045 |
| WI | Forest | 550410007 | POTAWATOMI | 45.565 | -88.8086 |
| WI | Jefferson | 550550009 | JEFFERSON - LAATSCH | 43.0034 | -88.8283 |
| WI | Kenosha | 550590019 | CHIWAUKEE PRAIRIE STATELINE | 42.504722 | -87.8093 |
| WI | Kenosha | 550590025 | KENOSHA - WATER TOWER | 42.5958 | -87.8858 |
| WI | Kewaunee | 550610002 | KEWAUNEE | 44.44312 | -87.50524 |
| WI | La Crosse | 550630012 | LACROSSE - DOT BUILDING | 43.7775 | -91.2269 |
| WI | Manitowoc | 550710007 | MANITOWOC - WDLND DUNES | 44.138619 | -87.6161 |
| WI | Marathon | 550730012 | LAKE DUBAY | 44.70735 | -89.77183 |
| WI | Milwaukee | 550790010 | MILWAUKEE - SIXTEENTH ST. HEALTH CENTER | 43.016667 | -87.933333 |
| WI | Milwaukee | 550790026 | MILWAUKEE - SER DNR HDQRS | 43.060975 | -87.913504 |
| WI | Milwaukee | 550790085 | BAYSIDE | 43.1818 | -87.901 |
| WI | Outagamie | 550870009 | APPLETON - AAL | 44.30738 | -88.395178 |
| WI | Ozaukee | 550890008 | GRAFTON | 43.343 | -87.92 |
| WI | Ozaukee | 550890009 | HARRINGTON BEACH PARK | 43.4981 | -87.81 |
| WI | Racine | 551010020 | RACINE - PAYNE AND DOLAN | 42.773677 | -87.796306 |
| WI | Rock | 551050030 | BELOIT - CONVERSE | 42.51831 | -89.06347 |

| State | County | AQS Code | Site name | Lat | Lon |
|---|---|---|---|---|---|
| WI | Sauk | 551110007 | DEVILS LAKE PARK | 43.4351 | -89.6797 |
| WI | Sheboygan | 551170006 | SHEBOYGAN - KOHLER ANDRAE | 43.667418 | -87.716213 |
| WI | Sheboygan | 551170009 | SHEBOYGAN - HAVEN | 43.815596 | -87.792235 |
| WI | Taylor | 551199991 | Perkinstown | 45.2066 | -90.5969 |
| WI | Vilas | 551250001 | TROUT LAKE | 46.0519 | -89.654 |
| WI | Walworth | 551270005 | LAKE GENEVA | 42.580009 | -88.499046 |
| WI | Waukesha | 551330027 | WAUKESHA - CLEVELAND AVE | 43.020075 | -88.21507 |
| WY | Albany | 560019991 | Centennial | 41.3642 | -106.2399 |
| WY | Campbell | 560050123 | Thunder Basin | 44.6522 | -105.2903 |
| WY | Campbell | 560050456 | Campbell County | 44.146964 | -105.529994 |
| WY | Carbon | 560070100 | Atlantic Rim Sun Dog | 41.386944 | -107.616667 |
| WY | Converse | 560090008 | Tallgrass Energy Partners - Gaseous | 42.796372 | -105.361822 |
| WY | Converse | 560090010 | Converse County Long-Term | 43.101281 | -105.498931 |
| WY | Fremont | 560130232 | Spring Creek | 43.081667 | -107.549444 |
| WY | Laramie | 560210100 | Cheyenne NCore | 41.182227 | -104.778334 |
| WY | Natrona | 560250100 | Casper Gaseous | 42.82231 | -106.36501 |
| WY | Natrona | 560252601 | | 42.8608 | -106.23586 |
| WY | Sweetwater | 560370200 | Wamsutter | 41.677667 | -108.024835 |
| WY | Weston | 560450003 | | 43.873056 | -104.191944 |

## Appendix E. *DVFs for all 12OTC2 monitors*

Baseline (2014-2018) and projected 2023 $O_3$ design values from CAMx and CMAQ, using the standard 3x3 method and the 3x3 No Water 1 method. Table includes DVBs and DVFs for all monitors in 12OTC2 domain (see Section 2.1).

| | | | | | | 2014-18 DVB | | CAMx v7.10 3x3 DVF | CAMx v7.10 No Water 1 | CMAQ v5.3.1 3x3 DVF | CMAQ v5.3.1 No Water 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Site ID | State | County | Site name | Lat | Lon | AVG | MAX | AVG | AVG | AVG | AVG |
| 90010017 | Connecticut | Fairfield | Greenwich Point Park - Greenwich | 41.00 | -73.59 | 79.3 | 80 | 74 | 74 | 71 | 78 |
| 90011123 | Connecticut | Fairfield | Western Conn State Univ - Danbury | 41.40 | -73.44 | 77 | 78 | 69 | 69 | 69 | 69 |
| 90013007 | Connecticut | Fairfield | Lighthouse - Stratford | 41.15 | -73.10 | 82 | 83 | 75 | 75 | 74 | 75 |
| 90019003 | Connecticut | Fairfield | Sherwood Island State Park - Westport | 41.12 | -73.34 | 82.7 | 83 | 78 | 76 | 80 | 75 |
| 90031003 | Connecticut | Hartford | McAuliffe Park | 41.78 | -72.63 | 71.7 | 74 | 63 | 63 | 62 | 62 |
| 90050005 | Connecticut | Litchfield | Mohawk Mt-Cornwall | 41.82 | -73.30 | 71.3 | 72 | 63 | 63 | 62 | 62 |
| 90079007 | Connecticut | Middlesex | Connecticut Valley Hospital - Middletown | 41.55 | -72.63 | 78.7 | 79 | 70 | 70 | 69 | 69 |
| 90090027 | Connecticut | New Haven | Criscuolo Park-New Haven | 41.30 | -72.90 | 75.7 | 77 | 69 | 68 | 69 | 68 |
| 90099002 | Connecticut | New Haven | Hammonasset State Park - Madison | 41.26 | -72.55 | 79.7 | 82 | 71 | 72 | 71 | 71 |
| 90110124 | Connecticut | New London | Fort Griswold Park - Groton | 41.35 | -72.08 | 74.3 | 76 | 67 | 68 | 67 | 71 |
| 90131001 | Connecticut | Tolland | | 41.98 | -72.39 | 71.7 | 73 | 63 | 63 | 62 | 62 |
| 90159991 | Connecticut | Windham | Abington | 41.84 | -72.01 | 69.7 | 71 | 61 | 61 | 60 | 60 |
| 100010002 | Delaware | Kent | PROPERTY OF KILLENS POND STATE PARK; BEHIND FARM BUILDINGS | 38.99 | -75.56 | 66.3 | 67 | 58 | 57 | 58 | 57 |
| 100031007 | Delaware | New Castle | Lums Pond | 39.55 | -75.73 | 68 | 69 | 59 | 59 | 59 | 59 |
| 100031010 | Delaware | New Castle | BCSP | 39.82 | -75.56 | 73.7 | 74 | 65 | 65 | 65 | 65 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100031013 | Delaware | New Castle | BELLEVUE STATE PARK: FIELD IN SE PORTION OF PARK | 39.77 | -75.50 | 71 | 72 | 63 | 63 | 62 | 62 |
| 100032004 | Delaware | New Castle | MLK CORNER OF MLK BLVD AND JUSTISON ST | 39.74 | -75.56 | 71.3 | 72 | 63 | 63 | 63 | 63 |
| 100051002 | Delaware | Sussex | Seaford Shipley State Service Center | 38.65 | -75.61 | 65.3 | 66 | 57 | 57 | 57 | 57 |
| 100051003 | Delaware | Sussex | Lewes SPM SITE: NEAR UD ACID RAIN/MERCURY COLLECTORS | 38.78 | -75.16 | 67.7 | 69 | 59 | 60 | 55 | 59 |
| 110010041 | District Of Columbia | District of Columbia | RIVER TERRACE | 38.90 | -76.96 | 57 | 57 | 49 | 49 | 48 | 48 |
| 110010043 | District Of Columbia | District of Columbia | MCMILLAN NCore-PAMS | 38.92 | -77.01 | 71 | 72 | 61 | 61 | 60 | 60 |
| 110010050 | District Of Columbia | District of Columbia | Takoma Rec Center | 38.97 | -77.02 | 70 | 70 | 60 | 60 | 59 | 59 |
| 230010014 | Maine | Androscoggin | DURHAM FIRE STATION | 43.97 | -70.12 | 59.3 | 60 | 52 | 51 | 52 | 50 |
| 230039991 | Maine | Aroostook | Ashland | 46.60 | -68.41 | 52 | 52 | | | | |
| 230052003 | Maine | Cumberland | CETL - Cape Elizabeth Two Lights (State Park) | 43.56 | -70.21 | 64.7 | 65 | 57 | 57 | 56 | |
| 230090102 | Maine | Hancock | TOP OF CADILLAC MTN (FENCED ENCLOSURE) | 44.35 | -68.23 | 69 | 71 | 60 | 60 | 61 | 61 |
| 230090103 | Maine | Hancock | MCFARLAND HILL Air Pollutant Research Site | 44.38 | -68.26 | 63 | 64 | 55 | 55 | 56 | |
| 230112005 | Maine | Kennebec | Gardiner: Pray Street School (GPSS) | 44.23 | -69.79 | 61.3 | 63 | 53 | 53 | | |
| 230130004 | Maine | Knox | Marshall Point Lighthouse | 43.92 | -69.26 | 63.3 | 64 | 56 | 55 | 55 | 55 |
| 230194008 | Maine | Penobscot | WLBZ TV Transmitter Building - Summit of Rider Bluff | 44.74 | -68.67 | 58.3 | 60 | | | | |
| 230290019 | Maine | Washington | Harbor Masters Office; Jonesport Public Landing | 44.53 | -67.60 | 59.3 | 61 | 52 | 52 | | |
| 230310038 | Maine | York | WBFD - West Buxton (Hollis) Fire Department | 43.66 | -70.63 | 58.7 | 59 | | | | |
| 230310040 | Maine | York | SBP - Shapleigh Ball Park | 43.59 | -70.88 | 61.3 | 62 | 53 | 53 | | |
| 230312002 | Maine | York | KPW - Kennebunkport Parson'd Way | 43.34 | -70.47 | 66.5 | 67 | 58 | 58 | 58 | 57 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 240031003 | Maryland | Anne Arundel | GLEN BURNIE | 39.17 | -76.63 | 74 | 74 | 64 | 64 | 65 | 63 |
| 240051007 | Maryland | Baltimore | Padonia | 39.46 | -76.63 | 72 | 72 | 62 | 62 | 61 | 61 |
| 240053001 | Maryland | Baltimore | Essex | 39.31 | -76.47 | 72.7 | 73 | 64 | 63 | 64 | 62 |
| 240090011 | Maryland | Calvert | Calvert | 38.54 | -76.62 | 67.7 | 69 | 59 | 59 | 59 | 58 |
| 240130001 | Maryland | Carroll | South Carroll | 39.44 | -77.04 | 68.3 | 69 | 58 | 58 | 57 | 57 |
| 240150003 | Maryland | Cecil | Fair Hill Natural Resource Management Area | 39.70 | -75.86 | 74 | 74 | 64 | 64 | 64 | 64 |
| 240170010 | Maryland | Charles | Southern Maryland | 38.51 | -76.81 | 69.3 | 70 | 60 | 60 | 59 | 59 |
| 240190004 | Maryland | Dorchester | Horn Point | 38.59 | -76.14 | 64.7 | 66 | 56 | 57 | 58 | 57 |
| 240199991 | Maryland | Dorchester | Blackwater NWR | 38.44 | -76.11 | 65.7 | 66 | 58 | 57 | 59 | 57 |
| 240210037 | Maryland | Frederick | Frederick Airport | 39.42 | -77.38 | 68 | 69 | 59 | 59 | 58 | 58 |
| 240230002 | Maryland | Garrett | Piney Run | 39.71 | -79.01 | 65.3 | 66 | 59 | 59 | | |
| 240251001 | Maryland | Harford | Edgewood | 39.41 | -76.30 | 74 | 75 | 65 | 64 | 63 | 64 |
| 240259001 | Maryland | Harford | Aldino | 39.56 | -76.20 | 73 | 73 | 63 | 63 | 62 | 63 |
| 240290002 | Maryland | Kent | Millington | 39.31 | -75.80 | 69.3 | 70 | 60 | 60 | 59 | 59 |
| 240313001 | Maryland | Montgomery | Rockville | 39.11 | -77.11 | 67.7 | 68 | 59 | 59 | 57 | 57 |
| 240330030 | Maryland | Prince George's | HU-Beltsville | 39.06 | -76.88 | 69.3 | 70 | 59 | 59 | 58 | 58 |
| 240338003 | Maryland | Prince George's | PG Equestrian Center | 38.81 | -76.74 | 70.7 | 71 | 61 | 61 | 59 | 59 |
| 240339991 | Maryland | Prince George's | Beltsville | 39.03 | -76.82 | 69.3 | 71 | 60 | 60 | 59 | 59 |
| 240430009 | Maryland | Washington | Hagerstown | 39.56 | -77.72 | 66.7 | 67 | 58 | 58 | 58 | 58 |
| 245100054 | Maryland | Baltimore (City) | Furley | 39.33 | -76.55 | 68.3 | 70 | 60 | 59 | 60 | 59 |
| 250010002 | Massachusetts | Barnstable | TRURO NATIONAL SEASHORE | 41.98 | -70.02 | 69 | 69 | 61 | 61 | 60 | 59 |
| 250051004 | Massachusetts | Bristol | FALL RIVER | 41.69 | -71.17 | 71.7 | 74 | 64 | 64 | 68 | 63 |
| 250051006 | Massachusetts | Bristol | FAIRHAVEN2 | 41.65 | -70.90 | 67.3 | 69 | 61 | 60 | 60 | 59 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 250070001 | Massachusetts | Dukes | 1 HERRING CREEK RD: AQUINNAH (WAMPANOAG TRIBAL SITE) | 41.33 | -70.79 | 70 | 70 | 63 | 62 | 62 | 62 |
| 250092006 | Massachusetts | Essex | LYNN WATER TREATMENT PLANT | 42.47 | -70.97 | 66.3 | 68 | 60 | 59 | 61 | 59 |
| 250094005 | Massachusetts | Essex | NEWBURYPORT HARBOR ST PARKING LOT | 42.81 | -70.82 | 64.5 | 65 | 57 | 56 | 57 | 56 |
| 250095005 | Massachusetts | Essex | CONSENTINO SCHOOL. | 42.77 | -71.10 | 62.7 | 64 | 55 | 55 | 55 | 55 |
| 250112005 | Massachusetts | Franklin | Greenfield 16 Barr Ave | 42.61 | -72.60 | 64.7 | 66 | 56 | 56 | | |
| 250130008 | Massachusetts | Hampden | WESTOVER AFB | 42.19 | -72.56 | 70 | 71 | 61 | 61 | 60 | 60 |
| 250154002 | Massachusetts | Hampshire | QUABBIN RES | 42.30 | -72.33 | 69 | 70 | 60 | 60 | 59 | 59 |
| 250170009 | Massachusetts | Middlesex | USEPA REGION 1 LAB | 42.63 | -71.36 | 64 | 65 | 56 | 56 | 55 | 55 |
| 250213003 | Massachusetts | Norfolk | BLUE HILL OBSERVATORY | 42.21 | -71.11 | 69 | 70 | 62 | 60 | 64 | 60 |
| 250230005 | Massachusetts | Plymouth | Brockton Buckley | 42.07 | -71.01 | 67 | 69 | 59 | 59 | 58 | 58 |
| 250250042 | Massachusetts | Suffolk | DUDLEY SQUARE ROXBURY | 42.33 | -71.08 | 60.3 | 64 | 54 | 53 | 55 | 53 |
| 250270015 | Massachusetts | Worcester | WORCESTER AIRPORT | 42.27 | -71.88 | 65 | 66 | 57 | 57 | 56 | 56 |
| 250270024 | Massachusetts | Worcester | UXBRIDGE | 42.10 | -71.62 | 66.3 | 69 | 58 | 58 | 58 | 58 |
| 330012004 | New Hampshire | Belknap | FIELD OFFICE ON THE GROUNDS OF THE FORMER STATE PRISON | 43.57 | -71.50 | 58.7 | 59 | 50 | 50 | 49 | |
| 330050007 | New Hampshire | Cheshire | WATER STREET | 42.93 | -72.27 | 62.3 | 63 | 54 | 54 | | |
| 330074001 | New Hampshire | Coos | | 44.27 | -71.30 | 67.3 | 68 | | | | |
| 330074002 | New Hampshire | Coos | CAMP DODGE: GREENS GRANT | 44.31 | -71.22 | 58.3 | 59 | | | | |
| 330090010 | New Hampshire | Grafton | LEBANON AIRPORT ROAD | 43.63 | -72.31 | 57.7 | 59 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 330099991 | New Hampshire | Grafton | Woodstock | 43.94 | -71.70 | 54.7 | 56 | | | | |
| 330111011 | New Hampshire | Hillsborough | GILSON ROAD | 42.72 | -71.52 | 63 | 64 | 55 | 55 | | |
| 330115001 | New Hampshire | Hillsborough | MILLER STATE PARK | 42.86 | -71.88 | 67 | 68 | 58 | 58 | | |
| 330131007 | New Hampshire | Merrimack | HAZEN DRIVE | 43.22 | -71.51 | 62 | 63 | 54 | 54 | | |
| 330150014 | New Hampshire | Rockingham | PORTSMOUTH - PEIRCE ISLAND | 43.08 | -70.75 | 63.3 | 65 | 55 | 55 | 56 | 54 |
| 330150016 | New Hampshire | Rockingham | SEACOAST SCIENCE CENTER | 43.05 | -70.71 | 66.7 | 67 | 58 | 58 | 59 | 57 |
| 330150018 | New Hampshire | Rockingham | MOOSEHILL SCHOOL | 42.86 | -71.38 | 65.3 | 66 | 57 | 57 | | |
| 340010006 | New Jersey | Atlantic | Brigantine | 39.46 | -74.45 | 63.7 | 64 | 57 | 56 | 57 | 56 |
| 340030006 | New Jersey | Bergen | Leonia | 40.87 | -73.99 | 74.3 | 75 | 69 | 69 | 68 | 68 |
| 340070002 | New Jersey | Camden | Camden Spruce Street | 39.93 | -75.13 | 75.3 | 77 | 67 | 67 | 66 | 66 |
| 340071001 | New Jersey | Camden | Ancora State Hospital | 39.68 | -74.86 | 67.3 | 68 | 59 | 59 | 58 | 58 |
| 340110007 | New Jersey | Cumberland | Millville | 39.42 | -75.03 | 65.7 | 67 | 57 | 57 | 57 | 57 |
| 340130003 | New Jersey | Essex | Newark Firehouse | 40.72 | -74.19 | 68.3 | 70 | 61 | 61 | 61 | 61 |
| 340150002 | New Jersey | Gloucester | Clarksboro | 39.80 | -75.21 | 73.7 | 74 | 66 | 66 | 65 | 65 |
| 340170006 | New Jersey | Hudson | Bayonne | 40.67 | -74.13 | 71 | 72 | 66 | 65 | 68 | 64 |
| 340190001 | New Jersey | Hunterdon | Flemington | 40.52 | -74.81 | 71.3 | 72 | 63 | 63 | 62 | 62 |
| 340210005 | New Jersey | Mercer | Rider University | 40.28 | -74.74 | 71.3 | 72 | 63 | 63 | 62 | 62 |
| 340219991 | New Jersey | Mercer | Wash. Crossing | 40.31 | -74.87 | 73.3 | 74 | 65 | 65 | 65 | 65 |
| 340230011 | New Jersey | Middlesex | Rutgers University | 40.46 | -74.43 | 74.7 | 75 | 66 | 66 | 65 | 65 |
| 340250005 | New Jersey | Monmouth | Monmouth University | 40.28 | -74.01 | 67.3 | 69 | 60 | 60 | 61 | 59 |
| 340273001 | New Jersey | Morris | Chester | 40.79 | -74.68 | 69 | 70 | 61 | 61 | 61 | 61 |
| 340290006 | New Jersey | Ocean | Colliers Mills | 40.06 | -74.44 | 72.7 | 73 | 65 | 65 | 64 | 64 |
| 340315001 | New Jersey | Passaic | Ramapo | 41.06 | -74.26 | 67.7 | 68 | 60 | 60 | 60 | 60 |
| 340410007 | New Jersey | Warren | Columbia | 40.92 | -75.07 | 64.3 | 65 | 57 | 57 | 56 | 56 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 360010012 | New York | Albany | LOUDONVILLE | 42.68 | -73.76 | 64 | 64 | 57 | 57 | 56 | 56 |
| 360050110 | New York | Bronx | IS 52 | 40.82 | -73.90 | 67.7 | 69 | 63 | 63 | 62 | 63 |
| 360050133 | New York | Bronx | PFIZER LAB SITE | 40.87 | -73.88 | 70.7 | 72 | 67 | 66 | 63 | 65 |
| 360130006 | New York | Chautauqua | DUNKIRK | 42.50 | -79.32 | 68 | 68 | 62 | 61 | 61 | 61 |
| 360270007 | New York | Dutchess | MILLBROOK | 41.79 | -73.74 | 67 | 68 | 59 | 59 | 59 | 59 |
| 360290002 | New York | Erie | AMHERST | 42.99 | -78.77 | 69.3 | 70 | 63 | 63 | 65 | 62 |
| 360310002 | New York | Essex | WHITEFACE SUMMIT | 44.37 | -73.90 | 64 | 66 | | | | |
| 360310003 | New York | Essex | WHITEFACE BASE | 44.39 | -73.86 | 64.7 | 65 | | | | |
| 360319991 | New York | Essex | Huntington Wildlife Forest | 43.97 | -74.22 | 57 | 58 | | | | |
| 360337003 | New York | Franklin | Y001 | 44.98 | -74.70 | 58 | 58 | | | | |
| 360410005 | New York | Hamilton | PISECO LAKE | 43.45 | -74.52 | 61.3 | 62 | | | | |
| 360430005 | New York | Herkimer | NICKS LAKE | 43.69 | -74.99 | 63 | 63 | | | | |
| 360450002 | New York | Jefferson | PERCH RIVER | 44.09 | -75.97 | 63 | 63 | 57 | 57 | 57 | 57 |
| 360551007 | New York | Monroe | ROCHESTER 2 | 43.15 | -77.55 | 65.7 | 68 | 59 | 59 | 59 | 59 |
| 360610135 | New York | New York | CCNY | 40.82 | -73.95 | 70.3 | 72 | 66 | 66 | 64 | 65 |
| 360631006 | New York | Niagara | MIDDLEPORT | 43.22 | -78.48 | 66.3 | 67 | 61 | 60 | 61 | 60 |
| 360671015 | New York | Onondaga | EAST SYRACUSE | 43.05 | -76.06 | 64.3 | 65 | 58 | 58 | | |
| 360715001 | New York | Orange | VALLEY CENTRAL HIGH SCHOOL | 41.52 | -74.22 | 64.3 | 66 | 57 | 57 | 56 | 56 |
| 360750003 | New York | Oswego | FULTON | 43.28 | -76.46 | 61 | 63 | 55 | | 55 | 54 |
| 360790005 | New York | Putnam | MT NINHAM | 41.46 | -73.71 | 69 | 70 | 62 | 62 | 62 | 62 |
| 360810124 | New York | Queens | QUEENS COLLEGE 2 | 40.74 | -73.82 | 72.3 | 74 | 67 | 68 | 66 | 65 |
| 360850067 | New York | Richmond | SUSAN WAGNER HS | 40.60 | -74.13 | 76 | 76 | 71 | 70 | 74 | 70 |
| 360870005 | New York | Rockland | Rockland County | 41.18 | -74.03 | 71.3 | 72 | 64 | 64 | 64 | 64 |
| 360910004 | New York | Saratoga | STILLWATER | 43.01 | -73.65 | 63 | 64 | 56 | 56 | | |
| 361010003 | New York | Steuben | PINNACLE STATE PARK | 42.09 | -77.21 | 59.7 | 61 | | | | |
| 361030002 | New York | Suffolk | BABYLON | 40.75 | -73.42 | 74 | 76 | 69 | 68 | 68 | 67 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 361030004 | New York | Suffolk | RIVERHEAD | 40.96 | -72.71 | 74.3 | 76 | 68 | 67 | 66 | 66 |
| 361030009 | New York | Suffolk | HOLTSVILLE | 40.83 | -73.06 | 71 | 73 | 66 | 64 | 66 | 64 |
| 361099991 | New York | Tompkins | Connecticut Hill | 42.40 | -76.65 | 62.7 | 63 | | | | |
| 361173001 | New York | Wayne | WILLIAMSON | 43.23 | -77.17 | 65 | 67 | 59 | 59 | 59 | 58 |
| 361192004 | New York | Westchester | WHITE PLAINS | 41.05 | -73.76 | 74 | 75 | 70 | 67 | 66 | 68 |
| 420010001 | Pennsylvania | Adams | NARSTO SITE ARENDTSVILLE | 39.92 | -77.31 | 66.5 | 67 | 59 | 59 | 58 | 58 |
| 420019991 | Pennsylvania | Adams | Arendtsville | 39.92 | -77.31 | 66.3 | 67 | 59 | 59 | 58 | 58 |
| 420030008 | Pennsylvania | Allegheny | Lawrenceville | 40.47 | -79.96 | 68 | 69 | 61 | 61 | 60 | 60 |
| 420030067 | Pennsylvania | Allegheny | South Fayette | 40.38 | -80.17 | 69.7 | 71 | 62 | 62 | 60 | 60 |
| 420031008 | Pennsylvania | Allegheny | Harrison | 40.62 | -79.73 | 69 | 70 | 62 | 62 | 61 | 61 |
| 420050001 | Pennsylvania | Armstrong | LAT/LON IS CENTER OF TRAILER | 40.81 | -79.56 | 69 | 70 | 61 | 61 | 61 | 61 |
| 420070002 | Pennsylvania | Beaver | | 40.56 | -80.50 | 68.7 | 70 | 57 | 57 | 54 | 54 |
| 420070005 | Pennsylvania | Beaver | DRIVEWAY TO BAKEY RESIDENCE | 40.68 | -80.36 | 67.3 | 68 | 56 | 56 | 51 | 51 |
| 420070014 | Pennsylvania | Beaver | | 40.75 | -80.32 | 65.7 | 67 | 55 | 55 | 51 | 51 |
| 420110006 | Pennsylvania | Berks | Kutztown | 40.51 | -75.79 | 65.7 | 66 | 58 | 58 | 57 | 57 |
| 420110011 | Pennsylvania | Berks | Reading Airport | 40.38 | -75.97 | 70 | 70 | 62 | 62 | 60 | 60 |
| 420130801 | Pennsylvania | Blair | | 40.54 | -78.37 | 63.5 | 64 | 56 | 56 | 56 | 56 |
| 420150011 | Pennsylvania | Bradford | Towanda | 41.71 | -76.51 | 57.3 | 59 | 50 | 50 | | |
| 420170012 | Pennsylvania | Bucks | A420170012LAT/LONG POINT IS OF SAMPLING INLET | 40.11 | -74.88 | 79.3 | 81 | 71 | 71 | 69 | 69 |
| 420210011 | Pennsylvania | Cambria | | 40.31 | -78.92 | 62.3 | 63 | 56 | 56 | 54 | 54 |
| 420270100 | Pennsylvania | Centre | LAT/LON=POINT SW CORNER OF TRAILER | 40.81 | -77.88 | 62.3 | 63 | 56 | 56 | | |
| 420279991 | Pennsylvania | Centre | Penn State | 40.72 | -77.93 | 64.7 | 65 | 58 | 58 | | |
| 420290100 | Pennsylvania | Chester | CHESTER COUNTY TRANSPORT SITE INTO PHILADELPHIA | 39.83 | -75.77 | 72.7 | 73 | 64 | 64 | 63 | 63 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 420334000 | Pennsylvania | Clearfield | MOSHANNON STATE FOREST | 41.12 | -78.53 | 64.7 | 66 | 58 | 58 | 57 | 57 |
| 420430401 | Pennsylvania | Dauphin | A420430401LAT/LON POINT IS AT CORNER OF TRAILER | 40.25 | -76.85 | 65.3 | 66 | 57 | 57 | 56 | 56 |
| 420431100 | Pennsylvania | Dauphin | A420431100LAT/LON POINT IS AT CORNER OF TRAILER | 40.27 | -76.68 | 66 | 67 | 58 | 58 | 57 | 57 |
| 420450002 | Pennsylvania | Delaware | A420450002LAT/LON POINT IS OF CORNER OF TRAILER | 39.84 | -75.37 | 71.3 | 72 | 64 | 64 | 64 | 64 |
| 420479991 | Pennsylvania | Elk | Kane Exp. Forest | 41.60 | -78.77 | 65.7 | 66 | 59 | 59 | | |
| 420490003 | Pennsylvania | Erie | | 42.14 | -80.04 | 65 | 66 | 59 | 59 | 59 | 57 |
| 420550001 | Pennsylvania | Franklin | HIGH ELEVATION OZONE SITE | 39.96 | -77.48 | 59.3 | 60 | 53 | 53 | 52 | 52 |
| 420590002 | Pennsylvania | Greene | 75 KM SSW OF PITTSBURGH RURAL SITE ON A KNOLL WITHIN A LARGE CLEARIN | 39.81 | -80.27 | 67 | 68 | 61 | 61 | 61 | 61 |
| 420630004 | Pennsylvania | Indiana | | 40.56 | -78.92 | 69.7 | 70 | 62 | 62 | 61 | 61 |
| 420690101 | Pennsylvania | Lackawanna | A420690101LAT/LON POINT IS AT CORNER OF TRAILER | 41.48 | -75.58 | 66 | 67 | 58 | 58 | | |
| 420692006 | Pennsylvania | Lackawanna | A420692006LAT/LON POINT IS AT CORNER OF TRAILER | 41.44 | -75.62 | 62.5 | 64 | 55 | 55 | | |
| 420710007 | Pennsylvania | Lancaster | A420710007LAT/LON POINT AT CORNER OF TRAILER | 40.05 | -76.28 | 69.3 | 70 | 60 | 60 | 60 | 60 |
| 420710012 | Pennsylvania | Lancaster | Lancaster DW | 40.04 | -76.11 | 65 | 66 | 57 | 57 | 57 | 57 |
| 420730015 | Pennsylvania | Lawrence | | 41.00 | -80.35 | 66.3 | 68 | 57 | 57 | 56 | 56 |
| 420750100 | Pennsylvania | Lebanon | Lebanon | 40.34 | -76.38 | 69 | 70 | 60 | 60 | 60 | 60 |
| 420770004 | Pennsylvania | Lehigh | A420770004LAT/LONG POINT IS OF SAMPLING INLET | 40.61 | -75.43 | 69.7 | 70 | 62 | 62 | 61 | 61 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 420791101 | Pennsylvania | Luzerne | A420791101LAT/LON POINT IS AT CORNER OF TRAILER | 41.27 | -75.85 | 64 | 64 | 56 | 56 | 55 | 55 |
| 420810100 | Pennsylvania | Lycoming | MONTOURSVILLE | 41.25 | -76.92 | 63.7 | 64 | 56 | 56 | | |
| 420850100 | Pennsylvania | Mercer | | 41.22 | -80.48 | 68.7 | 69 | 60 | 60 | 58 | 58 |
| 420859991 | Pennsylvania | Mercer | M.K. Goddard | 41.43 | -80.15 | 65.3 | 66 | 57 | 57 | 56 | 56 |
| 420890002 | Pennsylvania | Monroe | SWIFTWATER | 41.08 | -75.32 | 66.7 | 68 | 58 | 58 | 58 | 58 |
| 420910013 | Pennsylvania | Montgomery | A420910013LAT/LON POINT IS OF CORNER OF TRAILER | 40.11 | -75.31 | 71.3 | 72 | 64 | 64 | 63 | 63 |
| 420950025 | Pennsylvania | Northampton | LAT/LON POINT IS CENTER OF TRAILER | 40.63 | -75.34 | 70 | 71 | 62 | 62 | 60 | 60 |
| 420958000 | Pennsylvania | Northampton | COMBINED EASTON SITE (420950100) AND EASTON H2S SPECIAL STUDY SITES | 40.69 | -75.24 | 69 | 69 | 61 | 61 | 60 | 60 |
| 421010004 | Pennsylvania | Philadelphia | Air Management Services Laboratory (AMS LAB) | 40.01 | -75.10 | 61 | 61 | 54 | 54 | 53 | 53 |
| 421010024 | Pennsylvania | Philadelphia | North East Airport (NEA) | 40.08 | -75.01 | 77.7 | 78 | 69 | 69 | 68 | 68 |
| 421010048 | Pennsylvania | Philadelphia | North East Waste (NEW) | 39.99 | -75.08 | 75.3 | 76 | 67 | 67 | 66 | 66 |
| 421119991 | Pennsylvania | Somerset | Laurel Hill | 39.99 | -79.25 | 65 | 65 | 59 | 59 | 58 | 58 |
| 421174000 | Pennsylvania | Tioga | PENN STATE OZONE MONITORING SITE | 41.64 | -76.94 | 63.7 | 64 | 56 | 56 | | |
| 421250005 | Pennsylvania | Washington | | 40.15 | -79.90 | 67 | 68 | 60 | 60 | 60 | 60 |
| 421250200 | Pennsylvania | Washington | | 40.17 | -80.26 | 65 | 65 | 58 | 58 | 57 | 57 |
| 421255001 | Pennsylvania | Washington | | 40.45 | -80.42 | 68 | 68 | 58 | 58 | 55 | 55 |
| 421290008 | Pennsylvania | Westmoreland | LAT/LON POINT IS TRAILER | 40.30 | -79.51 | 67 | 68 | 61 | 61 | 59 | 59 |
| 421330008 | Pennsylvania | York | A421330008LAT/LON POINT AT CORNER OF TRAILER | 39.97 | -76.70 | 65.7 | 66 | 57 | 57 | 56 | 56 |
| 421330011 | Pennsylvania | York | York DW | 39.86 | -76.46 | 69 | 70 | 61 | 61 | 59 | 59 |
| 440030002 | Rhode Island | Kent | AJ | 41.62 | -71.72 | 71.3 | 73 | 64 | 64 | 62 | 62 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 440071010 | Rhode Island | Providence | FRANCIS SCHOOL East Providence | 41.84 | -71.36 | 69.7 | 73 | 62 | 62 | 67 | 61 |
| 440090007 | Rhode Island | Washington | US-EPA Laboratory | 41.50 | -71.42 | 69.3 | 71 | 63 | 62 | 66 | 65 |
| 500030004 | Vermont | Bennington | Morse Airport - State of Vermont Property | 42.89 | -73.25 | 64.3 | 65 | 57 | 57 | | |
| 500070007 | Vermont | Chittenden | PROCTOR MAPLE RESEARCH CTR | 44.53 | -72.87 | 61 | 62 | | | | |
| 500210002 | Vermont | Rutland | State of Vermont District Court Parking Lot | 43.61 | -72.98 | 63 | 63 | | | | |
| 510030001 | Virginia | Albemarle | Albemarle High School | 38.08 | -78.50 | 60.5 | 61 | 53 | 53 | | |
| 510130020 | Virginia | Arlington | Aurora Hills Visitors Center | 38.86 | -77.06 | 71 | 72 | 61 | 61 | 60 | 60 |
| 510330001 | Virginia | Caroline | USGS Geomagnetic Center: Corbin | 38.20 | -77.38 | 61 | 61 | 52 | 52 | 52 | 52 |
| 510360002 | Virginia | Charles | Shirley Plantation | 37.34 | -77.26 | 62.3 | 63 | 50 | 50 | 49 | 49 |
| 510410004 | Virginia | Chesterfield | VDOT Chesterfield Residency Shop | 37.36 | -77.59 | 61.3 | 62 | 50 | 50 | 49 | 49 |
| 510590030 | Virginia | Fairfax | Lee District Park | 38.77 | -77.10 | 70 | 71 | 60 | 60 | 59 | 59 |
| 510610002 | Virginia | Fauquier | Chester Phelps Wildlife Management Area: Sumerduck | 38.47 | -77.77 | 58.7 | 59 | 51 | 51 | 50 | 50 |
| 510690010 | Virginia | Frederick | Rest | 39.28 | -78.08 | 61.3 | 62 | 54 | 54 | 53 | 53 |
| 510719991 | Virginia | Giles | Horton Station | 37.33 | -80.56 | 62 | 62 | 55 | 55 | | |
| 510850003 | Virginia | Hanover | Turner Property: Old Church | 37.61 | -77.22 | 63.3 | 65 | 51 | 51 | 49 | 49 |
| 510870014 | Virginia | Henrico | MathScience Innovation Center | 37.56 | -77.40 | 65.5 | 66 | 52 | 52 | 52 | 52 |
| 511071005 | Virginia | Loudoun | Broad Run High School: Ashburn | 39.02 | -77.49 | 67 | 68 | 58 | 58 | 57 | 57 |
| 511130003 | Virginia | Madison | Shenandoah NP - Big Meadows | 38.52 | -78.43 | 63 | 63 | 55 | 55 | | |
| 511479991 | Virginia | Prince Edward | Prince Edward | 37.17 | -78.31 | 59.3 | 60 | 49 | 49 | | |
| 511530009 | Virginia | Prince William | James S. Long Park | 38.85 | -77.63 | 65.3 | 66 | 57 | 57 | 56 | 56 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 511611004 | Virginia | Roanoke | East Vinton Elementary School | 37.28 | -79.88 | 61.3 | 62 | 53 | 53 | | |
| 511630003 | Virginia | Rockbridge | Natural Bridge Ranger Station | 37.63 | -79.51 | 58 | 59 | 50 | 50 | | |
| 511650003 | Virginia | Rockingham | ROCKINGHAM CO. VDOT | 38.48 | -78.82 | 60 | 60 | 53 | 53 | | |
| 511790001 | Virginia | Stafford | Widewater Elementary School | 38.48 | -77.37 | 62.3 | 63 | 53 | 53 | 53 | 53 |
| 511970002 | Virginia | Wythe | Rural Retreat Sewage Treatment Plant | 36.89 | -81.25 | 60.7 | 61 | 54 | 54 | | |
| 516500008 | Virginia | Hampton City | NASA Langley Research Center | 37.10 | -76.39 | 64.3 | 65 | 55 | 54 | 55 | 53 |
| 518000004 | Virginia | Suffolk City | Tidewater Community College | 36.90 | -76.44 | 61 | 62 | 53 | 53 | 53 | 52 |
| 518000005 | Virginia | Suffolk City | VA Tech Agricultural Research Station: Holland | 36.67 | -76.73 | 59.7 | 61 | 52 | 52 | | |
| 10030010 | Alabama | Baldwin | FAIRHOPE: Alabama | 30.50 | -87.88 | 63.7 | 65 | 55 | 55 | 54 | 55 |
| 10331002 | Alabama | Colbert | MUSCLE SHOALS | 34.76 | -87.64 | 58.7 | 59 | 50 | 50 | | |
| 10499991 | Alabama | DeKalb | Sand Mountain | 34.29 | -85.97 | 62.3 | 63 | 54 | 54 | | |
| 10550011 | Alabama | Etowah | SOUTHSIDE | 33.90 | -86.05 | 61.7 | 63 | 54 | 54 | | |
| 10690004 | Alabama | Houston | DOTHAN | 31.19 | -85.42 | 58.3 | 59 | 50 | 50 | | |
| 10730023 | Alabama | Jefferson | North Birmingham | 33.55 | -86.82 | 66.3 | 68 | 55 | 55 | 54 | 54 |
| 10731003 | Alabama | Jefferson | Fairfield | 33.49 | -86.92 | 65.7 | 66 | 55 | 55 | 55 | 55 |
| 10731005 | Alabama | Jefferson | McAdory | 33.33 | -87.00 | 65 | 65 | 55 | 55 | 53 | 53 |
| 10731010 | Alabama | Jefferson | Leeds | 33.55 | -86.55 | 64.3 | 66 | 54 | 54 | 53 | 53 |
| 10732006 | Alabama | Jefferson | Hoover | 33.39 | -86.82 | 66 | 66 | 54 | 54 | 53 | 53 |
| 10735003 | Alabama | Jefferson | Corner | 33.80 | -86.94 | 63.5 | 64 | 55 | 55 | 55 | 55 |
| 10736002 | Alabama | Jefferson | Tarrant Elementary School | 33.58 | -86.77 | 67.7 | 68 | 56 | 56 | 56 | 56 |
| 10890014 | Alabama | Madison | HUNTSVILLE OLD AIRPORT | 34.69 | -86.59 | 64 | 64 | 54 | 54 | 53 | 53 |
| 10890022 | Alabama | Madison | HUNTSVILLE CAPSHAW ROAD | 34.77 | -86.76 | 62 | 62 | 53 | 53 | 51 | 51 |
| 10970003 | Alabama | Mobile | CHICKASAW | 30.77 | -88.09 | 63 | 64 | 55 | 55 | 54 | 54 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 10972005 | Alabama | Mobile | BAY ROAD | 30.47 | -88.14 | 63.7 | 65 | 56 | 55 | 56 | 56 |
| 11011002 | Alabama | Montgomery | MOMS: ADEM | 32.41 | -86.26 | 61 | 62 | 52 | 52 | 50 | 50 |
| 11030011 | Alabama | Morgan | DECATUR: Alabama | 34.53 | -86.97 | 63.7 | 64 | 55 | 55 | 55 | 55 |
| 11130002 | Alabama | Russell | LADONIA: PHENIX CITY | 32.47 | -85.08 | 62 | 62 | 52 | 52 | 51 | 51 |
| 11170004 | Alabama | Shelby | HELENA | 33.32 | -86.83 | 66.7 | 67 | 55 | 55 | 54 | 54 |
| 11190003 | Alabama | Sumter | Ward: Sumter Co. | 32.36 | -88.28 | 57 | 57 | 51 | 51 | | |
| 11250010 | Alabama | Tuscaloosa | DUNCANVILLE: TUSCALOOSA | 33.09 | -87.46 | 60 | 60 | 51 | 51 | 49 | 49 |
| 50199991 | Arkansas | Clark | Caddo Valley | 34.18 | -93.10 | 57.7 | 58 | 50 | 50 | | |
| 50350005 | Arkansas | Crittenden | MARION | 35.20 | -90.19 | 67 | 68 | 59 | 59 | 58 | 58 |
| 51010002 | Arkansas | Newton | DEER | 35.83 | -93.21 | 58 | 59 | | | | |
| 51130003 | Arkansas | Polk | EAGLE MOUNTAIN | 34.45 | -94.14 | 61.7 | 62 | 56 | 56 | | |
| 51190007 | Arkansas | Pulaski | PARR | 34.76 | -92.28 | 62.3 | 64 | 53 | 53 | 52 | 52 |
| 51191002 | Arkansas | Pulaski | NLR AIRPORT | 34.84 | -92.26 | 63.7 | 64 | 54 | 54 | 53 | 53 |
| 51430005 | Arkansas | Washington | SPRINGDALE | 36.18 | -94.12 | 59.7 | 60 | 51 | 51 | | |
| 51430006 | Arkansas | Washington | Fayetteville Airport | 36.01 | -94.17 | 59.7 | 60 | 52 | 52 | | |
| 80013001 | Colorado | Adams | Welby | 39.84 | -104.95 | 67 | 67 | 62 | 62 | 61 | 61 |
| 80050002 | Colorado | Arapahoe | HIGHLAND RESERVOIR | 39.57 | -104.96 | 73 | 73 | 67 | 67 | 66 | 66 |
| 80050006 | Colorado | Arapahoe | Aurora East | 39.64 | -104.57 | 67.7 | 69 | 63 | 63 | 62 | 62 |
| 80310002 | Colorado | Denver | DENVER - CAMP | 39.75 | -104.99 | 67.7 | 69 | 63 | 63 | 61 | 61 |
| 80310026 | Colorado | Denver | La Casa | 39.78 | -105.01 | 68.7 | 69 | 64 | 64 | 62 | 62 |
| 80350004 | Colorado | Douglas | Chatfield State Park | 39.53 | -105.07 | 77.3 | 78 | 70 | 70 | 69 | 69 |
| 80410013 | Colorado | El Paso | U.S. AIR FORCE ACADEMY | 38.96 | -104.82 | 68 | 70 | 63 | 63 | 63 | 63 |
| 80410016 | Colorado | El Paso | MANITOU SPRINGS | 38.85 | -104.90 | 66.7 | 69 | 63 | 63 | 61 | 61 |
| 80450012 | Colorado | Garfield | Rifle-Health Dept | 39.54 | -107.78 | 62 | 63 | | | | |
| 80519991 | Colorado | Gunnison | Gothic | 38.96 | -106.99 | 64.7 | 65 | | | | |
| 80590005 | Colorado | Jefferson | WELCH | 39.64 | -105.14 | 73 | 75 | 67 | 67 | 65 | 65 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 80590006 | Colorado | Jefferson | ROCKY FLATS-N | 39.91 | -105.19 | 77.3 | 78 | 71 | 71 | 70 | 70 |
| 80590011 | Colorado | Jefferson | NATIONAL RENEWABLE ENERGY LABS - NREL | 39.74 | -105.18 | 79.3 | 80 | 73 | 73 | 72 | 72 |
| 80590013 | Colorado | Jefferson | Aspen Park | 39.54 | -105.30 | 70 | 70 | 63 | 63 | 62 | 62 |
| 80671004 | Colorado | La Plata | | 37.30 | -107.48 | 67 | 67 | | | | |
| 80677001 | Colorado | La Plata | LOCATED IN PINE RIVER VALLEY: THE MOST DENSELY POPULATED AREA. | 37.14 | -107.63 | 68.7 | 69 | | | | |
| 80690007 | Colorado | Larimer | Rocky Mountain NP - Long's Peak | 40.28 | -105.55 | 69 | 70 | 64 | 64 | 63 | 63 |
| 80690011 | Colorado | Larimer | FORT COLLINS - WEST | 40.59 | -105.14 | 75.7 | 77 | 70 | 70 | 70 | 70 |
| 80691004 | Colorado | Larimer | Fort Collins - CSU - S. Mason | 40.58 | -105.08 | 69 | 70 | 64 | 64 | 63 | 63 |
| 81030005 | Colorado | Rio Blanco | | 40.04 | -107.85 | 60.3 | 61 | | | | |
| 81230009 | Colorado | Weld | Greeley - Weld County Tower | 40.39 | -104.74 | 70 | 70 | 66 | 66 | 65 | 65 |
| 120013012 | Florida | Alachua | Paynes Prairie Farm | 29.57 | -82.27 | 59.3 | 61 | 51 | 51 | | |
| 120030002 | Florida | Baker | OLUSTEE | 30.20 | -82.44 | 60 | 61 | | | | |
| 120050006 | Florida | Bay | ST.ANDREWS STATE PARK: PANAMA CITY BEACH | 30.13 | -85.73 | 60.7 | 62 | 54 | | | |
| 120090007 | Florida | Brevard | Melbourne | 28.05 | -80.63 | 58.3 | 59 | | | | |
| 120094001 | Florida | Brevard | Cocoa Beach | 28.31 | -80.62 | 61 | 62 | | | | |
| 120110033 | Florida | Broward | Vista View Park | 26.07 | -80.34 | 59 | 59 | | | | |
| 120110034 | Florida | Broward | Daniela Banu NCORE | 26.05 | -80.26 | 63 | 63 | | | 57 | |
| 120112003 | Florida | Broward | Pompano Highlands | 26.29 | -80.10 | 61 | 62 | | | | |
| 120118002 | Florida | Broward | Dr. Von Mizell-Eula Johnson State Park (prev. John U Lloyd State Park) | 26.09 | -80.11 | 62.3 | 63 | | | | |
| 120210004 | Florida | Collier | LAURAL OAKS ELEMENTARY | 26.27 | -81.71 | 58.7 | 60 | | | | |
| 120230002 | Florida | Columbia | Lake City - Veteran's Domicile | 30.18 | -82.62 | 60.3 | 62 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 120310077 | Florida | Duval | Sheffield | 30.48 | -81.59 | 58 | 58 | 48 | 49 | 44 | |
| 120310100 | Florida | Duval | Mayo Clinic | 30.26 | -81.45 | 60 | 60 | 51 | 51 | 49 | |
| 120310106 | Florida | Duval | Cisco Drive | 30.38 | -81.84 | 61 | 61 | 53 | 53 | 50 | 50 |
| 120330004 | Florida | Escambia | Ellyson Industrial Park | 30.53 | -87.20 | 64 | 65 | 55 | 56 | 53 | 55 |
| 120330018 | Florida | Escambia | Pensacola NAS | 30.37 | -87.27 | 63 | 64 | 54 | 56 | 52 | 53 |
| 120350004 | Florida | Flagler | Flagler | 29.49 | -81.28 | 59.3 | 60 | | | | |
| 120550003 | Florida | Highlands | Archbold Biological Station | 27.19 | -81.34 | 60.3 | 61 | | | | |
| 120570081 | Florida | Hillsborough | Simmons Park | 27.74 | -82.47 | 67.7 | 68 | 60 | 60 | 59 | 59 |
| 120571035 | Florida | Hillsborough | Davis Island | 27.93 | -82.45 | 65.7 | 67 | 58 | 57 | 57 | 55 |
| 120571065 | Florida | Hillsborough | USMC Reserve Center (Gandy) | 27.89 | -82.54 | 66.3 | 67 | 59 | 58 | 58 | 57 |
| 120573002 | Florida | Hillsborough | SYDNEY | 27.97 | -82.23 | 66.3 | 67 | 57 | 57 | 56 | 56 |
| 120590004 | Florida | Holmes | Bonifay | 30.85 | -85.60 | 58.7 | 60 | | | | |
| 120619991 | Florida | Indian River | Indian River Lagoon | 27.85 | -80.46 | 62 | 63 | | | | |
| 120690002 | Florida | Lake | Clermont | 28.52 | -81.72 | 63.7 | 65 | 56 | 56 | 55 | |
| 120712002 | Florida | Lee | Cape Coral - Rotary Park | 26.55 | -81.98 | 60.3 | 62 | | | | |
| 120713002 | Florida | Lee | Bay Oaks Park | 26.45 | -81.94 | 60.3 | 62 | | | | |
| 120730012 | Florida | Leon | Tallahassee Community College | 30.44 | -84.35 | 60.7 | 61 | 51 | 51 | | |
| 120779991 | Florida | Liberty | Sumatra | 30.11 | -84.99 | 56.3 | 57 | | | | |
| 120813002 | Florida | Manatee | Port Manatee | 27.63 | -82.55 | 61 | 63 | 54 | 53 | 52 | 52 |
| 120814012 | Florida | Manatee | G.T. BRAY PARK | 27.48 | -82.62 | 63 | 64 | 55 | 55 | 54 | |
| 120814013 | Florida | Manatee | 39TH STREET SITE | 27.45 | -82.52 | 61 | 62 | 53 | 53 | 51 | 49 |
| 120830003 | Florida | Marion | Ocala YMCA | 29.17 | -82.10 | 61.3 | 62 | | | | |
| 120830004 | Florida | Marion | Marion County Sheriff | 29.19 | -82.17 | 58.7 | 60 | | | | |
| 120850007 | Florida | Martin | Stuart | 27.17 | -80.24 | 61.7 | 63 | | | | |
| 120860027 | Florida | Miami-Dade | Rosenstiel | 25.73 | -80.16 | 63 | 64 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 120860029 | Florida | Miami-Dade | Perdue | 25.59 | -80.33 | 61.5 | 62 | | | | |
| 120910002 | Florida | Okaloosa | Ft. Walton Beach | 30.43 | -86.67 | 61 | 62 | 53 | 53 | 52 | |
| 120950008 | Florida | Orange | Winegard Elementary School | 28.45 | -81.38 | 63 | 64 | 55 | 55 | 53 | 53 |
| 120952002 | Florida | Orange | WINTER PARK | 28.60 | -81.36 | 63 | 64 | 55 | 55 | 53 | 53 |
| 120972002 | Florida | Osceola | Osceola County Fire Station | 28.35 | -81.64 | 64.3 | 66 | 55 | 55 | 53 | 53 |
| 121010005 | Florida | Pasco | San Antonio | 28.33 | -82.31 | 61.3 | 62 | 53 | 53 | | |
| 121012001 | Florida | Pasco | Holiday | 28.20 | -82.76 | 62 | 63 | 54 | 54 | 54 | 53 |
| 121030004 | Florida | Pinellas | St. Petersburg College | 27.95 | -82.73 | 62.7 | 65 | 55 | 55 | 54 | 54 |
| 121030018 | Florida | Pinellas | Azalea Park | 27.79 | -82.74 | 60.7 | 61 | 55 | 55 | 53 | 53 |
| 121035002 | Florida | Pinellas | John Chesnut Sr. Park - East Lake | 28.09 | -82.70 | 59.7 | 61 | 52 | 52 | 53 | 51 |
| 121056005 | Florida | Polk | Sikes Elementary School | 27.94 | -82.00 | 65.3 | 67 | 55 | 55 | | |
| 121056006 | Florida | Polk | Baptist Childrens' Home | 28.03 | -81.97 | 64.3 | 66 | 54 | 54 | | |
| 121110013 | Florida | St. Lucie | Savannas | 27.39 | -80.31 | 61.3 | 62 | | | | |
| 121130015 | Florida | Santa Rosa | Woodlawn Beach Middle School | 30.39 | -87.01 | 62 | 64 | 54 | 54 | 52 | 51 |
| 121151005 | Florida | Sarasota | Lido Park | 27.31 | -82.57 | 62.7 | 63 | 54 | 54 | 53 | |
| 121151006 | Florida | Sarasota | Paw Park | 27.35 | -82.48 | 63 | 64 | 55 | 55 | 53 | |
| 121152002 | Florida | Sarasota | Jackson Road | 27.09 | -82.36 | 61 | 61 | 53 | 53 | | |
| 121171002 | Florida | Seminole | Sanford (Seminole Community College) | 28.75 | -81.31 | 62.7 | 64 | 53 | 53 | 52 | 52 |
| 121272001 | Florida | Volusia | Port Orange | 29.11 | -80.99 | 59 | 59 | | | 49 | |
| 121275002 | Florida | Volusia | DAYTONA BLIND SERVICES | 29.21 | -81.05 | 59.7 | 61 | | | | |
| 121290001 | Florida | Wakulla | St. Marks Wildlife Refuge | 30.09 | -84.16 | 59 | 59 | | | | |
| 130210012 | Georgia | Bibb | Macon-Forestry | 32.81 | -83.54 | 65 | 65 | 55 | 55 | 53 | 53 |
| 130510021 | Georgia | Chatham | Savannah-E. President | 32.07 | -81.05 | 57 | 57 | 50 | 50 | | |
| 130550001 | Georgia | Chattooga | Summerville | 34.47 | -85.41 | 61 | 62 | 52 | 52 | 52 | 52 |
| 130590002 | Georgia | Clarke | Athens | 33.92 | -83.34 | 64.3 | 65 | 53 | 53 | 53 | 53 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 130670003 | Georgia | Cobb | Kennesaw | 34.02 | -84.61 | 66.5 | 67 | 55 | 55 | 54 | 54 |
| 130730001 | Georgia | Columbia | Evans | 33.58 | -82.13 | 60 | 61 | 51 | 51 | 50 | 50 |
| 130770002 | Georgia | Coweta | Newnan | 33.40 | -84.75 | 64.5 | 66 | 54 | 54 | 53 | 53 |
| 130850001 | Georgia | Dawson | Dawsonville | 34.38 | -84.06 | 65 | 65 | 53 | 53 | 51 | 51 |
| 130890002 | Georgia | DeKalb | South DeKalb | 33.69 | -84.29 | 70.3 | 71 | 59 | 59 | 58 | 58 |
| 130970004 | Georgia | Douglas | Douglasville | 33.74 | -84.78 | 68 | 69 | 57 | 57 | 57 | 57 |
| 131210055 | Georgia | Fulton | United Avenue | 33.72 | -84.36 | 74.3 | 75 | 64 | 64 | 62 | 62 |
| 131270006 | Georgia | Glynn | Brunswick | 31.17 | -81.50 | 56.3 | 57 | 47 | | | |
| 131350002 | Georgia | Gwinnett | Gwinnett | 33.96 | -84.07 | 70.7 | 72 | 58 | 58 | 56 | 56 |
| 131510002 | Georgia | Henry | McDonough | 33.43 | -84.16 | 72 | 74 | 60 | 60 | 59 | 59 |
| 132130003 | Georgia | Murray | Fort Mountain | 34.79 | -84.63 | 65 | 65 | 55 | 55 | | |
| 132150008 | Georgia | Muscogee | Columbus-Airport | 32.52 | -84.94 | 61 | 62 | 51 | 51 | 50 | 50 |
| 132230003 | Georgia | Paulding | Yorkville: King Farm | 33.93 | -85.05 | 63 | 63 | 53 | 53 | 52 | 52 |
| 132319991 | Georgia | Pike | Georgia Station | 33.18 | -84.41 | 67.5 | 68 | 57 | 57 | 57 | 57 |
| 132450091 | Georgia | Richmond | Augusta | 33.43 | -82.02 | 61.7 | 62 | 53 | 53 | 53 | 53 |
| 132470001 | Georgia | Rockdale | Conyers | 33.59 | -84.07 | 71 | 74 | 60 | 60 | 59 | 59 |
| 132611001 | Georgia | Sumter | Leslie | 31.95 | -84.08 | 60.3 | 61 | 53 | 53 | | |
| 170010007 | Illinois | Adams | JOHN WOOD COMMUNITY COLLEGE | 39.92 | -91.34 | 62.7 | 63 | | | | |
| 170190007 | Illinois | Champaign | Thomasboro | 40.24 | -88.19 | 65.3 | 68 | 59 | 59 | 58 | 58 |
| 170191001 | Illinois | Champaign | ISWS CLIMATE STATION | 40.05 | -88.37 | 65.7 | 66 | 59 | 59 | 58 | 58 |
| 170230001 | Illinois | Clark | 416 S. State St. Hwy 1-West Union | 39.21 | -87.67 | 65 | 66 | 58 | 58 | 57 | 57 |
| 170310001 | Illinois | Cook | VILLAGE GARAGE | 41.67 | -87.73 | 73 | 77 | 69 | 69 | 67 | 67 |
| 170310032 | Illinois | Cook | SOUTH WATER FILTRATION PLANT | 41.76 | -87.55 | 72.3 | 75 | 68 | 69 | 69 | 67 |
| 170310076 | Illinois | Cook | COM ED MAINTENANCE BLDG | 41.75 | -87.71 | 72 | 75 | 68 | 68 | 67 | 67 |
| 170311003 | Illinois | Cook | TAFT HS | 41.98 | -87.79 | 68.3 | 69 | 65 | 64 | 64 | 63 |

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| 170311601 | Illinois | Cook | COOK COUNTY TRAILER | 41.67 | -87.99 | 69.3 | 70 | 64 | 64 | 63 | 63 |
| 170313103 | Illinois | Cook | IEPA TRAILER | 41.97 | -87.88 | 62.7 | 64 | 59 | 59 | 57 | 57 |
| 170314002 | Illinois | Cook | COOK COUNTY TRAILER | 41.86 | -87.75 | 68.7 | 72 | 66 | 65 | 65 | 64 |
| 170314007 | Illinois | Cook | REGIONAL OFFICE BUILDING | 42.06 | -87.86 | 72 | 74 | 67 | 67 | 66 | 65 |
| 170314201 | Illinois | Cook | NORTHBROOK WATER PLANT | 42.14 | -87.80 | 73.3 | 77 | 68 | 68 | 67 | 67 |
| 170317002 | Illinois | Cook | WATER PLANT | 42.06 | -87.68 | 74 | 77 | 69 | 69 | 69 | 68 |
| 170436001 | Illinois | DuPage | MORTON ARBORETUM | 41.81 | -88.07 | 69.7 | 71 | 64 | 64 | 63 | 63 |
| 170491001 | Illinois | Effingham | CENTRAL JR HIGH | 39.07 | -88.55 | 65.7 | 67 | 59 | 59 | | |
| 170650002 | Illinois | Hamilton | TEN MILE CREEK DNR OFFICE | 38.08 | -88.62 | 65.7 | 67 | 59 | 59 | | |
| 170831001 | Illinois | Jersey | ILLINI JR HIGH | 39.11 | -90.32 | 68 | 68 | 61 | 61 | 61 | 61 |
| 170859991 | Illinois | Jo Daviess | Stockton | 42.29 | -90.00 | 64.7 | 65 | | | | |
| 170890005 | Illinois | Kane | LARSEN JUNIOR HIGH | 42.05 | -88.27 | 69.3 | 71 | 63 | 63 | 62 | 62 |
| 170971007 | Illinois | Lake | CAMP LOGAN TRAILER | 42.47 | -87.81 | 73.7 | 75 | 68 | 68 | 69 | 67 |
| 171110001 | Illinois | McHenry | CARY GROVE HS | 42.22 | -88.24 | 69.7 | 72 | 63 | 63 | 62 | 62 |
| 171132003 | Illinois | McLean | ISU HARRIS PHYSICAL PLANT | 40.52 | -89.00 | 64.3 | 65 | 59 | 59 | | |
| 171150013 | Illinois | Macon | IEPA TRAILER | 39.87 | -88.93 | 66.3 | 67 | 60 | 60 | | |
| 171170002 | Illinois | Macoupin | IEPA TRAILER | 39.40 | -89.81 | 65 | 66 | 57 | 57 | | |
| 171190008 | Illinois | Madison | CLARA BARTON SCHOOL | 38.89 | -90.15 | 70 | 71 | 63 | 63 | 63 | 63 |
| 171191009 | Illinois | Madison | SOUTHWEST CABLE TV | 38.73 | -89.96 | 69 | 72 | 61 | 61 | 61 | 61 |
| 171193007 | Illinois | Madison | WATER PLANT | 38.86 | -90.11 | 70.7 | 71 | 63 | 63 | 63 | 63 |
| 171199991 | Illinois | Madison | Alhambra | 38.87 | -89.62 | 67.3 | 68 | 60 | 60 | 59 | 59 |
| 171430024 | Illinois | Peoria | FIRESTATION | 40.69 | -89.61 | 65 | 67 | 60 | 60 | 59 | 59 |
| 171431001 | Illinois | Peoria | PEORIA HEIGHTS HS | 40.75 | -89.59 | 66 | 67 | 60 | 60 | 60 | 60 |
| 171570001 | Illinois | Randolph | IEPA TRAILER | 38.18 | -89.79 | 66.3 | 67 | 59 | 59 | 60 | 60 |
| 171613002 | Illinois | Rock Island | ROCK ISLAND ARSENAL | 41.51 | -90.52 | 63.3 | 65 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 171630010 | Illinois | Saint Clair | IEPA-RAPS TRAILER | 38.61 | -90.16 | 69 | 71 | 61 | 61 | 61 | 61 |
| 171670014 | Illinois | Sangamon | Illinois Building State Fairgrounds | 39.83 | -89.64 | 66 | 68 | 59 | 59 | | |
| 171971011 | Illinois | Will | COM ED TRAINING CENTER | 41.22 | -88.19 | 65.3 | 67 | 60 | 60 | | |
| 172012001 | Illinois | Winnebago | MAPLE ELEMENTARY SCHOOL | 42.33 | -89.04 | 67.3 | 68 | 60 | 60 | | |
| 180030002 | Indiana | Allen | Leo High School | 41.22 | -85.02 | 64.7 | 67 | 58 | 58 | 56 | 56 |
| 180030004 | Indiana | Allen | Ft. Wayne- Beacon St. | 41.09 | -85.10 | 64 | 66 | 57 | 57 | 55 | 55 |
| 180050007 | Indiana | Bartholomew | Hope- Hauser Jr-Sr High School | 39.29 | -85.77 | 67.7 | 68 | 61 | 61 | 60 | 60 |
| 180110001 | Indiana | Boone | Perry Worth ELEMENTRY SCHOOL: WEST OF WHITESTOWN | 40.00 | -86.40 | 67 | 69 | 60 | 60 | 59 | 59 |
| 180150002 | Indiana | Carroll | Flora-Flora Airport | 40.54 | -86.55 | 63.7 | 64 | 57 | 57 | 56 | 56 |
| 180190008 | Indiana | Clark | Charlestown State Park- 1051.8 meters East of SR 62/ Indiana armory | 38.39 | -85.66 | 70.3 | 71 | 62 | 62 | 61 | 61 |
| 180350010 | Indiana | Delaware | Albany- Albany Elem. Sch. | 40.30 | -85.25 | 62.3 | 66 | 55 | 55 | 54 | 54 |
| 180390007 | Indiana | Elkhart | Bristol- Bristol Elem. Sch. | 41.72 | -85.82 | 64.3 | 68 | 58 | 58 | 57 | 57 |
| 180431004 | Indiana | Floyd | New Albany- Green Valley Elem. Sch. | 38.31 | -85.83 | 71 | 73 | 63 | 63 | 62 | 62 |
| 180550001 | Indiana | Greene | Plummer: 2500 S. W- Citizens gas Plummer maintenance faciliy | 38.99 | -86.99 | 66.7 | 67 | 58 | 58 | 57 | 57 |
| 180570006 | Indiana | Hamilton | Our Lady of Grace- Noblesville | 40.07 | -85.99 | 66.3 | 69 | 60 | 60 | 57 | 57 |
| 180630004 | Indiana | Hendricks | AVON- 255 S. SR 267 (also 255 S. Avon Ave.) Avon: IN | 39.76 | -86.40 | 63.3 | 67 | 58 | 58 | 56 | 56 |
| 180690002 | Indiana | Huntington | Roanoke- Roanoke Elem. School | 40.96 | -85.38 | 60.7 | 64 | 54 | 54 | 53 | 53 |
| 180710001 | Indiana | Jackson | Brownstown- 225 W & 200 N. Water facility | 38.92 | -86.08 | 65.7 | 66 | 58 | 58 | 57 | 57 |
| 180810002 | Indiana | Johnson | Indian Creek Elementary School in Trafalgar: DUE SOUTH OF INDIANAPOLIS | 39.42 | -86.15 | 61 | 62 | 55 | 55 | 53 | 53 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 180839991 | Indiana | Knox | Vincennes | 38.74 | -87.49 | 66.7 | 69 | 58 | 58 | 58 | 58 |
| 180890022 | Indiana | Lake | Gary-IITRI/ 1219.5 meters east of Tennessee St.- old ammuntion bunker | 41.61 | -87.30 | 68.3 | 70 | 64 | 64 | 63 | 63 |
| 180892008 | Indiana | Lake | HAMMOND CAAP- Hammond- 141st St. | 41.64 | -87.49 | 65.5 | 66 | 61 | 62 | 61 | 61 |
| 180910010 | Indiana | LaPorte | LAPORTE OZONE SITE AT WATER TREATMENT PLANT | 41.63 | -86.68 | 65 | 67 | 60 | 59 | 60 | 59 |
| 180950010 | Indiana | Madison | SCHOOL LOCATED ON THE SW CORNER OF US 36 AND IND 109 | 40.00 | -85.66 | 62.3 | 68 | 55 | 55 | 53 | 53 |
| 180970050 | Indiana | Marion | Indpls.- Ft. Harrison | 39.86 | -86.02 | 70.3 | 72 | 64 | 64 | 61 | 61 |
| 180970057 | Indiana | Marion | Indpls- Harding St. | 39.75 | -86.19 | 66 | 69 | 61 | 61 | 59 | 59 |
| 180970073 | Indiana | Marion | Indpls.- E. 16th St. | 39.79 | -86.06 | 65.5 | 66 | 60 | 60 | 57 | 57 |
| 180970078 | Indiana | Marion | Indpls- Washington Park/ in parking lot next to police station | 39.81 | -86.11 | 68.5 | 69 | 64 | 64 | 61 | 61 |
| 180970087 | Indiana | Marion | Indpls.- I 70 | 39.79 | -86.13 | 65.3 | 67 | 61 | 61 | 58 | 58 |
| 181090005 | Indiana | Morgan | Monrovia- Monrovia HS. | 39.58 | -86.48 | 63 | 64 | 57 | 57 | 56 | 56 |
| 181230009 | Indiana | Perry | Leopold- Perry Central HS | 38.12 | -86.60 | 66.7 | 67 | 59 | 59 | 58 | 58 |
| 181270024 | Indiana | Porter | Ogden Dunes- Water Treatment Plant | 41.62 | -87.20 | 69.7 | 71 | 64 | 64 | 64 | 64 |
| 181270026 | Indiana | Porter | VALPARAISO | 41.51 | -87.04 | 69.3 | 73 | 64 | 64 | 63 | 63 |
| 181290003 | Indiana | Posey | ST. PHILLIPS- St. Phillips road CAAP trailer | 38.01 | -87.72 | 66.7 | 67 | 60 | 60 | 59 | 59 |
| 181410010 | Indiana | St. Joseph | Potato Creek State Park | 41.55 | -86.37 | 65 | 68 | 59 | 59 | 58 | 58 |
| 181410015 | Indiana | St. Joseph | South Bend-Shields Dr. | 41.70 | -86.21 | 70 | 72 | 63 | 63 | 63 | 63 |
| 181410016 | Indiana | St. Joseph | Granger-Beckley St. | 41.75 | -86.11 | 67.3 | 69 | 61 | 61 | 60 | 60 |
| 181450001 | Indiana | Shelby | TRITON Middle SCHOOL: NORTH OF FAIRLAND | 39.61 | -85.87 | 64.7 | 68 | 59 | 59 | 56 | 56 |
| 181630013 | Indiana | Vanderburgh | Inglefield/ Scott School | 38.11 | -87.54 | 68.3 | 69 | 61 | 61 | 60 | 60 |
| 181630021 | Indiana | Vanderburgh | Evansville- Buena Vista | 38.01 | -87.58 | 69 | 70 | 62 | 62 | 62 | 62 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 181670018 | Indiana | Vigo | TERRE HAUTE CAAP/ McLean High School | 39.49 | -87.40 | 66.7 | 68 | 59 | 59 | 58 | 58 |
| 181670024 | Indiana | Vigo | Sandcut/ SITE LOCATED BY HOME BEHIND SHED. | 39.56 | -87.31 | 64.3 | 67 | 57 | 57 | 56 | 56 |
| 181699991 | Indiana | Wabash | Salamonie Reservoir | 40.82 | -85.66 | 68.7 | 70 | 61 | 61 | | |
| 181730008 | Indiana | Warrick | Boonville- Boonville HS | 38.05 | -87.28 | 68.7 | 69 | 62 | 62 | 61 | 61 |
| 181730009 | Indiana | Warrick | Lynnville- Tecumseh HS | 38.19 | -87.34 | 66 | 66 | 58 | 58 | 58 | 58 |
| 181730011 | Indiana | Warrick | Dayville | 37.95 | -87.32 | 67.7 | 68 | 61 | 61 | 61 | 61 |
| 190170011 | Iowa | Bremer | WAVERLY AIRPORT SITE | 42.74 | -92.51 | 61 | 63 | | | | |
| 190450021 | Iowa | Clinton | CLINTON: RAINBOW PARK | 41.87 | -90.18 | 63 | 64 | | | | |
| 190850007 | Iowa | Harrison | | 41.83 | -95.93 | 62.7 | 64 | | | | |
| 190851101 | Iowa | Harrison | PISGAH: HIGHWAY MAINTENANCE | 41.78 | -95.95 | 62 | 62 | | | | |
| 191130028 | Iowa | Linn | KIRKWOOD | 41.91 | -91.65 | 61 | 61 | | | | |
| 191130033 | Iowa | Linn | COGGON ELEMENTARY SCHOOL BLDG. NORTHERN LIMITS OF LINN COUNTY | 42.28 | -91.53 | 62.3 | 65 | | | | |
| 191130040 | Iowa | Linn | Public Health | 41.98 | -91.69 | 61.7 | 63 | | | | |
| 191370002 | Iowa | Montgomery | VIKING LAKE STATE PARK | 40.97 | -95.04 | 60.3 | 61 | | | | |
| 191471002 | Iowa | Palo Alto | EMMETSBURG: IOWA LAKES COMMUNITY COLL. | 43.12 | -94.69 | 61.3 | 62 | | | | |
| 191530030 | Iowa | Polk | CARPENTER | 41.60 | -93.64 | 60 | 61 | | | | |
| 191630014 | Iowa | Scott | SCOTT COUNTY PARK | 41.70 | -90.52 | 63.3 | 65 | | | | |
| 191630015 | Iowa | Scott | DAVENPORT: JEFFERSON SCH. | 41.53 | -90.59 | 61.3 | 63 | | | | |
| 191690011 | Iowa | Story | SLATER CITY HALL | 41.88 | -93.69 | 60 | 60 | | | | |
| 191770006 | Iowa | Van Buren | LAKE SUGEMA STATE PARK II | 40.70 | -92.01 | 60 | 61 | | | | |
| 191810022 | Iowa | Warren | GRAVEL ROAD IN LAKE AQUABI STATE PARK | 41.29 | -93.58 | 58 | 58 | | | | |
| 200910010 | Kansas | Johnson | HERITAGE PARK | 38.84 | -94.75 | 60 | 61 | 55 | 55 | 53 | 53 |
| 201030003 | Kansas | Leavenworth | Leavenworth | 39.33 | -94.95 | 61.3 | 63 | 54 | 54 | 53 | 53 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 201330003 | Kansas | Neosho | CHANUTE | 37.68 | -95.48 | 61 | 61 | 55 | 55 | | |
| 201730010 | Kansas | Sedgwick | WICHITA HD | 37.70 | -97.31 | 63.7 | 65 | | | | |
| 201730018 | Kansas | Sedgwick | Sedgwick Ozone | 37.90 | -97.49 | 64 | 65 | | | | |
| 201770013 | Kansas | Shawnee | KNI | 39.02 | -95.71 | 62.3 | 63 | 56 | 56 | 55 | 55 |
| 201910002 | Kansas | Sumner | PECK | 37.48 | -97.37 | 63.7 | 64 | | | | |
| 201950001 | Kansas | Trego | CEDAR BLUFF | 38.77 | -99.76 | 61.7 | 63 | | | | |
| 202090021 | Kansas | Wyandotte | JFK | 39.12 | -94.64 | 63 | 64 | 57 | 57 | 55 | 55 |
| 210130002 | Kentucky | Bell | MIDDLESBORO | 36.61 | -83.74 | 60.7 | 61 | 53 | 53 | | |
| 210150003 | Kentucky | Boone | EAST BEND | 38.92 | -84.85 | 63 | 64 | 57 | 57 | 57 | 57 |
| 210190017 | Kentucky | Boyd | ASHLAND PRIMARY (FIVCO) | 38.46 | -82.64 | 65 | 66 | 61 | 61 | 60 | 60 |
| 210290006 | Kentucky | Bullitt | SHEPHERDSVILLE | 37.99 | -85.71 | 65.7 | 66 | 60 | 60 | 59 | 59 |
| 210373002 | Kentucky | Campbell | NORTHERN KENTUCKY UNIVERSITY (NKU) | 39.02 | -84.47 | 68.7 | 70 | 61 | 61 | 61 | 61 |
| 210430500 | Kentucky | Carter | GRAYSON LAKE | 38.24 | -82.99 | 62 | 63 | 56 | 56 | 56 | 56 |
| 210470006 | Kentucky | Christian | HOPKINSVILLE | 36.91 | -87.32 | 61 | 62 | 54 | 54 | | |
| 210590005 | Kentucky | Daviess | OWENSBORO PRIMARY | 37.78 | -87.08 | 65 | 65 | 56 | 56 | 56 | 56 |
| 210610501 | Kentucky | Edmonson | Mammoth Cave NP - Houchin Meadow | 37.13 | -86.14 | 63.7 | 64 | 55 | 55 | | |
| 210670012 | Kentucky | Fayette | LEXINGTON PRIMARY | 38.07 | -84.50 | 65.7 | 67 | 58 | 58 | 56 | 56 |
| 210890007 | Kentucky | Greenup | WORTHINGTON | 38.55 | -82.73 | 61.7 | 63 | 57 | 57 | 56 | 56 |
| 210910012 | Kentucky | Hancock | LEWISPORT | 37.94 | -86.90 | 67.5 | 68 | 59 | 59 | 58 | 58 |
| 210930006 | Kentucky | Hardin | ELIZABETHTOWN | 37.71 | -85.85 | 64.7 | 65 | 57 | 57 | 58 | 58 |
| 211010014 | Kentucky | Henderson | BASKETT | 37.87 | -87.46 | 68.3 | 69 | 61 | 61 | 61 | 61 |
| 211110027 | Kentucky | Jefferson | Bates | 38.14 | -85.58 | 69 | 69 | 61 | 61 | 61 | 61 |
| 211110051 | Kentucky | Jefferson | Watson Lane | 38.06 | -85.90 | 68.3 | 69 | 62 | 62 | 60 | 60 |
| 211110067 | Kentucky | Jefferson | CANNONS LANE | 38.23 | -85.65 | 74.3 | 75 | 66 | 66 | 64 | 64 |
| 211130001 | Kentucky | Jessamine | NICHOLASVILLE | 37.89 | -84.59 | 64 | 65 | 57 | 57 | 56 | 56 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 211390003 | Kentucky | Livingston | SMITHLAND | 37.16 | -88.39 | 65 | 66 | 58 | 58 | 58 | 58 |
| 211451024 | Kentucky | McCracken | JACKSON PURCHASE (PADUCAH PRIMARY) | 37.06 | -88.57 | 62.7 | 63 | 57 | 57 | 57 | 57 |
| 211759991 | Kentucky | Morgan | Crockett | 37.92 | -83.07 | 64 | 64 | 58 | 58 | | |
| 211850004 | Kentucky | Oldham | BUCKNER | 38.40 | -85.44 | 68.3 | 70 | 60 | 60 | 60 | 60 |
| 211930003 | Kentucky | Perry | HAZARD | 37.28 | -83.21 | 58 | 58 | 52 | 52 | | |
| 211950002 | Kentucky | Pike | PIKEVILLE PRIMARY | 37.48 | -82.54 | 59.3 | 60 | 54 | 54 | | |
| 211990003 | Kentucky | Pulaski | SOMERSET | 37.10 | -84.61 | 61 | 62 | 54 | 54 | | |
| 212130004 | Kentucky | Simpson | FRANKLIN | 36.71 | -86.57 | 63.7 | 64 | 56 | 56 | | |
| 212219991 | Kentucky | Trigg | Cadiz | 36.78 | -87.85 | 62 | 63 | 55 | 55 | | |
| 212270009 | Kentucky | Warren | ED SPEAR PARK (SMITHS GROVE) | 37.05 | -86.21 | 61.3 | 62 | 53 | 53 | | |
| 212299991 | Kentucky | Washington | Mackville | 37.70 | -85.05 | 64 | 64 | 57 | 57 | 57 | 57 |
| 220050004 | Louisiana | Ascension | Dutchtown | 30.23 | -90.97 | 70 | 71 | 64 | 64 | 64 | 64 |
| 220150008 | Louisiana | Bossier | Shreveport / Airport | 32.54 | -93.75 | 65.3 | 66 | 58 | 58 | 57 | 57 |
| 220170001 | Louisiana | Caddo | Dixie | 32.68 | -93.86 | 63.3 | 64 | 57 | 57 | | |
| 220190002 | Louisiana | Calcasieu | Carlyss | 30.14 | -93.37 | 66.3 | 68 | 62 | 62 | 62 | 62 |
| 220190009 | Louisiana | Calcasieu | Vinton | 30.23 | -93.58 | 64 | 64 | 59 | 59 | | |
| 220330003 | Louisiana | East Baton Rouge | LSU | 30.42 | -91.18 | 71 | 72 | 65 | 65 | 65 | 65 |
| 220330009 | Louisiana | East Baton Rouge | Capitol | 30.46 | -91.18 | 67.3 | 69 | 61 | 61 | 60 | 60 |
| 220470009 | Louisiana | Iberville | Bayou Plaquemine | 30.22 | -91.32 | 66 | 66 | 61 | 61 | 60 | 60 |
| 220511001 | Louisiana | Jefferson | Kenner | 30.04 | -90.27 | 66.7 | 68 | 60 | 62 | 61 | 61 |
| 220550007 | Louisiana | Lafayette | Lafayette / USGS | 30.23 | -92.04 | 65 | 66 | 59 | 59 | | |
| 220570004 | Louisiana | Lafourche | Thibodaux | 29.76 | -90.77 | 63.7 | 65 | 59 | 59 | 58 | 58 |
| 220630002 | Louisiana | Livingston | French Settlement | 30.32 | -90.81 | 68 | 70 | 62 | 62 | 61 | 61 |
| 220730004 | Louisiana | Ouachita | Monroe / Airport | 32.51 | -92.05 | 59 | 59 | 54 | 54 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 220770001 | Louisiana | Pointe Coupee | New Roads | 30.68 | -91.37 | 67 | 68 | 62 | 62 | 62 | 62 |
| 220870004 | Louisiana | St. Bernard | Meraux | 29.94 | -89.92 | 65.3 | 66 | 59 | 59 | 59 | 59 |
| 220930002 | Louisiana | St. James | Convent | 29.99 | -90.82 | 63.3 | 65 | 58 | 58 | 58 | 58 |
| 220950002 | Louisiana | St. John the Baptist | Garyville | 30.06 | -90.62 | 65 | 66 | 60 | 60 | 59 | 59 |
| 220990001 | Louisiana | St. Martin | St.Martinville | 30.09 | -91.87 | 65 | 65 | 59 | 59 | | |
| 221030002 | Louisiana | St. Tammany | Madisonville | 30.43 | -90.20 | 66 | 68 | 58 | 59 | 57 | |
| 221210001 | Louisiana | West Baton Rouge | Port Allen | 30.50 | -91.21 | 67 | 68 | 61 | 61 | 60 | 60 |
| 260050003 | Michigan | Allegan | Holland | 42.77 | -86.15 | 73.7 | 75 | 67 | 67 | 68 | 67 |
| 260190003 | Michigan | Benzie | | 44.62 | -86.11 | 68.3 | 69 | 62 | 62 | 62 | 61 |
| 260210014 | Michigan | Berrien | Coloma | 42.20 | -86.31 | 73.3 | 74 | 67 | 67 | 68 | 66 |
| 260270003 | Michigan | Cass | Cassopolis | 41.90 | -86.00 | 72 | 74 | 64 | 64 | 64 | 64 |
| 260330901 | Michigan | Chippewa | NORTH OF EASTERDAY AVENUE | 46.49 | -84.36 | 58 | 59 | | | 52 | |
| 260370001 | Michigan | Clinton | ROSE LAKE: STOLL RD.(8562 E.) | 42.80 | -84.39 | 67 | 67 | 59 | 59 | 57 | 57 |
| 260490021 | Michigan | Genesee | | 43.05 | -83.67 | 67.7 | 68 | 61 | 61 | 59 | 59 |
| 260492001 | Michigan | Genesee | Otisville | 43.17 | -83.46 | 68 | 69 | 60 | 60 | 59 | 59 |
| 260630007 | Michigan | Huron | RURAL THUMB AREA OZONE SITE | 43.84 | -82.64 | 67.7 | 68 | 62 | | 63 | |
| 260650012 | Michigan | Ingham | | 42.74 | -84.53 | 67 | 67 | 59 | 59 | 57 | 57 |
| 260770008 | Michigan | Kalamazoo | KALAMAZOO FAIRGROUNDS | 42.28 | -85.54 | 69.7 | 71 | 62 | 62 | 61 | 61 |
| 260810020 | Michigan | Kent | GR-Monroe | 42.98 | -85.67 | 69 | 70 | 62 | 62 | 62 | 62 |
| 260810022 | Michigan | Kent | APPROXIMATELY 1/4 MILE SOUTH OF 14 MILE RD | 43.18 | -85.42 | 67.3 | 68 | 60 | 60 | | |
| 260910007 | Michigan | Lenawee | 6792 RAISIN CENTER HWY: LENAWEE CO.RD.COMM.OWNER: TECUMSEH | 42.00 | -83.95 | 67 | 68 | 60 | 60 | 59 | 59 |

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| 260990009 | Michigan | Macomb | New Haven | 42.73 | -82.79 | 71.7 | 72 | 64 | 64 | 64 | 63 |
| 260991003 | Michigan | Macomb | | 42.51 | -83.01 | 67.3 | 69 | 60 | 60 | 59 | 59 |
| 261010922 | Michigan | Manistee | | 44.31 | -86.24 | 67 | 68 | 60 | 60 | 60 | 60 |
| 261050007 | Michigan | Mason | LOCATED 550 FT NORTH OF US10 | 43.95 | -86.29 | 68.7 | 70 | 62 | 62 | 61 | 61 |
| 261130001 | Michigan | Missaukee | LOCATED ABOUT 1/4 MILE WEST OF SITE | 44.31 | -84.89 | 66.7 | 67 | | | | |
| 261210039 | Michigan | Muskegon | | 43.28 | -86.31 | 75 | 76 | 68 | 68 | 68 | 68 |
| 261250001 | Michigan | Oakland | Oak Park | 42.46 | -83.18 | 70.7 | 73 | 64 | 64 | 61 | 61 |
| 261390005 | Michigan | Ottawa | Jenison | 42.89 | -85.85 | 69.3 | 70 | 63 | 63 | 63 | 63 |
| 261470005 | Michigan | St. Clair | Port Huron | 42.95 | -82.46 | 72 | 73 | 66 | 65 | 66 | 65 |
| 261530001 | Michigan | Schoolcraft | Seney | 46.29 | -85.95 | 67 | 70 | | | | |
| 261579991 | Michigan | Tuscola | Unionville | 43.61 | -83.36 | 65.7 | 66 | 59 | | 59 | |
| 261610008 | Michigan | Washtenaw | TOWNER ST: SOUTH; 2 LANE RESIDENIAL - HOSPITAL | 42.24 | -83.60 | 67.7 | 69 | 61 | 61 | 60 | 60 |
| 261619991 | Michigan | Washtenaw | Ann Arbor | 42.42 | -83.90 | 69.3 | 71 | 62 | 62 | 60 | 60 |
| 261630001 | Michigan | Wayne | Allen Park | 42.23 | -83.21 | 66.3 | 68 | 60 | 60 | 59 | 59 |
| 261630019 | Michigan | Wayne | East 7 Mile | 42.43 | -83.00 | 73 | 74 | 64 | 64 | 63 | 63 |
| 261659991 | Michigan | Wexford | Hoxeyville | 44.18 | -85.74 | 66.7 | 67 | 60 | 60 | | |
| 270031001 | Minnesota | Anoka | Cedar Creek | 45.40 | -93.20 | 60 | 61 | 54 | 54 | 54 | 54 |
| 270031002 | Minnesota | Anoka | Anoka County Airport | 45.14 | -93.21 | 62.7 | 63 | 59 | 59 | 59 | 59 |
| 270052013 | Minnesota | Becker | FWS Wetland Management District | 46.85 | -95.85 | 58.7 | 59 | | | | |
| 270177417 | Minnesota | Carlton | Fond du Lac Band | 46.71 | -92.51 | 59 | 59 | | | | |
| 270353204 | Minnesota | Crow Wing | Brainerd Lakes Regional Airport | 46.40 | -94.13 | 59 | 59 | | | | |
| 270495302 | Minnesota | Goodhue | Stanton Air Field | 44.47 | -93.01 | 60.7 | 61 | | | | |
| 270530962 | Minnesota | Hennepin | Near Road I-35/I-94 | 44.97 | -93.25 | 55.7 | 56 | 52 | 52 | 52 | 52 |
| 270750005 | Minnesota | Lake | Boundary Waters | 47.95 | -91.50 | 55.7 | 56 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 270834210 | Minnesota | Lyon | Southwest Minnesota Regional Airport | 44.44 | -95.82 | 59.3 | 60 | | | | |
| 270953051 | Minnesota | Mille Lacs | Mille Lacs Band | 46.21 | -93.76 | 60 | 60 | 53 | | 52 | |
| 271095008 | Minnesota | Olmsted | Ben Franklin School | 44.00 | -92.45 | 60.7 | 61 | | | | |
| 271370034 | Minnesota | Saint Louis | Voyageurs NP - Sullivan Bay | 48.41 | -92.83 | 54.7 | 55 | | | | |
| 271377550 | Minnesota | Saint Louis | U of M - Duluth | 46.82 | -92.09 | 53 | 53 | | | 47 | |
| 271390505 | Minnesota | Scott | B.F. Pearson School | 44.79 | -93.51 | 61.3 | 63 | 57 | 57 | 56 | 56 |
| 271453052 | Minnesota | Stearns | Talahi School | 45.55 | -94.13 | 60 | 61 | | | | |
| 271636016 | Minnesota | Washington | St. Croix Watershed Research Station | 45.17 | -92.77 | 60 | 61 | 54 | 54 | 54 | 54 |
| 271713201 | Minnesota | Wright | St. Michael Elementary School | 45.21 | -93.67 | 61.3 | 63 | | | | |
| 280110001 | Mississippi | Bolivar | Cleveland | 33.75 | -90.72 | 62 | 62 | | | | |
| 280330002 | Mississippi | DeSoto | Hernando | 34.82 | -89.99 | 63.7 | 65 | 55 | 55 | 55 | 55 |
| 280450003 | Mississippi | Hancock | Waveland | 30.30 | -89.40 | 61.7 | 63 | 53 | 53 | 52 | 52 |
| 280470008 | Mississippi | Harrison | Gulfport Youth Court | 30.39 | -89.05 | 65.3 | 67 | 56 | 57 | 55 | 54 |
| 280490020 | Mississippi | Hinds | Jackson NCORE | 32.33 | -90.18 | 60.3 | 61 | 49 | 49 | | |
| 280490021 | Mississippi | Hinds | Hinds CC | 32.35 | -90.23 | 62 | 63 | 50 | 50 | | |
| 280590006 | Mississippi | Jackson | Pascagoula | 30.38 | -88.53 | 64.7 | 67 | 57 | 57 | 56 | |
| 280750003 | Mississippi | Lauderdale | Meridian | 32.36 | -88.73 | 57 | 58 | 50 | 50 | | |
| 280810005 | Mississippi | Lee | TUPELO AIRPORT NEAR OLD NWS OFFICE | 34.26 | -88.77 | 58.3 | 59 | | | | |
| 281619991 | Mississippi | Yalobusha | Coffeeville | 34.00 | -89.80 | 55.7 | 57 | | | | |
| 290030001 | Missouri | Andrew | Savannah | 39.95 | -94.85 | 62.7 | 63 | 56 | 56 | | |
| 290190011 | Missouri | Boone | Finger Lakes | 39.08 | -92.32 | 63.3 | 64 | 55 | 55 | | |
| 290270002 | Missouri | Callaway | New Bloomfield | 38.71 | -92.09 | 62.7 | 64 | 55 | 55 | | |
| 290370003 | Missouri | Cass | Richard Gebaur-South | 38.76 | -94.58 | 63 | 63 | 57 | 57 | 56 | 56 |
| 290390001 | Missouri | Cedar | El Dorado Springs | 37.69 | -94.04 | 60.7 | 61 | | | | |
| 290470003 | Missouri | Clay | Watkins Mill State Park | 39.41 | -94.27 | 66.7 | 69 | 59 | 59 | 59 | 59 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 290470005 | Missouri | Clay | Liberty | 39.30 | -94.38 | 66 | 69 | 59 | 59 | 59 | 59 |
| 290470006 | Missouri | Clay | Rocky Creek | 39.33 | -94.58 | 68.7 | 70 | 62 | 62 | 62 | 62 |
| 290490001 | Missouri | Clinton | Trimble | 39.53 | -94.56 | 67.3 | 68 | 60 | 60 | 59 | 59 |
| 290770036 | Missouri | Greene | Hillcrest High School | 37.26 | -93.30 | 60 | 61 | 52 | 52 | | |
| 290770042 | Missouri | Greene | Fellows Lake | 37.32 | -93.20 | 60.3 | 61 | 53 | 53 | | |
| 290970004 | Missouri | Jasper | Alba | 37.24 | -94.42 | 60.7 | 61 | 53 | 53 | | |
| 290990019 | Missouri | Jefferson | Arnold West | 38.45 | -90.40 | 69 | 70 | 60 | 60 | 59 | 59 |
| 291130003 | Missouri | Lincoln | Foley | 39.05 | -90.87 | 65 | 65 | 57 | 57 | 57 | 57 |
| 291370001 | Missouri | Monroe | MTSP | 39.47 | -91.79 | 59.3 | 60 | | | | |
| 291570001 | Missouri | Perry | | 37.70 | -89.70 | 67 | 67 | 59 | 59 | | |
| 291831002 | Missouri | Saint Charles | West Alton | 38.87 | -90.23 | 72.7 | 74 | 65 | 65 | 64 | 64 |
| 291831004 | Missouri | Saint Charles | Orchard Farm | 38.90 | -90.45 | 71 | 72 | 63 | 63 | 62 | 62 |
| 291860005 | Missouri | Sainte Genevieve | Bonne Terre | 37.90 | -90.42 | 65.3 | 66 | 59 | 59 | 60 | 60 |
| 291890005 | Missouri | Saint Louis | Pacific | 38.49 | -90.71 | 65 | 66 | 57 | 57 | 57 | 57 |
| 291890014 | Missouri | Saint Louis | Maryland Heights | 38.71 | -90.48 | 70 | 71 | 62 | 62 | 61 | 61 |
| 292130004 | Missouri | Taney | Branson | 36.71 | -93.22 | 57 | 57 | 50 | 50 | | |
| 295100085 | Missouri | St. Louis City | Blair Street | 38.66 | -90.20 | 67.3 | 71 | 60 | 60 | 59 | 59 |
| 300710010 | Montana | Phillips | Malta | 48.32 | -107.86 | 55.3 | 56 | | | | |
| 300750001 | Montana | Powder River | BROADUS | 45.44 | -105.37 | 58.5 | 60 | | | | |
| 300830001 | Montana | Richland | Sidney Oil Field | 47.80 | -104.49 | 55 | 55 | | | | |
| 300870001 | Montana | Rosebud | Birney - Tongue river | 45.37 | -106.49 | 57 | 58 | | | | |
| 310550019 | Nebraska | Douglas | 4102 Woolworth Ave. on Healthcenter Warehouse | 41.25 | -95.97 | 62.7 | 64 | 59 | 59 | 58 | 58 |
| 310550028 | Nebraska | Douglas | | 41.21 | -95.95 | 60 | 62 | 57 | 57 | 56 | 56 |
| 310550053 | Nebraska | Douglas | Whitmore | 41.32 | -95.94 | 63.5 | 64 | 60 | 60 | 59 | 59 |
| 311079991 | Nebraska | Knox | Santee Sioux | 42.83 | -97.85 | 64 | 65 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 311090016 | Nebraska | Lancaster | | 40.98 | -96.68 | 60 | 60 | | | | |
| 350010023 | New Mexico | Bernalillo | DEL NORTE HIGH SCHOOL | 35.13 | -106.59 | 67.3 | 70 | 63 | 63 | 62 | 62 |
| 350010029 | New Mexico | Bernalillo | SOUTH VALLEY | 35.02 | -106.66 | 65.3 | 66 | 61 | 61 | 60 | 60 |
| 350011012 | New Mexico | Bernalillo | Foothills | 35.19 | -106.51 | 66.7 | 69 | 63 | 63 | 62 | 62 |
| 350130008 | New Mexico | Dona Ana | 6O La Union | 31.93 | -106.63 | 67.3 | 68 | 64 | 64 | 63 | 63 |
| 350130020 | New Mexico | Dona Ana | 6ZK Chaparral | 32.04 | -106.41 | 68.3 | 71 | 65 | 65 | 64 | 64 |
| 350130021 | New Mexico | Dona Ana | 6ZM Desert View | 31.80 | -106.58 | 72.7 | 74 | 69 | 69 | 69 | 69 |
| 350130022 | New Mexico | Dona Ana | 6ZN Santa Teresa | 31.79 | -106.68 | 71.3 | 74 | | | | |
| 350130023 | New Mexico | Dona Ana | 6ZQ Solano | 32.32 | -106.77 | 66 | 67 | | | | |
| 350151005 | New Mexico | Eddy | 5ZR ON BLM LAND BORDERING RESIDENTIAL AREA OUTSIDE CARLSBAD CITY LIM | 32.38 | -104.26 | 69.7 | 74 | | | | |
| 350153001 | New Mexico | Eddy | Carlsbad Caverns NP - Maintenance Area | 32.18 | -104.44 | 71 | 71 | | | | |
| 350250008 | New Mexico | Lea | 5ZS Hobbs Jefferson | 32.73 | -103.12 | 67.7 | 70 | | | | |
| 350390026 | New Mexico | Rio Arriba | 3CRD Coyote Ranger District | 36.19 | -106.70 | 65.3 | 67 | 61 | 61 | 61 | 61 |
| 350431001 | New Mexico | Sandoval | | 35.30 | -106.55 | 65.7 | 68 | 61 | 61 | 61 | 61 |
| 350490021 | New Mexico | Santa Fe | | 35.62 | -106.08 | 64 | 66 | 60 | 60 | | |
| 350610008 | New Mexico | Valencia | | 34.81 | -106.74 | 65.3 | 67 | 61 | 61 | 60 | 60 |
| 370030005 | North Carolina | Alexander | Taylorsville Liledoun | 35.91 | -81.19 | 64.3 | 65 | 52 | 52 | 51 | 51 |
| 370110002 | North Carolina | Avery | Linville Falls | 35.97 | -81.93 | 61.7 | 62 | 53 | 53 | | |
| 370119991 | North Carolina | Avery | Cranberry | 36.11 | -82.05 | 64 | 64 | 56 | 56 | | |
| 370210030 | North Carolina | Buncombe | Bent Creek | 35.50 | -82.60 | 62 | 63 | 54 | 54 | | |
| 370270003 | North Carolina | Caldwell | Lenoir (city) | 35.94 | -81.53 | 64 | 64 | 53 | 53 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 370330001 | North Carolina | Caswell | Cherry Grove | 36.31 | -79.47 | 62 | 63 | 52 | 52 | | |
| 370510008 | North Carolina | Cumberland | Wade | 35.16 | -78.73 | 62 | 63 | 54 | 54 | | |
| 370510010 | North Carolina | Cumberland | Honeycutt School | 35.00 | -78.99 | 63.3 | 64 | 55 | 55 | | |
| 370630015 | North Carolina | Durham | Durham Armory | 36.03 | -78.90 | 61.7 | 62 | 52 | 52 | 51 | 51 |
| 370650099 | North Carolina | Edgecombe | Leggett | 35.99 | -77.58 | 62 | 62 | 52 | 52 | | |
| 370670022 | North Carolina | Forsyth | Hattie Avenue | 36.11 | -80.23 | 66.7 | 67 | 56 | 56 | 54 | 54 |
| 370670030 | North Carolina | Forsyth | Clemmons Middle | 36.03 | -80.34 | 67.3 | 68 | 56 | 56 | 55 | 55 |
| 370671008 | North Carolina | Forsyth | Union Cross | 36.05 | -80.14 | 66.3 | 67 | 56 | 56 | 54 | 54 |
| 370750001 | North Carolina | Graham | Joanna Bald | 35.26 | -83.80 | 63.5 | 64 | 55 | 55 | | |
| 370770001 | North Carolina | Granville | Butner | 36.14 | -78.77 | 64.3 | 65 | 54 | 54 | | |
| 370810013 | North Carolina | Guilford | Mendenhall School | 36.11 | -79.80 | 65.3 | 66 | 55 | 55 | 52 | 52 |
| 370870008 | North Carolina | Haywood | Waynesville School | 35.51 | -82.96 | 61.3 | 62 | 54 | 54 | | |
| 370870035 | North Carolina | Haywood | Frying Pan Mountain | 35.38 | -82.79 | 64.3 | 66 | 56 | 56 | | |
| 370870036 | North Carolina | Haywood | Purchase Knob | 35.59 | -83.07 | 64.3 | 65 | 56 | 56 | | |
| 371010002 | North Carolina | Johnston | West Johnston Co. | 35.59 | -78.46 | 63.7 | 65 | 54 | 54 | 53 | 53 |
| 371050002 | North Carolina | Lee | Blackstone | 35.43 | -79.29 | 61.5 | 62 | 53 | 53 | | |
| 371070004 | North Carolina | Lenoir | Lenoir Co. Comm. Coll. | 35.23 | -77.57 | 62.7 | 63 | | | | |
| 371090004 | North Carolina | Lincoln | Crouse | 35.44 | -81.28 | 66.3 | 67 | 55 | 55 | 53 | 53 |
| 371139991 | North Carolina | Macon | Coweeta | 35.06 | -83.43 | 61.3 | 62 | 52 | 52 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 371170001 | North Carolina | Martin | Jamesville School | 35.81 | -76.91 | 60 | 60 | | | | |
| 371190041 | North Carolina | Mecklenburg | Garinger High School | 35.24 | -80.79 | 68.7 | 69 | 59 | 59 | 57 | 57 |
| 371190046 | North Carolina | Mecklenburg | University Meadows | 35.31 | -80.71 | 70 | 70 | 59 | 59 | 57 | 57 |
| 371239991 | North Carolina | Montgomery | Candor | 35.26 | -79.84 | 61 | 61 | 51 | 51 | | |
| 371290002 | North Carolina | New Hanover | Castle Hayne | 34.36 | -77.84 | 59 | 60 | 51 | | | |
| 371450003 | North Carolina | Person | Bushy Fork | 36.31 | -79.09 | 62 | 63 | 51 | 51 | 49 | 49 |
| 371470006 | North Carolina | Pitt | Pitt Agri. Center | 35.64 | -77.36 | 62.7 | 64 | 54 | 54 | | |
| 371570099 | North Carolina | Rockingham | Bethany sch. | 36.31 | -79.86 | 65.3 | 66 | 54 | 54 | 51 | 51 |
| 371590021 | North Carolina | Rowan | Rockwell | 35.55 | -80.40 | 63.7 | 65 | 53 | 53 | 51 | 51 |
| 371730002 | North Carolina | Swain | Bryson City | 35.43 | -83.44 | 60 | 60 | 52 | 52 | | |
| 371730007 | North Carolina | Swain | | 35.50 | -83.31 | 59 | 61 | 51 | 51 | | |
| 371790003 | North Carolina | Union | Monroe School | 34.97 | -80.54 | 67.7 | 68 | 59 | 59 | 58 | 58 |
| 371830014 | North Carolina | Wake | Millbrook School | 35.86 | -78.57 | 65.7 | 66 | 56 | 56 | 54 | 54 |
| 371990004 | North Carolina | Yancey | Mt. Mitchell | 35.77 | -82.26 | 65 | 65 | 56 | 56 | | |
| 380070002 | North Dakota | Billings | PAINTED CANYON | 46.89 | -103.38 | 59 | 60 | | | | |
| 380130004 | North Dakota | Burke | LOSTWOOD NWR | 48.64 | -102.40 | 58.3 | 59 | | | | |
| 380171004 | North Dakota | Cass | FARGO NW | 46.93 | -96.86 | 58 | 59 | | | | |
| 380250003 | North Dakota | Dunn | DUNN CENTER | 47.31 | -102.53 | 58 | 58 | | | | |
| 380530002 | North Dakota | McKenzie | TRNP-NU | 47.58 | -103.30 | 57.7 | 58 | | | | |
| 380570004 | North Dakota | Mercer | BEULAH NORTH | 47.30 | -101.77 | 57 | 58 | | | | |
| 380650002 | North Dakota | Oliver | HANNOVER | 47.19 | -101.43 | 59.3 | 60 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 381050003 | North Dakota | Williams | Williston | 48.15 | -103.64 | 57 | 58 | | | | |
| 390030009 | Ohio | Allen | Lima | 40.77 | -84.05 | 67.7 | 70 | 61 | 61 | 60 | 60 |
| 390071001 | Ohio | Ashtabula | Conneaut | 41.96 | -80.57 | 70 | 70 | 64 | 63 | 64 | 62 |
| 390170004 | Ohio | Butler | HAMILTON | 39.38 | -84.54 | 72 | 72 | 65 | 65 | 63 | 63 |
| 390170018 | Ohio | Butler | Middletown Airport | 39.53 | -84.39 | 71.3 | 73 | 64 | 64 | 62 | 62 |
| 390179991 | Ohio | Butler | Oxford | 39.53 | -84.73 | 69.3 | 70 | 62 | 62 | 61 | 61 |
| 390230001 | Ohio | Clark | Springfield Well Fd | 40.00 | -83.80 | 69.3 | 70 | 62 | 62 | 60 | 60 |
| 390230003 | Ohio | Clark | Mud Run | 39.86 | -84.00 | 68.3 | 69 | 61 | 61 | 59 | 59 |
| 390250022 | Ohio | Clermont | Batavia | 39.08 | -84.14 | 70 | 70 | 62 | 62 | 61 | 61 |
| 390271002 | Ohio | Clinton | Wilmington | 39.43 | -83.79 | 69.7 | 70 | 62 | 62 | 61 | 61 |
| 390350034 | Ohio | Cuyahoga | District 6 | 41.56 | -81.58 | 69 | 70 | 63 | 63 | 66 | 64 |
| 390350060 | Ohio | Cuyahoga | GT Craig NCore | 41.49 | -81.68 | 62.7 | 64 | 57 | 56 | 60 | 56 |
| 390350064 | Ohio | Cuyahoga | Berea BOE | 41.36 | -81.86 | 65.3 | 66 | 59 | 59 | 59 | 59 |
| 390355002 | Ohio | Cuyahoga | Mayfield | 41.54 | -81.46 | 69.3 | 71 | 63 | 62 | 64 | 61 |
| 390410002 | Ohio | Delaware | Delaware | 40.36 | -83.06 | 65.3 | 67 | 57 | 57 | 56 | 56 |
| 390479991 | Ohio | Fayette | Deer Creek | 39.64 | -83.26 | 66.7 | 68 | 60 | 60 | 58 | 58 |
| 390490029 | Ohio | Franklin | New Albany | 40.08 | -82.82 | 70.3 | 71 | 63 | 63 | 61 | 61 |
| 390490037 | Ohio | Franklin | FRANKLIN_PK | 39.97 | -82.96 | 65.5 | 66 | 59 | 59 | 56 | 56 |
| 390490081 | Ohio | Franklin | Maple Canyon | 40.09 | -82.96 | 66.3 | 67 | 59 | 59 | 57 | 57 |
| 390550004 | Ohio | Geauga | Notre Dame | 41.52 | -81.25 | 71.3 | 72 | 63 | 63 | 63 | 63 |
| 390570006 | Ohio | Greene | Xenia | 39.67 | -83.94 | 67.3 | 68 | 60 | 60 | 59 | 59 |
| 390610006 | Ohio | Hamilton | Sycamore | 39.28 | -84.37 | 73.3 | 75 | 66 | 66 | 65 | 65 |
| 390610010 | Ohio | Hamilton | Colerain | 39.21 | -84.69 | 71.3 | 72 | 64 | 64 | 63 | 63 |
| 390610040 | Ohio | Hamilton | Taft NCore | 39.13 | -84.50 | 71.3 | 72 | 64 | 64 | 63 | 63 |
| 390810017 | Ohio | Jefferson | Stuebenville | 40.37 | -80.62 | 63 | 65 | 56 | 56 | 55 | 55 |
| 390830002 | Ohio | Knox | CENTERBURG | 40.31 | -82.69 | 66.5 | 67 | 58 | 58 | 56 | 56 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 390850003 | Ohio | Lake | Eastlake | 41.67 | -81.42 | 73.7 | 74 | 67 | 67 | 68 | 69 |
| 390850007 | Ohio | Lake | Painesville | 41.73 | -81.24 | 69 | 70 | 63 | 63 | 63 | 64 |
| 390870011 | Ohio | Lawrence | Wilgus | 38.63 | -82.46 | 63.7 | 64 | 58 | 58 | 59 | 59 |
| 390870012 | Ohio | Lawrence | ODOT Ironton | 38.51 | -82.66 | 66 | 67 | 61 | 61 | 60 | 60 |
| 390890005 | Ohio | Licking | Heath | 40.03 | -82.43 | 65.7 | 67 | 57 | 57 | 56 | 56 |
| 390930018 | Ohio | Lorain | Sheffield | 41.42 | -82.10 | 65.7 | 67 | 60 | 60 | 58 | 58 |
| 390950024 | Ohio | Lucas | Erie | 41.64 | -83.55 | 67.5 | 69 | 60 | 61 | 59 | 60 |
| 390950027 | Ohio | Lucas | Waterville | 41.49 | -83.72 | 64.7 | 66 | 59 | 59 | 58 | 58 |
| 390970007 | Ohio | Madison | London | 39.79 | -83.48 | 67.3 | 68 | 60 | 60 | 59 | 59 |
| 390990013 | Ohio | Mahoning | Oakhill | 41.10 | -80.66 | 59.7 | 63 | 52 | 52 | 51 | 51 |
| 391030004 | Ohio | Medina | Chippewa | 41.06 | -81.92 | 64.3 | 65 | 58 | 58 | 56 | 56 |
| 391090005 | Ohio | Miami | Miami East HS | 40.09 | -84.11 | 67.7 | 68 | 60 | 60 | 59 | 59 |
| 391130037 | Ohio | Montgomery | Eastwood | 39.79 | -84.13 | 70.3 | 71 | 63 | 63 | 61 | 61 |
| 391219991 | Ohio | Noble | Quaker City | 39.94 | -81.34 | 64.7 | 66 | 58 | 58 | | |
| 391331001 | Ohio | Portage | Lake Rockwell | 41.18 | -81.33 | 62 | 63 | 55 | 55 | 54 | 54 |
| 391351001 | Ohio | Preble | Preble NCore | 39.84 | -84.72 | 67 | 67 | 60 | 60 | 60 | 60 |
| 391510016 | Ohio | Stark | Malone Univ | 40.83 | -81.38 | 68.3 | 69 | 60 | 60 | 59 | 59 |
| 391510022 | Ohio | Stark | Brewster | 40.71 | -81.60 | 65 | 66 | 57 | 57 | 56 | 56 |
| 391514005 | Ohio | Stark | Alliance | 40.93 | -81.12 | 68.3 | 70 | 60 | 60 | 59 | 59 |
| 391530020 | Ohio | Summit | Patterson Park | 41.11 | -81.50 | 63.3 | 65 | 56 | 56 | 55 | 55 |
| 391550011 | Ohio | Trumbull | TCSE | 41.24 | -80.66 | 68.3 | 69 | 60 | 60 | 58 | 58 |
| 391550013 | Ohio | Trumbull | Kinsman Maintenance | 41.45 | -80.59 | 66 | 66 | 58 | 58 | 57 | 57 |
| 391650007 | Ohio | Warren | Lebanon | 39.43 | -84.20 | 71.7 | 72 | 64 | 64 | 62 | 62 |
| 391670004 | Ohio | Washington | Marietta WTP | 39.43 | -81.46 | 64.3 | 65 | 58 | 58 | 58 | 58 |
| 391730003 | Ohio | Wood | Bowling Green | 41.38 | -83.61 | 64.3 | 66 | 58 | 58 | 58 | 58 |
| 400019009 | Oklahoma | Adair | STILWELL | 35.75 | -94.67 | 59.7 | 61 | 53 | 53 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 400170101 | Oklahoma | Canadian | OKC WEST-(YUKON) | 35.48 | -97.75 | 66.3 | 69 | 59 | 59 | 57 | 57 |
| 400219002 | Oklahoma | Cherokee | TAHLEQUAH SHELTER | 35.85 | -94.99 | 59.5 | 60 | 54 | 54 | | |
| 400270049 | Oklahoma | Cleveland | MOORE WATER TOWER | 35.32 | -97.48 | 66.7 | 68 | 60 | 60 | 59 | 59 |
| 400310651 | Oklahoma | Comanche | LAWTON NORTH | 34.63 | -98.43 | 65 | 66 | | | | |
| 400370144 | Oklahoma | Creek | MANNFORD | 36.11 | -96.36 | 64 | 65 | 57 | 57 | 56 | 56 |
| 400430860 | Oklahoma | Dewey | SEILING MUNICIPAL AIRPORT | 36.16 | -98.93 | 66 | 68 | | | | |
| 400719010 | Oklahoma | Kay | NEWKIRK IMPROVE | 36.96 | -97.03 | 62 | 63 | 56 | 56 | | |
| 400871073 | Oklahoma | McClain | GOLDSBY | 35.16 | -97.47 | 66.3 | 67 | 60 | 60 | 58 | 58 |
| 400979014 | Oklahoma | Mayes | CHEROKEE HEIGHTS | 36.23 | -95.25 | 62 | 62 | 55 | 55 | 54 | 54 |
| 401090033 | Oklahoma | Oklahoma | OKC CENTRAL-OSDH | 35.48 | -97.49 | 67.3 | 68 | 61 | 61 | 59 | 59 |
| 401090096 | Oklahoma | Oklahoma | CHOCTAW | 35.48 | -97.30 | 66.3 | 67 | 60 | 60 | 58 | 58 |
| 401091037 | Oklahoma | Oklahoma | OKC NORTH | 35.61 | -97.48 | 69 | 70 | 62 | 62 | 60 | 60 |
| 401159004 | Oklahoma | Ottawa | QUAPAW SHELTER | 36.92 | -94.84 | 55.7 | 57 | 49 | 49 | | |
| 401210415 | Oklahoma | Pittsburg | McALESTER MUNICIPAL AIRPORT | 34.89 | -95.78 | 61 | 63 | 56 | 56 | | |
| 401359021 | Oklahoma | Sequoyah | | 35.41 | -94.52 | 59.3 | 60 | 52 | 52 | | |
| 401430174 | Oklahoma | Tulsa | TULSA SOUTH | 35.95 | -96.00 | 65 | 65 | 59 | 59 | 58 | 58 |
| 401430178 | Oklahoma | Tulsa | TULSA EAST | 36.13 | -95.76 | 64 | 65 | 58 | 58 | 58 | 58 |
| 401431127 | Oklahoma | Tulsa | NORTH TULSA - FIRE STATION#24 | 36.20 | -95.98 | 65 | 65 | 59 | 59 | 59 | 59 |
| 450010001 | South Carolina | Abbeville | DUE WEST | 34.33 | -82.39 | 58 | 58 | 49 | 49 | | |
| 450030003 | South Carolina | Aiken | JACKSON MIDDLE SCHOOL | 33.34 | -81.79 | 60.3 | 62 | 52 | 52 | | |
| 450070005 | South Carolina | Anderson | Big Creek | 34.62 | -82.53 | 58.7 | 60 | 50 | 50 | 49 | 49 |
| 450150002 | South Carolina | Berkeley | BUSHY PARK PUMP STATION | 32.99 | -79.94 | 57.3 | 58 | 49 | 49 | | |
| 450190046 | South Carolina | Charleston | CAPE ROMAIN | 32.94 | -79.66 | 59 | 61 | 52 | 51 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 450250001 | South Carolina | Chesterfield | CHESTERFIELD | 34.62 | -80.20 | 60 | 60 | 52 | 52 | | |
| 450290002 | South Carolina | Colleton | ASHTON | 33.01 | -80.97 | 56.3 | 57 | | | | |
| 450310003 | South Carolina | Darlington | Pee Dee Experimental Station | 34.29 | -79.74 | 61 | 62 | 52 | 52 | | |
| 450370001 | South Carolina | Edgefield | TRENTON | 33.74 | -81.85 | 59.7 | 61 | 51 | 51 | | |
| 450450016 | South Carolina | Greenville | Hillcrest Middle School | 34.75 | -82.26 | 63.3 | 65 | 54 | 54 | 53 | 53 |
| 450730001 | South Carolina | Oconee | LONG CREEK | 34.81 | -83.24 | 63 | 63 | 54 | 54 | | |
| 450770002 | South Carolina | Pickens | CLEMSON CMS | 34.65 | -82.84 | 62.7 | 63 | 54 | 54 | 53 | 53 |
| 450770003 | South Carolina | Pickens | Wolf Creek | 34.85 | -82.74 | 61 | 62 | 52 | 52 | 51 | 51 |
| 450790007 | South Carolina | Richland | PARKLANE | 34.09 | -80.96 | 60 | 61 | 50 | 50 | 49 | 49 |
| 450790021 | South Carolina | Richland | CONGAREE BLUFF | 33.81 | -80.78 | 55 | 55 | 47 | 47 | | |
| 450791001 | South Carolina | Richland | SANDHILL EXPERIMENTAL STATION | 34.13 | -80.87 | 64.3 | 65 | 54 | 54 | 52 | 52 |
| 450830009 | South Carolina | Spartanburg | NORTH SPARTANBURG FIRE STATION #2 | 34.99 | -82.08 | 66 | 67 | 56 | 56 | 55 | 55 |
| 450910008 | South Carolina | York | YORK (LANDFILL) | 34.98 | -81.21 | 61.3 | 63 | 52 | 52 | 50 | 50 |
| 450918801 | South Carolina | York | | 34.91 | -80.87 | 64 | 64 | 55 | 55 | 54 | 54 |
| 460110003 | South Dakota | Brookings | Research Farm | 44.35 | -96.81 | 62 | 63 | | | | |
| 460330132 | South Dakota | Custer | Wind Cave NP - Visitor Center | 43.56 | -103.48 | 60.3 | 62 | | | | |
| 460710001 | South Dakota | Jackson | SOUTH OF BADLANDS NP HEADQUARTERS | 43.75 | -101.94 | 60.7 | 63 | | | | |
| 460930001 | South Dakota | Meade | BLACK HAWK ELEMENTARY SCHOOL GROUNDS | 44.16 | -103.32 | 53.3 | 57 | | | | |
| 460990008 | South Dakota | Minnehaha | SD School for the Deaf | 43.55 | -96.70 | 65 | 67 | | | | |
| 461270001 | South Dakota | Union | Union County #1 Jensen | 42.75 | -96.71 | 62.3 | 64 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 470010101 | Tennessee | Anderson | Freel's Bend O3 and SO2 monitoring | 35.96 | -84.22 | 63.7 | 64 | 55 | 55 | 53 | 53 |
| 470090101 | Tennessee | Blount | Great Smoky Mountains NP - Look Rock | 35.63 | -83.94 | 67 | 67 | 57 | 57 | 56 | 56 |
| 470090102 | Tennessee | Blount | Great Smoky Mountains NP - Cade's Cove | 35.60 | -83.78 | 61 | 62 | 52 | 52 | 51 | 51 |
| 470259991 | Tennessee | Claiborne | Speedwell | 36.47 | -83.83 | 62.7 | 63 | 54 | 54 | | |
| 470370011 | Tennessee | Davidson | East Health | 36.21 | -86.74 | 66 | 66 | 57 | 57 | 56 | 56 |
| 470370026 | Tennessee | Davidson | Percy Priest Dam | 36.15 | -86.62 | 66 | 67 | 56 | 56 | 55 | 55 |
| 470419991 | Tennessee | DeKalb | Edgar Evans | 36.04 | -85.73 | 61.3 | 62 | 53 | 53 | | |
| 470651011 | Tennessee | Hamilton | Soddy-Daisy High School | 35.23 | -85.18 | 64.7 | 65 | 55 | 55 | 54 | 54 |
| 470654003 | Tennessee | Hamilton | Eastside Utility | 35.10 | -85.16 | 67 | 68 | 56 | 56 | 55 | 55 |
| 470890002 | Tennessee | Jefferson | New Market ozone monitor | 36.11 | -83.60 | 67 | 68 | 58 | 58 | 57 | 57 |
| 470930021 | Tennessee | Knox | East Knox Elementary School | 36.09 | -83.76 | 64.3 | 65 | 55 | 55 | 54 | 54 |
| 470931020 | Tennessee | Knox | Spring Hill Elementary School | 36.02 | -83.87 | 66.7 | 67 | 57 | 57 | 56 | 56 |
| 471050109 | Tennessee | Loudon | Loudon Middle School ozone monitor | 35.72 | -84.34 | 68 | 69 | 59 | 59 | 59 | 59 |
| 471550101 | Tennessee | Sevier | Great Smoky Mountains NP - Cove Mountain | 35.70 | -83.61 | 67.3 | 68 | 58 | 58 | | |
| 471570021 | Tennessee | Shelby | Frayser Ozone Monitor | 35.22 | -90.02 | 66.7 | 67 | 59 | 59 | 58 | 58 |
| 471570075 | Tennessee | Shelby | Memphis NCORE site | 35.15 | -89.85 | 67.3 | 69 | 60 | 60 | 59 | 59 |
| 471571004 | Tennessee | Shelby | Edmund Orgill Park Ozone | 35.38 | -89.83 | 65.7 | 66 | 57 | 57 | 56 | 56 |
| 471632002 | Tennessee | Sullivan | Blountville Ozone Monitor | 36.54 | -82.42 | 66 | 66 | 60 | 60 | 59 | 59 |
| 471632003 | Tennessee | Sullivan | Kingsport ozone monitor | 36.58 | -82.49 | 64.7 | 65 | 58 | 58 | 58 | 58 |
| 471650007 | Tennessee | Sumner | Hendersonville Ozone Site at Old Hickory Dam | 36.30 | -86.65 | 66.3 | 67 | 56 | 56 | 55 | 55 |
| 471870106 | Tennessee | Williamson | FAIRVIEW MIDDLE SCHOOL ozone monitor | 35.95 | -87.14 | 60.3 | 61 | 51 | 51 | 51 | 51 |
| 471890103 | Tennessee | Wilson | Cedars of Lebanon Ozone Monitor | 36.06 | -86.29 | 63.5 | 64 | 53 | 53 | 53 | 53 |

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| 480271045 | Texas | Bell | Temple Georgia | 31.12 | -97.43 | 68 | 69 | 61 | 61 | | |
| 480271047 | Texas | Bell | Killeen Skylark Field | 31.09 | -97.68 | 67.3 | 68 | 60 | 60 | | |
| 480290032 | Texas | Bexar | San Antonio Northwest | 29.52 | -98.62 | 73 | 74 | 65 | 65 | 64 | 64 |
| 480290052 | Texas | Bexar | Camp Bullis | 29.63 | -98.56 | 72.3 | 73 | 65 | 65 | 64 | 64 |
| 480290059 | Texas | Bexar | Calaveras Lake | 29.28 | -98.31 | 65 | 66 | 58 | 58 | 57 | 57 |
| 480391004 | Texas | Brazoria | Manvel Croix Park | 29.52 | -95.39 | 74.7 | 77 | 70 | 70 | 67 | 67 |
| 480391016 | Texas | Brazoria | Lake Jackson | 29.04 | -95.47 | 65 | 66 | 59 | 59 | 57 | 57 |
| 480430101 | Texas | Brewster | Big Bend NP - K-Bar Ranch Road | 29.30 | -103.18 | 62.3 | 63 | | | | |
| 480610006 | Texas | Cameron | Brownsville | 25.89 | -97.49 | 56.5 | 57 | | | | |
| 480611023 | Texas | Cameron | Harlingen Teege | 26.20 | -97.71 | 57 | 57 | | | | |
| 480850005 | Texas | Collin | Frisco | 33.13 | -96.79 | 74.3 | 75 | 66 | 66 | 63 | 63 |
| 481130069 | Texas | Dallas | Dallas Hinton | 32.82 | -96.86 | 73 | 74 | 65 | 65 | 63 | 63 |
| 481130075 | Texas | Dallas | Dallas North #2 | 32.92 | -96.81 | 73.7 | 75 | 66 | 66 | 63 | 63 |
| 481130087 | Texas | Dallas | Dallas Redbird Airport Executive | 32.68 | -96.87 | 64.7 | 66 | 57 | 57 | 57 | 57 |
| 481210034 | Texas | Denton | Denton Airport South | 33.22 | -97.20 | 78 | 80 | 69 | 69 | 68 | 68 |
| 481211032 | Texas | Denton | Pilot Point | 33.41 | -96.94 | 74 | 76 | 66 | 66 | 64 | 64 |
| 481390016 | Texas | Ellis | Midlothian OFW | 32.48 | -97.03 | 64.3 | 65 | 57 | 57 | 56 | 56 |
| 481391044 | Texas | Ellis | Italy | 32.18 | -96.87 | 63.7 | 65 | 56 | 56 | | |
| 481410029 | Texas | El Paso | Ivanhoe | 31.79 | -106.32 | 63.7 | 66 | 62 | 62 | 61 | 61 |
| 481410037 | Texas | El Paso | El Paso UTEP | 31.77 | -106.50 | 71.3 | 73 | 69 | 69 | 68 | 68 |
| 481410044 | Texas | El Paso | El Paso Chamizal | 31.77 | -106.46 | 69 | 71 | 66 | 66 | 66 | 66 |
| 481410055 | Texas | El Paso | Ascarate Park SE | 31.75 | -106.40 | 66 | 69 | 63 | 63 | 63 | 63 |
| 481410057 | Texas | El Paso | Socorro Hueco | 31.67 | -106.29 | 65.3 | 66 | 63 | 63 | 63 | 63 |
| 481410058 | Texas | El Paso | Skyline Park | 31.89 | -106.43 | 70 | 72 | 67 | 67 | 66 | 66 |
| 481671034 | Texas | Galveston | Galveston 99th Street | 29.25 | -94.86 | 75.7 | 77 | 70 | 71 | 70 | 69 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 481830001 | Texas | Gregg | Longview | 32.38 | -94.71 | 65.3 | 66 | 59 | 59 | 59 | 59 |
| 482010024 | Texas | Harris | Houston Aldine | 29.90 | -95.33 | 79.3 | 81 | 75 | 75 | 72 | 72 |
| 482010026 | Texas | Harris | Channelview | 29.80 | -95.13 | 68.3 | 69 | 65 | 65 | 63 | 64 |
| 482010029 | Texas | Harris | Northwest Harris County | 30.04 | -95.67 | 71.3 | 73 | 64 | 64 | 62 | 62 |
| 482010046 | Texas | Harris | Houston North Wayside | 29.83 | -95.28 | 67 | 69 | 63 | 63 | 61 | 61 |
| 482010047 | Texas | Harris | Lang | 29.83 | -95.49 | 73.7 | 76 | 69 | 69 | 66 | 66 |
| 482010051 | Texas | Harris | Houston Croquet | 29.62 | -95.47 | 70 | 71 | 65 | 65 | 62 | 62 |
| 482010055 | Texas | Harris | Houston Bayland Park | 29.70 | -95.50 | 76 | 77 | 70 | 70 | 68 | 68 |
| 482010062 | Texas | Harris | Houston Monroe | 29.63 | -95.27 | 63 | 65 | 60 | 60 | 58 | 58 |
| 482010066 | Texas | Harris | Houston Westhollow | 29.72 | -95.64 | 75 | 76 | 68 | 68 | 66 | 66 |
| 482010416 | Texas | Harris | Park Place | 29.69 | -95.29 | 72.3 | 74 | 69 | 69 | 65 | 65 |
| 482011015 | Texas | Harris | Lynchburg Ferry | 29.76 | -95.08 | 65 | 65 | 61 | 61 | 60 | 60 |
| 482011017 | Texas | Harris | Baytown Garth | 29.82 | -94.98 | 71 | 73 | 66 | 66 | 67 | 67 |
| 482011034 | Texas | Harris | Houston East | 29.77 | -95.22 | 73.7 | 75 | 70 | 70 | 69 | 69 |
| 482011035 | Texas | Harris | Clinton | 29.73 | -95.26 | 71.3 | 75 | 68 | 68 | 66 | 66 |
| 482011039 | Texas | Harris | Houston Deer Park #2 | 29.67 | -95.13 | 68.7 | 71 | 65 | 65 | 64 | 64 |
| 482011050 | Texas | Harris | Seabrook Friendship Park | 29.58 | -95.02 | 70.7 | 71 | 66 | 66 | 65 | 65 |
| 482030002 | Texas | Harrison | Karnack | 32.67 | -94.17 | 61.3 | 62 | 55 | 55 | | |
| 482150043 | Texas | Hidalgo | Mission | 26.23 | -98.29 | 55 | 55 | 53 | 53 | 54 | 54 |
| 482210001 | Texas | Hood | Granbury | 32.44 | -97.80 | 67.3 | 69 | 59 | 59 | | |
| 482311006 | Texas | Hunt | Greenville | 33.15 | -96.12 | 62.3 | 65 | 54 | 54 | | |
| 482450009 | Texas | Jefferson | Beaumont Downtown | 30.04 | -94.07 | 64.7 | 65 | 59 | 59 | 59 | 59 |
| 482450011 | Texas | Jefferson | Port Arthur West | 29.90 | -93.99 | 66.7 | 67 | 62 | 61 | 64 | |
| 482450022 | Texas | Jefferson | Hamshire | 29.86 | -94.32 | 67 | 68 | 61 | 61 | | |
| 482450101 | Texas | Jefferson | SETRPC 40 Sabine Pass | 29.73 | -93.89 | 65.7 | 67 | 61 | 60 | 61 | |
| 482450102 | Texas | Jefferson | SETRPC 43 Jefferson Co Airport | 29.94 | -94.00 | 63 | 65 | 59 | 59 | 61 | 59 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 482451035 | Texas | Jefferson | Nederland High School | 29.98 | -94.01 | 66.7 | 68 | 62 | 62 | 64 | 62 |
| 482510003 | Texas | Johnson | Cleburne Airport | 32.35 | -97.44 | 73.7 | 76 | 66 | 66 | 64 | 64 |
| 482570005 | Texas | Kaufman | Kaufman | 32.56 | -96.32 | 61 | 61 | 54 | 54 | | |
| 483091037 | Texas | McLennan | Waco Mazanec | 31.65 | -97.07 | 63 | 63 | 55 | 55 | | |
| 483390078 | Texas | Montgomery | Conroe Relocated | 30.35 | -95.43 | 73.7 | 75 | 67 | 67 | 67 | 67 |
| 483491051 | Texas | Navarro | Corsicana Airport | 32.03 | -96.40 | 62.7 | 64 | 55 | 55 | | |
| 483550025 | Texas | Nueces | Corpus Christi West | 27.77 | -97.43 | 62.3 | 64 | 58 | 58 | | |
| 483550026 | Texas | Nueces | Corpus Christi Tuloso | 27.83 | -97.56 | 61.3 | 63 | 57 | 57 | | |
| 483611001 | Texas | Orange | West Orange | 30.09 | -93.76 | 61.7 | 64 | 57 | 57 | 61 | |
| 483670081 | Texas | Parker | Parker County | 32.87 | -97.91 | 70.7 | 73 | 62 | 62 | | |
| 483739991 | Texas | Polk | Alabama-Coushatta | 30.70 | -94.67 | 60.3 | 61 | 56 | 56 | | |
| 483819991 | Texas | Randall | Palo Duro | 34.88 | -101.66 | 65.7 | 68 | | | | |
| 483970001 | Texas | Rockwall | Rockwall Heath | 32.94 | -96.46 | 66 | 66 | 59 | 59 | 58 | 58 |
| 484230007 | Texas | Smith | Tyler Airport Relocated | 32.34 | -95.42 | 64.7 | 65 | 58 | 58 | | |
| 484390075 | Texas | Tarrant | Eagle Mountain Lake | 32.99 | -97.48 | 71 | 72 | 63 | 63 | 62 | 62 |
| 484391002 | Texas | Tarrant | Fort Worth Northwest | 32.81 | -97.36 | 72.3 | 74 | 64 | 64 | 63 | 63 |
| 484392003 | Texas | Tarrant | Keller | 32.92 | -97.28 | 73.3 | 74 | 65 | 65 | 64 | 64 |
| 484393009 | Texas | Tarrant | Grapevine Fairway | 32.98 | -97.06 | 75.3 | 76 | 67 | 67 | 66 | 66 |
| 484393011 | Texas | Tarrant | Arlington Municipal Airport | 32.66 | -97.09 | 67 | 69 | 59 | 59 | 59 | 59 |
| 484530014 | Texas | Travis | Austin Northwest | 30.35 | -97.76 | 67.7 | 69 | 61 | 61 | 60 | 60 |
| 484530020 | Texas | Travis | Austin Audubon Society | 30.48 | -97.87 | 66.3 | 67 | 59 | 59 | 58 | 58 |
| 484690003 | Texas | Victoria | Victoria | 28.84 | -97.01 | 65 | 65 | 59 | 59 | | |
| 484790016 | Texas | Webb | Laredo Vidaurri | 27.52 | -99.52 | 54 | 54 | 52 | 52 | 52 | 52 |
| 540030003 | West Virginia | Berkeley | MARTINSBURG BALL FIELD | 39.45 | -77.96 | 62 | 63 | 54 | 54 | 54 | 54 |
| 540110006 | West Virginia | Cabell | HENDERSON CENTER/MARSHALL | 38.42 | -82.43 | 64 | 64 | 60 | 60 | 59 | 59 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | UNIVERSITY - MOVED FROM WATER CO. 5/98 | | | | | | | | |
| 540219991 | West Virginia | Gilmer | Cedar Creek | 38.88 | -80.85 | 58 | 59 | 54 | 54 | 54 | 54 |
| 540250003 | West Virginia | Greenbrier | SAM BLACK CHURCH - DOH GARAGE - GREENBRIER COUNTY | 37.91 | -80.63 | 59.7 | 60 | 55 | 55 | | |
| 540290009 | West Virginia | Hancock | | 40.43 | -80.59 | 65.5 | 66 | 56 | 56 | 53 | 53 |
| 540390020 | West Virginia | Kanawha | | 38.35 | -81.62 | 67 | 67 | 62 | 62 | 63 | 63 |
| 540610003 | West Virginia | Monongalia | | 39.65 | -79.92 | 62.3 | 64 | 58 | 58 | 57 | 57 |
| 540690010 | West Virginia | Ohio | | 40.11 | -80.70 | 67 | 68 | 61 | 61 | 60 | 60 |
| 540939991 | West Virginia | Tucker | Parsons | 39.09 | -79.66 | 61.7 | 62 | 57 | 57 | 56 | 56 |
| 541071002 | West Virginia | Wood | Neale Elementary School | 39.32 | -81.55 | 65 | 68 | 59 | 59 | 59 | 59 |
| 550030010 | Wisconsin | Ashland | BAD RIVER TRIBAL SCHOOL - ODANAH | 46.60 | -90.66 | 58.3 | 59 | | | | |
| 550090026 | Wisconsin | Brown | GREEN BAY - UW | 44.53 | -87.91 | 65.3 | 66 | 59 | 59 | 58 | |
| 550210015 | Wisconsin | Columbia | COLUMBUS | 43.32 | -89.11 | 66 | 67 | | | | |
| 550250041 | Wisconsin | Dane | MADISON EAST | 43.10 | -89.36 | 65 | 65 | | | | |
| 550270001 | Wisconsin | Dodge | HORICON WILDLIFE AREA | 43.47 | -88.62 | 66.3 | 68 | 60 | 60 | 60 | 60 |
| 550290004 | Wisconsin | Door | NEWPORT PARK | 45.24 | -86.99 | 72.7 | 73 | 66 | 66 | 66 | 66 |
| 550350014 | Wisconsin | Eau Claire | EAU CLAIRE - DOT SIGN SHOP | 44.76 | -91.14 | 62 | 64 | | | | |
| 550390006 | Wisconsin | Fond du Lac | FOND DU LAC | 43.69 | -88.42 | 64.7 | 66 | 59 | 59 | | |
| 550410007 | Wisconsin | Forest | POTAWATOMI | 45.57 | -88.81 | 62.7 | 63 | | | | |
| 550550009 | Wisconsin | Jefferson | JEFFERSON - LAATSCH | 43.00 | -88.83 | 68 | 69 | | | | |
| 550590019 | Wisconsin | Kenosha | CHIWAUKEE PRAIRIE STATELINE | 42.50 | -87.81 | 78 | 79 | 72 | 72 | 72 | 73 |
| 550590025 | Wisconsin | Kenosha | KENOSHA - WATER TOWER | 42.60 | -87.89 | 73.7 | 77 | 68 | 68 | 70 | 66 |
| 550610002 | Wisconsin | Kewaunee | KEWAUNEE | 44.44 | -87.51 | 69.3 | 70 | 63 | 63 | 64 | 63 |
| 550630012 | Wisconsin | La Crosse | LACROSSE - DOT BUILDING | 43.78 | -91.23 | 62 | 62 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 550710007 | Wisconsin | Manitowoc | MANITOWOC - WDLND DUNES | 44.14 | -87.62 | 73 | 74 | 67 | 67 | 67 | 66 |
| 550730012 | Wisconsin | Marathon | LAKE DUBAY | 44.71 | -89.77 | 64 | 65 | | | | |
| 550790010 | Wisconsin | Milwaukee | MILWAUKEE - SIXTEENTH ST. HEALTH CENTER | 43.02 | -87.93 | 65.3 | 67 | 60 | 60 | 61 | 60 |
| 550790026 | Wisconsin | Milwaukee | MILWAUKEE - SER DNR HDQRS | 43.06 | -87.91 | 68 | 69 | 63 | 63 | 64 | 64 |
| 550790085 | Wisconsin | Milwaukee | BAYSIDE | 43.18 | -87.90 | 71.7 | 73 | 66 | 68 | 66 | 68 |
| 550870009 | Wisconsin | Outagamie | APPLETON - AAL | 44.31 | -88.40 | 65.7 | 67 | | | | |
| 550890008 | Wisconsin | Ozaukee | GRAFTON | 43.34 | -87.92 | 71.3 | 72 | 66 | 66 | 67 | 65 |
| 550890009 | Wisconsin | Ozaukee | HARRINGTON BEACH PARK | 43.50 | -87.81 | 73.3 | 74 | 68 | 68 | 68 | 67 |
| 551010020 | Wisconsin | Racine | RACINE - PAYNE AND DOLAN | 42.77 | -87.80 | 76 | 78 | 70 | 71 | 71 | 71 |
| 551050030 | Wisconsin | Rock | BELOIT - CONVERSE | 42.52 | -89.06 | 67.7 | 69 | | | | |
| 551110007 | Wisconsin | Sauk | DEVILS LAKE PARK | 43.44 | -89.68 | 63.7 | 64 | | | | |
| 551170006 | Wisconsin | Sheboygan | SHEBOYGAN - KOHLER ANDRAE | 43.67 | -87.72 | 80 | 81 | 74 | 73 | 73 | 73 |
| 551170009 | Wisconsin | Sheboygan | SHEBOYGAN - HAVEN | 43.82 | -87.79 | 70 | 71 | 64 | 64 | 64 | 64 |
| 551199991 | Wisconsin | Taylor | Perkinstown | 45.21 | -90.60 | 61 | 62 | | | | |
| 551250001 | Wisconsin | Vilas | TROUT LAKE | 46.05 | -89.65 | 61.3 | 62 | | | | |
| 551270005 | Wisconsin | Walworth | LAKE GENEVA | 42.58 | -88.50 | 69 | 70 | 62 | 62 | 62 | 62 |
| 551330027 | Wisconsin | Waukesha | WAUKESHA - CLEVELAND AVE | 43.02 | -88.22 | 65.7 | 66 | 61 | 61 | 61 | 61 |
| 560019991 | Wyoming | Albany | Centennial | 41.36 | -106.24 | 64.7 | 66 | | | | |
| 560050123 | Wyoming | Campbell | Thunder Basin | 44.65 | -105.29 | 59.7 | 61 | | | | |
| 560050456 | Wyoming | Campbell | Campbell County | 44.15 | -105.53 | 61.5 | 63 | | | | |
| 560070100 | Wyoming | Carbon | Atlantic Rim Sun Dog | 41.39 | -107.62 | 60.7 | 62 | | | | |
| 560090008 | Wyoming | Converse | Tallgrass Energy Partners - Gaseous | 42.80 | -105.36 | 59 | 59 | | | | |
| 560090010 | Wyoming | Converse | Converse County Long-Term | 43.10 | -105.50 | 62 | 63 | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 560130232 | Wyoming | Fremont | Spring Creek | 43.08 | -107.55 | 61.7 | 62 | | | | |
| 560210100 | Wyoming | Laramie | Cheyenne NCore | 41.18 | -104.78 | 63.3 | 64 | | | | |
| 560250100 | Wyoming | Natrona | Casper Gaseous | 42.82 | -106.37 | 61.3 | 63 | | | | |
| 560252601 | Wyoming | Natrona | | 42.86 | -106.24 | 58 | 59 | | | | |
| 560370200 | Wyoming | Sweetwater | Wamsutter | 41.68 | -108.02 | 52.7 | 55 | | | | |
| 560450003 | Wyoming | Weston | | 43.87 | -104.19 | 60.5 | 61 | | | | |

## Appendix F. *Part-75 CEMS-Based Units Identified by OTC as Peaking Units for HEDD Episodic Modeling Purposes*

Peaker determination based on definition detailed at the beginning of this paper. Electric determination separates electric providing units from industrial/institutional units. Hour counts are based on July 1 – August 31 for 2016 (1488 hour max), April 1 – September 30 for combined 2018 and 2019 (7344 max), and July 1 – August 31 for Run 2 ReBase (1488 max).

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| CT | Alfred L Pierce Generating Station | 6635 | AP-1 | Electric Utility | No | Yes | 19 | 48 | 8 | 0.0491 |
| CT | Algonquin Power Windsor Locks, LLC | 10567 | GT1 | Cogeneration | Yes | Yes | 402 | 536 | 320 | 0.1386 |
| CT | Branford | 540 | 10 | Electric Utility | Yes | Yes | 24 | 34 | 8 | 0.6780 |
| CT | Bridgeport Energy | 55042 | BE1 | Electric Utility | No | Yes | 1427 | 5489 | 1322 | 0.0184 |
| CT | Bridgeport Energy | 55042 | BE2 | Electric Utility | No | Yes | 1439 | 5549 | 1417 | 0.0187 |
| CT | Bridgeport Harbor Station | 568 | BHB3 | Electric Utility | No | Yes | 238 | 277 | 173 | 0.1271 |
| CT | Bridgeport Harbor Station | 568 | BHB4 | Electric Utility | Yes | Yes | 6 | 15 | 8 | 0.6987 |
| CT | Capitol District Energy Center | 50498 | GT | Cogeneration | Yes | Yes | 1209 | 566 | 335 | 0.0964 |
| CT | Cos Cob | 542 | 10 | Electric Utility | Yes | Yes | 13 | 28 | 0 | 0.1520 |
| CT | Cos Cob | 542 | 11 | Electric Utility | Yes | Yes | 9 | 21 | 3 | 0.1730 |
| CT | Cos Cob | 542 | 12 | Electric Utility | Yes | Yes | 10 | 17 | 3 | 0.1880 |
| CT | Cos Cob | 542 | 13 | Electric Utility | No | Yes | 16 | 24 | 7 | 0.1530 |
| CT | Cos Cob | 542 | 14 | Electric Utility | No | Yes | 22 | 23 | 5 | 0.1880 |
| CT | CPV Towantic Energy Center | 56047 | 1 | Electric Utility | No | Yes | | 6112 | 1472 | 0.0070 |
| CT | CPV Towantic Energy Center | 56047 | 2 | Electric Utility | No | Yes | | 3444 | 625 | 0.0072 |
| CT | Devon | 544 | 10 | Electric Utility | Yes | Yes | 8 | 18 | 2 | 0.7120 |
| CT | Devon | 544 | 11 | Electric Utility | No | Yes | 7 | 71 | 55 | 0.1022 |
| CT | Devon | 544 | 12 | Electric Utility | No | Yes | 10 | 77 | 62 | 0.0938 |
| CT | Devon | 544 | 13 | Electric Utility | No | Yes | 14 | 69 | 35 | 0.0910 |
| CT | Devon | 544 | 14 | Electric Utility | No | Yes | 9 | 62 | 25 | 0.1061 |
| CT | Devon | 544 | 15 | Electric Utility | No | Yes | 42 | 53 | 16 | 0.0174 |
| CT | Devon | 544 | 16 | Electric Utility | No | Yes | 41 | 53 | 15 | 0.0166 |
| CT | Devon | 544 | 17 | Electric Utility | No | Yes | 41 | 59 | 15 | 0.0216 |
| CT | Devon | 544 | 18 | Electric Utility | No | Yes | 37 | 49 | 8 | 0.0188 |
| CT | EmpireCo Sterling Energy Facility | 50736 | B1 | Electric Utility | No | Yes | 0 | 0 | 0 | 0.0000 |
| CT | EmpireCo Sterling Energy Facility | 50736 | B2 | Electric Utility | No | Yes | 0 | 0 | 0 | 0.0000 |
| CT | Franklin Drive | 561 | 10 | Electric Utility | Yes | Yes | 7 | 22 | 11 | 0.6590 |
| CT | Kleen Energy Systems Project | 56798 | U1 | Electric Utility | No | Yes | 1382 | 5022 | 1383 | 0.0103 |
| CT | Kleen Energy Systems Project | 56798 | U2 | Electric Utility | No | Yes | 1393 | 5083 | 1383 | 0.0100 |
| CT | Lake Road Generating Company | 55149 | LRG1 | Electric Utility | No | Yes | 1431 | 7217 | 1473 | 0.0071 |
| CT | Lake Road Generating Company | 55149 | LRG2 | Electric Utility | No | Yes | 1488 | 7059 | 1488 | 0.0064 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| CT | Lake Road Generating Company | 55149 | LRG3 | Electric Utility | No | Yes | 1433 | 6915 | 1482 | 0.0059 |
| CT | Middletown | 562 | 10 | Electric Utility | Yes | Yes | 17 | 36 | 4 | 0.6470 |
| CT | Middletown | 562 | 12 | Electric Utility | No | Yes | 26 | 49 | 15 | 0.0079 |
| CT | Middletown | 562 | 13 | Electric Utility | No | Yes | 16 | 49 | 15 | 0.0099 |
| CT | Middletown | 562 | 14 | Electric Utility | No | Yes | 27 | 58 | 21 | 0.0108 |
| CT | Middletown | 562 | 15 | Electric Utility | No | Yes | 29 | 40 | 12 | 0.0067 |
| CT | Middletown | 562 | 2 | Electric Utility | No | Yes | 781 | 2349 | 1188 | 0.0825 |
| CT | Middletown | 562 | 3 | Electric Utility | No | Yes | 676 | 2390 | 1035 | 0.1402 |
| CT | Middletown | 562 | 4 | Electric Utility | Yes | Yes | 20 | 47 | 47 | 0.1269 |
| CT | Milford Power Company LLC | 55126 | CT01 | Electric Utility | No | Yes | 1302 | 6827 | 1437 | 0.0154 |
| CT | Milford Power Company LLC | 55126 | CT02 | Electric Utility | No | Yes | 1220 | 6236 | 1352 | 0.0133 |
| CT | Montville | 546 | 5 | Electric Utility | Yes | Yes | 25 | 453 | 385 | 0.0682 |
| CT | Montville | 546 | 6 | Electric Utility | Yes | Yes | 69 | 93 | 50 | 0.1397 |
| CT | New Haven Harbor | 6156 | NHB1 | Electric Utility | Yes | Yes | 315 | 447 | 308 | 0.0468 |
| CT | New Haven Harbor | 6156 | NHHS2 | Electric Utility | No | Yes | 27 | 34 | 3 | 0.0402 |
| CT | New Haven Harbor | 6156 | NHHS3 | Electric Utility | No | Yes | 24 | 60 | 8 | 0.0463 |
| CT | New Haven Harbor | 6156 | NHHS4 | Electric Utility | No | Yes | 13 | 40 | 3 | 0.0342 |
| CT | Norwich | 581 | TRBINE | Electric Utility | Yes | Yes | 20 | 42 | 10 | 0.4997 |
| CT | Pratt & Whitney, East Hartford | 54605 | 001 | Cogeneration | No | Yes | 150 | 6452 | 1423 | 0.0233 |
| CT | South Meadow Station | 563 | 11A | Electric Utility | Yes | Yes | 11 | 18 | 2 | 0.7895 |
| CT | South Meadow Station | 563 | 11B | Electric Utility | Yes | Yes | 11 | 19 | 3 | 0.7502 |
| CT | South Meadow Station | 563 | 12A | Electric Utility | Yes | Yes | 3 | 21 | 11 | 0.7921 |
| CT | South Meadow Station | 563 | 12B | Electric Utility | Yes | Yes | 3 | 21 | 11 | 0.7288 |
| CT | South Meadow Station | 563 | 13A | Electric Utility | Yes | Yes | 5 | 21 | 13 | 0.8572 |
| CT | South Meadow Station | 563 | 13B | Electric Utility | Yes | Yes | 5 | 21 | 13 | 0.8151 |
| CT | South Meadow Station | 563 | 14A | Electric Utility | Yes | Yes | 6 | 17 | 11 | 0.7902 |
| CT | South Meadow Station | 563 | 14B | Electric Utility | Yes | Yes | 6 | 17 | 11 | 0.8074 |
| CT | Torrington Terminal | 565 | 10 | Electric Utility | Yes | Yes | 3 | 17 | 5 | 0.7210 |
| CT | Tunnel | 557 | 10 | Electric Utility | Yes | Yes | 7 | 26 | 8 | 0.6685 |
| CT | Wallingford Energy, LLC | 55517 | CT01 | Electric Utility | No | Yes | 265 | 586 | 211 | 0.0167 |
| CT | Wallingford Energy, LLC | 55517 | CT02 | Electric Utility | No | Yes | 283 | 660 | 241 | 0.0160 |
| CT | Wallingford Energy, LLC | 55517 | CT03 | Electric Utility | No | Yes | 291 | 636 | 197 | 0.0137 |
| CT | Wallingford Energy, LLC | 55517 | CT04 | Electric Utility | No | Yes | 269 | 597 | 230 | 0.0123 |
| CT | Wallingford Energy, LLC | 55517 | CT05 | Electric Utility | No | Yes | 269 | 691 | 275 | 0.0151 |
| CT | Wallingford Energy, LLC | 55517 | CT06 | Electric Utility | No | Yes | | 820 | 277 | 0.0282 |
| CT | Wallingford Energy, LLC | 55517 | CT07 | Electric Utility | No | Yes | | 807 | 288 | 0.0204 |
| CT | Waterbury Generation | 56629 | 10 | Electric Utility | No | Yes | 225 | 265 | 68 | 0.0310 |
| CT | Waterside Power, LLC | 56189 | 4 | Electric Utility | No | Yes | 20 | 55 | 14 | 0.1439 |
| CT | Waterside Power, LLC | 56189 | 5 | Electric Utility | No | Yes | 20 | 53 | 10 | 0.2018 |
| CT | Waterside Power, LLC | 56189 | 7 | Electric Utility | No | Yes | 21 | 65 | 10 | 0.1583 |
| DC | GSA Central Heating | 880004 | 3 | Industrial Boiler | No | No | 0 | 8 | 0 | 0.2760 |
| DC | GSA Central Heating | 880004 | 4 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| DC | GSA Central Heating | 880004 | 5C | Cogeneration | No | No | 1478 | 5974 | 1201 | 0.0902 |
| DE | Christiana Substation | 591 | 11 | Electric Utility | Yes | Yes | 2 | 11 | 5 | 0.3079 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| DE | Christiana Substation | 591 | 14 | Electric Utility | Yes | Yes | 3 | 5 | 1 | 0.3082 |
| DE | Delaware City Refinery | 52193 | DCPP4 | Petroleum Refinery | No | No | 1488 | 7266 | 0 | 0.0383 |
| DE | Delaware City | 592 | 10 | Electric Utility | Yes | Yes | 3 | 17 | 5 | 0.2718 |
| DE | Edge Moor | 593 | 10 | Electric Utility | Yes | Yes | 2 | 19 | 5 | 0.2375 |
| DE | Edge Moor | 593 | 3 | Electric Utility | No | Yes | 1283 | 1263 | 358 | 0.0626 |
| DE | Edge Moor | 593 | 4 | Electric Utility | No | Yes | 1434 | 1176 | 404 | 0.0484 |
| DE | Edge Moor | 593 | 5 | Electric Utility | No | Yes | 1371 | 1433 | 356 | 0.0608 |
| DE | Garrison Energy Center | 57349 | 1 | Electric Utility | No | Yes | 1470 | 4781 | 1424 | 0.0081 |
| DE | Hay Road | 7153 | **3 | Electric Utility | Yes | Yes | 1157 | 3304 | 934 | 0.0553 |
| DE | Hay Road | 7153 | 1 | Electric Utility | No | Yes | 1163 | 3472 | 926 | 0.0559 |
| DE | Hay Road | 7153 | 2 | Electric Utility | No | Yes | 1090 | 3405 | 914 | 0.0609 |
| DE | Hay Road | 7153 | 5 | Electric Utility | No | Yes | 1136 | 3296 | 1005 | 0.0288 |
| DE | Hay Road | 7153 | 6 | Electric Utility | Yes | Yes | 1155 | 3262 | 1014 | 0.0286 |
| DE | Hay Road | 7153 | 7 | Electric Utility | No | Yes | 1098 | 3275 | 982 | 0.0288 |
| DE | Indian River | 594 | 10 | Electric Utility | No | Yes | 2 | 23 | 2 | 0.2244 |
| DE | Indian River | 594 | 4 | Electric Utility | Yes | Yes | 941 | 1717 | 646 | 0.0899 |
| DE | McKee Run | 599 | 1 | Electric Utility | No | Yes | 15 | 0 | 0 | 0.0000 |
| DE | McKee Run | 599 | 2 | Electric Utility | No | Yes | 20 | 0 | 0 | 0.0000 |
| DE | McKee Run | 599 | 3 | Electric Utility | No | Yes | 676 | 534 | 42 | 0.1654 |
| DE | NRG Energy Center Dover | 10030 | 2 | Electric Utility | No | Yes | 1169 | 2216 | 706 | 0.0116 |
| DE | NRG Energy Center Dover | 10030 | 3 | Electric Utility | No | Yes | 502 | 865 | 457 | 0.0837 |
| DE | Van Sant | 7318 | **11 | Electric Utility | Yes | Yes | 4 | 332 | 131 | 0.1509 |
| DE | Warren F. Sam Beasley Pwr Station | 7962 | 1 | Electric Utility | No | Yes | 609 | 709 | 362 | 0.0181 |
| DE | Warren F. Sam Beasley Pwr Station | 7962 | 2 | Electric Utility | Yes | Yes | 527 | 605 | 318 | 0.0437 |
| DE | West Substation | 597 | 10 | Electric Utility | Yes | Yes | 25 | 14 | 1 | 0.2464 |
| MA | ANP Bellingham Energy Company, LLC | 55211 | 1 | Electric Utility | No | Yes | 1450 | 5174 | 1138 | 0.0363 |
| MA | ANP Bellingham Energy Company, LLC | 55211 | 2 | Electric Utility | No | Yes | 1375 | 4843 | 1345 | 0.0318 |
| MA | ANP Blackstone Energy Company, LLC | 55212 | 1 | Electric Utility | No | Yes | 1461 | 4718 | 1275 | 0.0329 |
| MA | ANP Blackstone Energy Company, LLC | 55212 | 2 | Electric Utility | No | Yes | 1426 | 4679 | 1320 | 0.0268 |
| MA | Bellingham | 10307 | 1 | Electric Utility | Yes | Yes | 1185 | 498 | 400 | 0.0937 |
| MA | Bellingham | 10307 | 2 | Electric Utility | Yes | Yes | 1218 | 637 | 492 | 0.1034 |
| MA | Berkshire Power | 55041 | 1 | Electric Utility | No | Yes | 765 | 3253 | 1314 | 0.0193 |
| MA | Blackstone | 1594 | 11 | Cogeneration | Yes | Yes |  | 40 | 0 | 0.0791 |
| MA | Blackstone | 1594 | 12 | Cogeneration | Yes | Yes |  | 53 | 5 | 0.0651 |
| MA | Brayton Point | 1619 | 1 | Electric Utility | No | Yes | 1163 |  | 0 |  |
| MA | Brayton Point | 1619 | 2 | Electric Utility | No | Yes | 230 |  | 0 |  |
| MA | Brayton Point | 1619 | 3 | Electric Utility | No | Yes | 242 |  | 0 |  |
| MA | Brayton Point | 1619 | 4 | Electric Utility | No | Yes | 242 |  | 0 |  |
| MA | Canal Station | 1599 | 1 | Electric Utility | Yes | Yes |  | 78 | 40 | 0.0974 |
| MA | Canal Station | 1599 | 2 | Electric Utility | Yes | Yes | 174 | 74 | 66 | 0.0808 |
| MA | Cleary Flood | 1682 | 8 | Electric Utility | Yes | Yes | 39 | 60 | 20 | 0.2457 |
| MA | Cleary Flood | 1682 | 9 | Electric Utility | Yes | Yes | 521 | 1322 | 592 | 0.1380 |
| MA | Dartmouth Power | 52026 | 1 | Electric Utility | Yes | Yes | 795 | 1565 | 699 | 0.0327 |
| MA | Dartmouth Power | 52026 | 2 | Electric Utility | No | Yes | 425 | 892 | 398 | 0.0102 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| MA | Deer Island Treatment | 10823 | S42 | Industrial Turbine | No | No | 36 | 362 | 14 | 0.6086 |
| MA | Deer Island Treatment | 10823 | S43 | Industrial Turbine | No | No | 29 | 350 | 13 | 0.2803 |
| MA | Dighton | 55026 | 1 | Electric Utility | No | Yes | 1361 | 2970 | 1114 | 0.0201 |
| MA | Doreen | 1631 | 10 | Electric Utility | Yes | Yes | 17 | 33 | 16 | 1.2006 |
| MA | Exelon L Street Generating Station | 1587 | NBJ-1 | Electric Utility | No | Yes | 23 | | 0 | |
| MA | Exelon West Medway II | 59882 | J4 | Electric Utility | No | Yes | | 206 | 22 | 0.0124 |
| MA | Exelon West Medway II | 59882 | J5 | Electric Utility | No | Yes | | 134 | 28 | 0.0143 |
| MA | Fore River Energy Center | 55317 | 11 | Electric Utility | No | Yes | 1419 | 6410 | 1488 | 0.0072 |
| MA | Fore River Energy Center | 55317 | 12 | Electric Utility | No | Yes | 1488 | 5053 | 1400 | 0.0086 |
| MA | Framingham Station | 1586 | FJ-1 | Electric Utility | Yes | Yes | 17 | 38 | 16 | 0.5518 |
| MA | Framingham Station | 1586 | FJ-2 | Electric Utility | Yes | Yes | 21 | 39 | 8 | 0.4847 |
| MA | Framingham Station | 1586 | FJ-3 | Electric Utility | Yes | Yes | 20 | 52 | 19 | 0.5950 |
| MA | General Electric Aircraft | 10029 | 3 | Industrial Boiler | No | No | 1461 | 3512 | 0 | 0.0999 |
| MA | Kendall Green Energy LLC | 1595 | 2 | Electric Utility | Yes | Yes | | 573 | 85 | 0.0713 |
| MA | Kendall Green Energy LLC | 1595 | 3 | Electric Utility | Yes | Yes | | 1996 | 239 | 0.0631 |
| MA | Kendall Green Energy LLC | 1595 | 4 | Electric Utility | No | Yes | | | 16 | |
| MA | Kendall Green Energy LLC | 1595 | S6 | Electric Utility | Yes | Yes | | 108 | 24 | 0.3887 |
| MA | Kneeland Station | 880023 | K1 | Industrial Boiler | No | No | 370 | 1688 | 370 | 0.1024 |
| MA | Kneeland Station | 880023 | K2 | Industrial Boiler | No | No | 612 | 2557 | 612 | 0.0944 |
| MA | Kneeland Station | 880023 | K3 | Industrial Boiler | No | No | 0 | 1241 | 0 | 0.0975 |
| MA | Kneeland Station | 880023 | K4 | Industrial Boiler | No | No | 179 | 583 | 179 | 0.0815 |
| MA | MASSPOWER | 10726 | 1 | Cogeneration | No | Yes | 1037 | 2921 | 1126 | 0.0356 |
| MA | MASSPOWER | 10726 | 2 | Cogeneration | No | Yes | 983 | 2598 | 1014 | 0.0356 |
| MA | MBTA South Boston Power Facility | 10176 | A | Electric Utility | Yes | Yes | 15 | 24 | 16 | 0.2138 |
| MA | MBTA South Boston Power Facility | 10176 | B | Electric Utility | Yes | Yes | 0 | 35 | 19 | 0.1855 |
| MA | Medway Station | 1592 | J1T1 | Electric Utility | Yes | Yes | 15 | 74 | 30 | 0.5305 |
| MA | Medway Station | 1592 | J1T2 | Electric Utility | Yes | Yes | 15 | 50 | 19 | 0.5597 |
| MA | Medway Station | 1592 | J2T1 | Electric Utility | Yes | Yes | 27 | 43 | 12 | 0.5097 |
| MA | Medway Station | 1592 | J2T2 | Electric Utility | Yes | Yes | 26 | 34 | 10 | 0.5151 |
| MA | Medway Station | 1592 | J3T1 | Electric Utility | Yes | Yes | 21 | 53 | 24 | 0.5160 |
| MA | Medway Station | 1592 | J3T2 | Electric Utility | Yes | Yes | 20 | 43 | 15 | 0.4750 |
| MA | Milford Power, LLC | 54805 | 1 | Electric Utility | No | Yes | 418 | 2719 | 1080 | 0.0405 |
| MA | Millennium Power Partners | 55079 | 1 | Electric Utility | No | Yes | 1423 | 4586 | 1483 | 0.0147 |
| MA | MIT Central Utility Plant | 54907 | 1 | Cogeneration | No | Yes | 1346 | 7194 | 1488 | 0.0588 |
| MA | Mystic | 1588 | 7 | Electric Utility | Yes | Yes | 317 | 330 | 191 | 0.0787 |
| MA | Mystic | 1588 | 81 | Electric Utility | No | Yes | 1358 | 2260 | 613 | 0.0119 |
| MA | Mystic | 1588 | 82 | Electric Utility | No | Yes | 1359 | 2669 | 778 | 0.0119 |
| MA | Mystic | 1588 | 93 | Electric Utility | No | Yes | 1384 | 2207 | 933 | 0.0115 |
| MA | Mystic | 1588 | 94 | Electric Utility | No | Yes | 1437 | 2003 | 911 | 0.0121 |
| MA | Mystic | 1588 | MJ-1 | Electric Utility | Yes | Yes | 38 | 59 | 28 | 0.4838 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| MA | Pittsfield Generating | 50002 | 1 | Electric Utility | Yes | Yes | 774 | 1158 | 557 | 0.0238 |
| MA | Pittsfield Generating | 50002 | 2 | Electric Utility | Yes | Yes | 801 | 1250 | 594 | 0.0242 |
| MA | Pittsfield Generating | 50002 | 3 | Electric Utility | Yes | Yes | 793 | 1222 | 580 | 0.0260 |
| MA | Potter | 1660 | 3 | Electric Utility | Yes | Yes | 99 | 96 | 68 | 0.2642 |
| MA | Potter | 1660 | 4 | Electric Utility | No | Yes | 166 | 339 | 140 | 0.0149 |
| MA | Potter | 1660 | 5 | Electric Utility | No | Yes | 144 | 349 | 146 | 0.0151 |
| MA | Salem Harbor Station NGCC | 60903 | 1 | Electric Utility | No | Yes | | 2257 | 698 | 0.0259 |
| MA | Salem Harbor Station NGCC | 60903 | 2 | Electric Utility | No | Yes | | 1729 | 794 | 0.0225 |
| MA | Stony Brook Energy Center | 6081 | 001 | Electric Utility | Yes | Yes | 532 | 570 | 321 | 0.2141 |
| MA | Stony Brook Energy Center | 6081 | 002 | Electric Utility | Yes | Yes | 31 | 79 | 36 | 0.1502 |
| MA | Stony Brook Energy Center | 6081 | 003 | Electric Utility | Yes | Yes | 470 | 603 | 387 | 0.1393 |
| MA | Stony Brook Energy Center | 6081 | 004 | Electric Utility | Yes | Yes | 6 | 39 | 15 | 0.3000 |
| MA | Stony Brook Energy Center | 6081 | 005 | Electric Utility | Yes | Yes | 12 | 36 | 12 | 0.3000 |
| MA | Tanner Street Generation, LLC | 54586 | 2 | Cogeneration | No | Yes | 696 | 771 | 476 | 0.0568 |
| MA | Waters River | 1678 | 1 | Electric Utility | Yes | Yes | 228 | 220 | 93 | 0.4630 |
| MA | Waters River | 1678 | 2 | Electric Utility | Yes | Yes | 0 | 125 | 37 | 0.4925 |
| MA | West Springfield | 1642 | 10 | Electric Utility | Yes | Yes | 39 | 24 | 9 | 0.4000 |
| MA | West Springfield | 1642 | 3 | Electric Utility | Yes | Yes | 207 | 116 | 103 | 0.0601 |
| MA | West Springfield | 1642 | CTG1 | Electric Utility | No | Yes | 179 | | 0 | |
| MA | West Springfield | 1642 | CTG2 | Electric Utility | No | Yes | 181 | 196 | 73 | 0.0491 |
| MA | Woodland Road | 1643 | 10 | Electric Utility | Yes | Yes | 26 | 32 | 13 | 0.5976 |
| MD | AES Warrior Run | 10678 | 001 | Cogeneration | No | Yes | 1358 | 6926 | 1338 | 0.0698 |
| MD | American Sugar Refining, Inc. | 54795 | C6 | Cogeneration | No | No | | 1583 | 721 | 0.0324 |
| MD | Brandon Shores | 602 | 1 | Electric Utility | No | Yes | 1429 | 4564 | 1213 | 0.0671 |
| MD | Brandon Shores | 602 | 2 | Electric Utility | No | Yes | 1488 | 5510 | 1296 | 0.0693 |
| MD | Brandywine Power Facility | 54832 | 1 | Cogeneration | No | Yes | 1318 | 5106 | 972 | 0.0282 |
| MD | Brandywine Power Facility | 54832 | 2 | Cogeneration | No | Yes | 1320 | 5216 | 959 | 0.0310 |
| MD | C P Crane | 1552 | 1 | Electric Utility | No | Yes | 504 | 138 | 0 | 0.2770 |
| MD | C P Crane | 1552 | 2 | Electric Utility | No | Yes | 977 | 106 | 0 | 0.4397 |
| MD | Chalk Point | 1571 | **GT3 | Electric Utility | Yes | Yes | 10 | 21 | 23 | 0.1010 |
| MD | Chalk Point | 1571 | **GT4 | Electric Utility | Yes | Yes | 19 | 15 | 19 | 0.1038 |
| MD | Chalk Point | 1571 | **GT5 | Electric Utility | Yes | Yes | 43 | 28 | 19 | 0.0877 |
| MD | Chalk Point | 1571 | **GT6 | Electric Utility | Yes | Yes | 134 | 23 | 19 | 0.0874 |
| MD | Chalk Point | 1571 | 1 | Electric Utility | No | Yes | 1138 | 1837 | 495 | 0.1229 |
| MD | Chalk Point | 1571 | 2 | Electric Utility | Yes | Yes | 1351 | 1398 | 563 | 0.1661 |
| MD | Chalk Point | 1571 | 3 | Electric Utility | Yes | Yes | 857 | 669 | 224 | 0.1064 |
| MD | Chalk Point | 1571 | 4 | Electric Utility | Yes | Yes | 1085 | 744 | 267 | 0.1113 |
| MD | Chalk Point | 1571 | GT2 | Electric Utility | Yes | Yes | 12 | 6 | 0 | 1.2002 |
| MD | Chalk Point | 1571 | SMECO | Electric Utility | Yes | Yes | 25 | 36 | 24 | 0.1183 |
| MD | Cove Point LNG Terminal | 59073 | 214JA | Industrial Turbine | No | No | | 4949 | 1373 | 0.0218 |
| MD | Cove Point LNG Terminal | 59073 | 214JB | Industrial Turbine | No | No | | 5767 | 1480 | 0.0171 |
| MD | Cove Point LNG Terminal | 59073 | B921A | Industrial Boiler | No | No | | 6622 | 1488 | 0.0074 |
| MD | Cove Point LNG Terminal | 59073 | B921B | Industrial Boiler | No | No | | 6615 | 1488 | 0.0071 |
| MD | Cove Point LNG Terminal | 59073 | GT501A | Industrial Turbine | No | No | | 6412 | 1482 | 0.0077 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| MD | Cove Point LNG Terminal | 59073 | GT501B | Industrial Turbine | No | No | | 6597 | 1488 | 0.0083 |
| MD | CPV St. Charles Energy Center | 56846 | GT1 | Electric Utility | No | Yes | | 5514 | 1294 | 0.0052 |
| MD | CPV St. Charles Energy Center | 56846 | GT2 | Electric Utility | No | Yes | | 5618 | 1273 | 0.0052 |
| MD | Dickerson | 1572 | 1 | Electric Utility | Yes | Yes | 730 | 432 | 201 | 0.1971 |
| MD | Dickerson | 1572 | 2 | Electric Utility | Yes | Yes | 871 | 553 | 206 | 0.1804 |
| MD | Dickerson | 1572 | 3 | Electric Utility | Yes | Yes | 866 | 631 | 205 | 0.1850 |
| MD | Dickerson | 1572 | GT2 | Electric Utility | Yes | Yes | 638 | 725 | 289 | 0.1042 |
| MD | Dickerson | 1572 | GT3 | Electric Utility | Yes | Yes | 642 | 561 | 342 | 0.0812 |
| MD | Gould Street | 1553 | 3 | Electric Utility | No | Yes | 302 | 494 | 22 | 0.1104 |
| MD | Herbert A Wagner | 1554 | 1 | Electric Utility | Yes | Yes | 492 | 642 | 202 | 0.0629 |
| MD | Herbert A Wagner | 1554 | 2 | Electric Utility | Yes | Yes | 125 | 670 | 163 | 0.0987 |
| MD | Herbert A Wagner | 1554 | 3 | Electric Utility | Yes | Yes | 1488 | 1558 | 251 | 0.0737 |
| MD | Herbert A Wagner | 1554 | 4 | Electric Utility | Yes | Yes | 87 | 146 | 21 | 0.0965 |
| MD | Keys Energy Center | 60302 | 11 | Electric Utility | No | Yes | | 3702 | 1349 | 0.0058 |
| MD | Keys Energy Center | 60302 | 12 | Electric Utility | No | Yes | | 3923 | 1323 | 0.0058 |
| MD | Luke Paper Company | 50282 | PR003 | Pulp & Paper Mill | No | No | 1390 | 4324 | 0 | 0.0000 |
| MD | Luke Paper Company | 50282 | PR004 | Pulp & Paper Mill | No | No | 1372 | 4222 | 0 | 0.0000 |
| MD | Luke Paper Company | 50282 | PR005 | Pulp & Paper Mill | No | No | 112 | 695 | 0 | 0.0000 |
| MD | Morgantown | 1573 | 1 | Electric Utility | No | Yes | 1388 | 2782 | 1135 | 0.0492 |
| MD | Morgantown | 1573 | 2 | Electric Utility | No | Yes | 1415 | 3633 | 1046 | 0.0472 |
| MD | Morgantown | 1573 | GT3 | Electric Utility | Yes | Yes | 24 | 48 | 40 | 0.5417 |
| MD | Morgantown | 1573 | GT4 | Electric Utility | Yes | Yes | 22 | 32 | 25 | 0.5418 |
| MD | Morgantown | 1573 | GT5 | Electric Utility | Yes | Yes | 25 | 23 | 18 | 0.5414 |
| MD | Morgantown | 1573 | GT6 | Electric Utility | Yes | Yes | 23 | 11 | 7 | 0.5420 |
| MD | Perryman | 1556 | **51 | Electric Utility | Yes | Yes | 715 | 990 | 311 | 0.0683 |
| MD | Perryman | 1556 | 6-1 | Electric Utility | No | Yes | | 2204 | 594 | 0.0170 |
| MD | Perryman | 1556 | 6-2 | Electric Utility | No | Yes | | 2155 | 594 | 0.0169 |
| MD | Perryman | 1556 | CT1 | Electric Utility | Yes | Yes | 31 | 26 | 9 | 0.6389 |
| MD | Perryman | 1556 | CT2 | Electric Utility | No | Yes | 0 | | 0 | |
| MD | Perryman | 1556 | CT3 | Electric Utility | Yes | Yes | 26 | 34 | 19 | 0.7311 |
| MD | Perryman | 1556 | CT4 | Electric Utility | Yes | Yes | 24 | 20 | 15 | 0.7457 |
| MD | Riverside | 1559 | 4 | Electric Utility | No | Yes | 0 | | 0 | |
| MD | Rock Springs Generating Facility | 7835 | 1 | Electric Utility | No | Yes | 874 | 784 | 232 | 0.0380 |
| MD | Rock Springs Generating Facility | 7835 | 2 | Electric Utility | No | Yes | 712 | 676 | 184 | 0.0413 |
| MD | Rock Springs Generating Facility | 7835 | 3 | Electric Utility | No | Yes | 963 | 682 | 217 | 0.0391 |
| MD | Rock Springs Generating Facility | 7835 | 4 | Electric Utility | No | Yes | 947 | 664 | 210 | 0.0436 |
| MD | Vienna | 1564 | 8 | Electric Utility | Yes | Yes | 11 | 116 | 85 | 0.1823 |
| MD | Westport | 1560 | CT5 | Electric Utility | Yes | Yes | 300 | 685 | 267 | 0.3810 |
| MD | Wildcat Point Generation Facility | 59220 | CT1 | Electric Utility | No | Yes | | 4889 | 1228 | 0.0084 |
| MD | Wildcat Point Generation Facility | 59220 | CT2 | Electric Utility | No | Yes | | 5190 | 1255 | 0.0086 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| ME | Androscoggin Energy | 55031 | CT01 | Cogeneration | No | Yes | 447 | 2647 | 799 | 0.0179 |
| ME | Androscoggin Energy | 55031 | CT02 | Cogeneration | No | Yes | 163 | 1439 | 233 | 0.0177 |
| ME | Androscoggin Energy | 55031 | CT03 | Cogeneration | No | Yes | 354 | 2443 | 633 | 0.0207 |
| ME | Bucksport Generation LLC | 50243 | GEN4 | Cogeneration | No | Yes | 53 | 74 | 42 | 0.1205 |
| ME | Maine Independence Station | 55068 | 1 | Electric Utility | No | Yes | 695 | 1156 | 648 | 0.0332 |
| ME | Maine Independence Station | 55068 | 2 | Electric Utility | No | Yes | 853 | 1065 | 561 | 0.0313 |
| ME | Rumford Power | 55100 | 1 | Electric Utility | No | Yes | 1019 | 925 | 578 | 0.0525 |
| ME | Westbrook Energy Center | 55294 | 1 | Electric Utility | No | Yes | 1236 | 3284 | 895 | 0.0367 |
| ME | Westbrook Energy Center | 55294 | 2 | Electric Utility | No | Yes | 1163 | 3138 | 897 | 0.0342 |
| ME | William F Wyman | 1507 | 1 | Electric Utility | Yes | Yes | 40 | 9 | 0 | 0.2140 |
| ME | William F Wyman | 1507 | 2 | Electric Utility | Yes | Yes | 362 | 9 | 0 | 0.1720 |
| ME | William F Wyman | 1507 | 3 | Electric Utility | Yes | Yes | 47 | 296 | 158 | 0.1416 |
| ME | William F Wyman | 1507 | 4 | Electric Utility | Yes | Yes | 72 | 132 | 107 | 0.1360 |
| NH | Burgess BioPower | 58054 | ST01 | Electric Utility | No | Yes | 1436 | 7100 | 1410 | 0.0603 |
| NH | Granite Ridge Energy | 55170 | 0001 | Electric Utility | No | Yes | 1365 | 5068 | 1381 | 0.0088 |
| NH | Granite Ridge Energy | 55170 | 0002 | Electric Utility | No | Yes | 1406 | 5274 | 1396 | 0.0087 |
| NH | Merrimack | 2364 | 1 | Electric Utility | Yes | Yes | 402 | 448 | 295 | 0.3286 |
| NH | Merrimack | 2364 | 2 | Electric Utility | Yes | Yes | 361 | 796 | 414 | 0.3234 |
| NH | Newington Energy | 55661 | 1 | Electric Utility | No | Yes | 849 | 2082 | 820 | 0.0223 |
| NH | Newington Energy | 55661 | 2 | Electric Utility | No | Yes | 864 | 2190 | 865 | 0.0229 |
| NH | Newington | 8002 | 1 | Electric Utility | Yes | Yes | 226 | 375 | 242 | 0.0773 |
| NH | Schiller | 2367 | 4 | Electric Utility | Yes | Yes | 228 | 964 | 371 | 0.1903 |
| NH | Schiller | 2367 | 5 | Electric Utility | No | Yes | 1488 | 5854 | 1353 | 0.0664 |
| NH | Schiller | 2367 | 6 | Electric Utility | Yes | Yes | 190 | 1200 | 467 | 0.1912 |
| NJ | B L England | 2378 | 2 | Electric Utility | No | Yes | 440 | 106 | 0 | 0.3616 |
| NJ | B L England | 2378 | 3 | Electric Utility | No | Yes | 36 | 0 | 0 | 0.0000 |
| NJ | Bayonne Energy Center | 56964 | GT1 | Electric Utility | No | Yes | 835 | | 0 | |
| NJ | Bayonne Energy Center | 56964 | GT2 | Electric Utility | No | Yes | 849 | | 0 | |
| NJ | Bayonne Energy Center | 56964 | GT3 | Electric Utility | No | Yes | 930 | | 0 | |
| NJ | Bayonne Energy Center | 56964 | GT4 | Electric Utility | No | Yes | 819 | | 0 | |
| NJ | Bayonne Energy Center | 56964 | GT5 | Electric Utility | No | Yes | 893 | | 0 | |
| NJ | Bayonne Energy Center | 56964 | GT6 | Electric Utility | No | Yes | 792 | | 0 | |
| NJ | Bayonne Energy Center | 56964 | GT7 | Electric Utility | No | Yes | 798 | | 0 | |
| NJ | Bayonne Energy Center | 56964 | GT8 | Electric Utility | No | Yes | 798 | | 0 | |
| NJ | Bayonne Plant Holding, LLC | 50497 | 001001 | Cogeneration | Yes | Yes | 754 | 0 | 0 | 0.0000 |
| NJ | Bayonne Plant Holding, LLC | 50497 | 002001 | Cogeneration | Yes | Yes | 781 | 0 | 0 | 0.0000 |
| NJ | Bayonne Plant Holding, LLC | 50497 | 004001 | Cogeneration | Yes | Yes | 750 | 0 | 0 | 0.0000 |
| NJ | Bergen Generating Station | 2398 | 1101 | Electric Utility | No | Yes | 1345 | 3091 | 1053 | 0.0361 |
| NJ | Bergen Generating Station | 2398 | 1201 | Electric Utility | No | Yes | 1211 | 2959 | 1025 | 0.0359 |
| NJ | Bergen Generating Station | 2398 | 1301 | Electric Utility | No | Yes | 1268 | 3576 | 1127 | 0.0319 |
| NJ | Bergen Generating Station | 2398 | 1401 | Electric Utility | No | Yes | 1410 | 2909 | 1125 | 0.0347 |
| NJ | Bergen Generating Station | 2398 | 2101 | Electric Utility | No | Yes | 1402 | 5728 | 1341 | 0.0119 |
| NJ | Bergen Generating Station | 2398 | 2201 | Electric Utility | No | Yes | 1407 | 4719 | 1214 | 0.0179 |
| NJ | Burlington Generating Station | 2399 | 121 | Electric Utility | No | Yes | 377 | 447 | 145 | 0.1505 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NJ | Burlington Generating Station | 2399 | 122 | Electric Utility | No | Yes | 378 | 441 | 123 | 0.1472 |
| NJ | Burlington Generating Station | 2399 | 123 | Electric Utility | No | Yes | 335 | 453 | 128 | 0.1463 |
| NJ | Burlington Generating Station | 2399 | 124 | Electric Utility | No | Yes | 335 | 440 | 109 | 0.1623 |
| NJ | Camden Plant Holding, LLC | 10751 | 002001 | Cogeneration | Yes | Yes | 765 | 863 | 459 | 0.0618 |
| NJ | Carlls Corner Energy Center | 2379 | 002001 | Electric Utility | Yes | Yes | 148 | 276 | 45 | 0.7109 |
| NJ | Carlls Corner Energy Center | 2379 | 003001 | Electric Utility | Yes | Yes | 145 | 98 | 80 | 0.7255 |
| NJ | Carneys Point | 10566 | 1001 | Electric Utility | No | Yes | 1385 | 6781 | 1459 | 0.1061 |
| NJ | Carneys Point | 10566 | 1002 | Electric Utility | No | Yes | 1488 | 6983 | 1461 | 0.1048 |
| NJ | Clayville | 58235 | U1 | Electric Utility | No | Yes | 812 | | 0 | |
| NJ | Cumberland Energy Center | 5083 | 004001 | Electric Utility | Yes | Yes | 207 | 725 | 309 | 0.0783 |
| NJ | Cumberland Energy Center | 5083 | 05001 | Electric Utility | No | Yes | 104 | 1533 | 554 | 0.0130 |
| NJ | E F Kenilworth, Inc. | 10805 | 002001 | Cogeneration | No | Yes | 1484 | 7222 | 1472 | 0.1446 |
| NJ | Eagle Point Power Generation | 50561 | 0001 | Electric Utility | No | Yes | 1366 | 4135 | 1364 | 0.0279 |
| NJ | Eagle Point Power Generation | 50561 | 0002 | Electric Utility | No | Yes | 1466 | 4050 | 1381 | 0.0268 |
| NJ | EFS Parlin Holdings, LLC | 50799 | 001001 | Cogeneration | Yes | Yes | 329 | 274 | 182 | 0.0700 |
| NJ | EFS Parlin Holdings, LLC | 50799 | 003001 | Cogeneration | Yes | Yes | 300 | 313 | 200 | 0.0708 |
| NJ | Elmwood Park Power - LLC | 50852 | 002001 | Cogeneration | Yes | Yes | 316 | 89 | 43 | 0.0794 |
| NJ | Essex | 2401 | 35001 | Electric Utility | Yes | Yes | 218 | 54 | 9 | 0.0888 |
| NJ | Forked River Power | 7138 | 002001 | Electric Utility | Yes | Yes | 143 | 250 | 115 | 0.2794 |
| NJ | Forked River Power | 7138 | 003001 | Electric Utility | Yes | Yes | 155 | 199 | 78 | 0.2760 |
| NJ | Gilbert Generating Station | 2393 | 04 | Electric Utility | Yes | Yes | 147 | 84 | 46 | 0.0508 |
| NJ | Gilbert Generating Station | 2393 | 05 | Electric Utility | Yes | Yes | 151 | 57 | 44 | 0.0446 |
| NJ | Gilbert Generating Station | 2393 | 06 | Electric Utility | Yes | Yes | 175 | 60 | 55 | 0.0359 |
| NJ | Gilbert Generating Station | 2393 | 07 | Electric Utility | Yes | Yes | 151 | 58 | 49 | 0.0493 |
| NJ | Gilbert Generating Station | 2393 | 9 | Electric Utility | No | Yes | 69 | 127 | 66 | 0.3112 |
| NJ | Howard M Down | 2434 | U11 | Electric Utility | No | Yes | 852 | 1850 | 634 | 0.0221 |
| NJ | Hudson Generating Station | 2403 | 2 | Electric Utility | No | Yes | 704 | | 0 | |
| NJ | Kearny Generating Station | 2404 | 121 | Electric Utility | No | Yes | 525 | 787 | 279 | 0.1155 |
| NJ | Kearny Generating Station | 2404 | 122 | Electric Utility | No | Yes | 608 | 833 | 271 | 0.1196 |
| NJ | Kearny Generating Station | 2404 | 123 | Electric Utility | No | Yes | 516 | 876 | 311 | 0.1107 |
| NJ | Kearny Generating Station | 2404 | 124 | Electric Utility | No | Yes | 607 | 856 | 302 | 0.1123 |
| NJ | Kearny Generating Station | 2404 | 131 | Electric Utility | No | Yes | 677 | 920 | 303 | 0.0113 |
| NJ | Kearny Generating Station | 2404 | 132 | Electric Utility | No | Yes | 673 | 953 | 279 | 0.0091 |
| NJ | Kearny Generating Station | 2404 | 133 | Electric Utility | No | Yes | 683 | 887 | 266 | 0.0093 |
| NJ | Kearny Generating Station | 2404 | 134 | Electric Utility | No | Yes | 675 | 956 | 307 | 0.0096 |
| NJ | Kearny Generating Station | 2404 | 141 | Electric Utility | No | Yes | 698 | 995 | 394 | 0.0090 |
| NJ | Kearny Generating Station | 2404 | 142 | Electric Utility | No | Yes | 695 | 984 | 372 | 0.0080 |
| NJ | Lakewood | 54640 | 001001 | Cogeneration | No | Yes | 1394 | 3474 | 1035 | 0.0192 |
| NJ | Lakewood | 54640 | 002001 | Cogeneration | No | Yes | 1397 | 3520 | 1058 | 0.0234 |
| NJ | Linden Cogeneration Facility | 50006 | 004001 | Cogeneration | No | Yes | 1488 | 7092 | 1488 | 0.0062 |
| NJ | Linden Cogeneration Facility | 50006 | 005001 | Cogeneration | No | Yes | 1113 | 6500 | 1374 | 0.0254 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NJ | Linden Cogeneration Facility | 50006 | 006001 | Cogeneration | No | Yes | 1283 | 6096 | 1298 | 0.0262 |
| NJ | Linden Cogeneration Facility | 50006 | 007001 | Cogeneration | No | Yes | 1203 | 6836 | 1463 | 0.0253 |
| NJ | Linden Cogeneration Facility | 50006 | 008001 | Cogeneration | No | Yes | 1135 | 6113 | 1469 | 0.0257 |
| NJ | Linden Cogeneration Facility | 50006 | 009001 | Cogeneration | No | Yes | 1225 | 6541 | 1474 | 0.0248 |
| NJ | Linden Generating Station | 2406 | 1101 | Electric Utility | No | Yes | 1488 | 6244 | 1363 | 0.0102 |
| NJ | Linden Generating Station | 2406 | 1201 | Electric Utility | No | Yes | 1413 | 4658 | 1238 | 0.0170 |
| NJ | Linden Generating Station | 2406 | 2101 | Electric Utility | No | Yes | 1432 | 5167 | 1344 | 0.0121 |
| NJ | Linden Generating Station | 2406 | 2201 | Electric Utility | No | Yes | 1472 | 5039 | 1370 | 0.0131 |
| NJ | Linden Generating Station | 2406 | 5 | Electric Utility | No | Yes | 186 | 183 | 84 | 0.0535 |
| NJ | Linden Generating Station | 2406 | 6 | Electric Utility | No | Yes | 224 | 237 | 102 | 0.0625 |
| NJ | Linden Generating Station | 2406 | 7 | Electric Utility | Yes | Yes | 178 | 221 | 84 | 0.0656 |
| NJ | Linden Generating Station | 2406 | 8 | Electric Utility | Yes | Yes | 161 | 195 | 88 | 0.0682 |
| NJ | Logan Generating Plant | 10043 | 1001 | Electric Utility | No | Yes | 1488 | 7077 | 1453 | 0.1147 |
| NJ | Mercer Generating Station | 2408 | 1 | Electric Utility | No | Yes | 140 | | 0 | |
| NJ | Mercer Generating Station | 2408 | 2 | Electric Utility | No | Yes | 255 | | 0 | |
| NJ | Mickleton Energy Center | 8008 | 001001 | Electric Utility | Yes | Yes | 70 | 65 | 7 | 1.1100 |
| NJ | Newark Bay Cogen | 50385 | 1001 | Cogeneration | Yes | Yes | 986 | 498 | 205 | 0.0609 |
| NJ | Newark Bay Cogen | 50385 | 2001 | Cogeneration | Yes | Yes | 980 | 484 | 204 | 0.0635 |
| NJ | Newark Energy Center | 58079 | U001 | Electric Utility | No | Yes | 1470 | 6881 | 1488 | 0.0064 |
| NJ | Newark Energy Center | 58079 | U002 | Electric Utility | No | Yes | 1467 | 6680 | 1475 | 0.0063 |
| NJ | North Jersey Energy Associates | 10308 | 1001 | Cogeneration | No | Yes | 1279 | 3318 | 1272 | 0.0835 |
| NJ | North Jersey Energy Associates | 10308 | 1002 | Cogeneration | No | Yes | 1292 | 3217 | 1237 | 0.0864 |
| NJ | Ocean Peaking Power | 55938 | OPP3 | Electric Utility | No | Yes | 627 | 940 | 284 | 0.0389 |
| NJ | Ocean Peaking Power | 55938 | OPP4 | Electric Utility | No | Yes | 647 | 880 | 276 | 0.0392 |
| NJ | Pedricktown Cogeneration Plant | 10099 | 001001 | Electric Utility | Yes | Yes | 832 | 495 | 162 | 0.0458 |
| NJ | Red Oak Power, LLC | 55239 | 1 | Electric Utility | No | Yes | 1486 | 6979 | 1488 | 0.0102 |
| NJ | Red Oak Power, LLC | 55239 | 2 | Electric Utility | No | Yes | 1488 | 6571 | 1479 | 0.0104 |
| NJ | Red Oak Power, LLC | 55239 | 3 | Electric Utility | No | Yes | 1480 | 6916 | 1488 | 0.0102 |
| NJ | Salem Generating Station | 2410 | 2001 | Electric Utility | Yes | Yes | 3 | 8 | 1 | 1.1998 |
| NJ | Sayreville | 2390 | 012001 | Electric Utility | Yes | Yes | 20 | 21 | 2 | 0.1499 |
| NJ | Sayreville | 2390 | 014001 | Electric Utility | Yes | Yes | 31 | 17 | 3 | 0.1504 |
| NJ | Sayreville | 2390 | 015001 | Electric Utility | Yes | Yes | 40 | 14 | 8 | 0.1499 |
| NJ | Sayreville | 2390 | 016001 | Electric Utility | Yes | Yes | 32 | 9 | 5 | 0.1500 |
| NJ | Sewaren Generating Station | 2411 | 1 | Electric Utility | No | Yes | 307 | 0 | 0 | 0.0000 |
| NJ | Sewaren Generating Station | 2411 | 2 | Electric Utility | No | Yes | 421 | 0 | 0 | 0.0000 |
| NJ | Sewaren Generating Station | 2411 | 3 | Electric Utility | No | Yes | 305 | 0 | 0 | 0.0000 |
| NJ | Sewaren Generating Station | 2411 | 4 | Electric Utility | No | Yes | 308 | 0 | 0 | 0.0000 |
| NJ | Sewaren Generating Station | 2411 | 7 | Electric Utility | No | Yes | | 5426 | 1216 | 0.0064 |
| NJ | Sherman Avenue | 7288 | 1 | Electric Utility | Yes | Yes | 256 | 683 | 288 | 0.0727 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NJ | West Deptford Energy Station | 56963 | E101 | Electric Utility | No | Yes | 1448 | 6629 | 1482 | 0.0061 |
| NJ | West Deptford Energy Station | 56963 | E102 | Electric Utility | No | Yes | 1434 | 6681 | 1487 | 0.0062 |
| NJ | West Station | 6776 | 002001 | Electric Utility | Yes | Yes | 6 | 4 | 0 | 0.4125 |
| NJ | Woodbridge Energy Center | 57839 | 0001 | Electric Utility | No | Yes | 1483 | 6536 | 1439 | 0.0057 |
| NJ | Woodbridge Energy Center | 57839 | 0002 | Electric Utility | No | Yes | 1481 | 6500 | 1442 | 0.0057 |
| NY | 23rd and 3rd | 7910 | 2301 | Electric Utility | No | Yes | 789 | 2489 | 962 | 0.0145 |
| NY | 23rd and 3rd | 7910 | 2302 | Electric Utility | No | Yes | 783 | 1968 | 799 | 0.0175 |
| NY | 59th Street | 2503 | BLR114 | Electric Utility | No | No | 118 | 366 | 110 | 0.0661 |
| NY | 59th Street | 2503 | BLR115 | Electric Utility | No | No | 364 | 1191 | 458 | 0.0744 |
| NY | 59th Street | 2503 | BLR116 | Electric Utility | No | No | 691 | 2340 | 829 | 0.0574 |
| NY | 59th Street | 2503 | BLR117 | Electric Utility | No | No | 766 | 2410 | 839 | 0.0573 |
| NY | 59th Street | 2503 | BLR118 | Electric Utility | No | No | 742 | 2179 | 826 | 0.0578 |
| NY | 59th Street | 2503 | CT0001 | Electric Utility | No | No | 6 | 7 | 0 | 1.5000 |
| NY | 74th Street | 2504 | 120 | Electric Utility | No | No | 0 | 747 | 114 | 0.0733 |
| NY | 74th Street | 2504 | 121 | Electric Utility | No | No | 0 | 221 | 90 | 0.0746 |
| NY | 74th Street | 2504 | 122 | Electric Utility | No | No | 0 | 713 | 76 | 0.0633 |
| NY | 74th Street | 2504 | CT0001 | Electric Utility | No | No | 3 | 13 | 0 | 1.5000 |
| NY | 74th Street | 2504 | CT0002 | Electric Utility | No | No | 0 | 27 | 4 | 1.5000 |
| NY | AG - Energy | 10803 | 1 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | AG - Energy | 10803 | 2 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Allegany Station No. 133 | 10619 | 00001 | Electric Utility | No | Yes | 586 | 683 | 491 | 0.0323 |
| NY | Arthur Kill | 2490 | 20 | Electric Utility | No | Yes | 1387 | 6026 | 1435 | 0.0560 |
| NY | Arthur Kill | 2490 | 30 | Electric Utility | No | Yes | 1026 | 3063 | 1026 | 0.0653 |
| NY | Arthur Kill | 2490 | CT0001 | Electric Utility | Yes | Yes | 18 | 96 | 43 | 0.3230 |
| NY | Astoria Energy | 55375 | CT1 | Electric Utility | No | Yes | 1446 | 7122 | 1482 | 0.0072 |
| NY | Astoria Energy | 55375 | CT2 | Electric Utility | No | Yes | 1333 | 6793 | 1446 | 0.0064 |
| NY | Astoria Energy | 55375 | CT3 | Electric Utility | No | Yes | 1366 | 6428 | 1467 | 0.0096 |
| NY | Astoria Energy | 55375 | CT4 | Electric Utility | No | Yes | 1385 | 6512 | 1453 | 0.0109 |
| NY | Astoria Gas Turbine Power | 55243 | CT0005 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Gas Turbine Power | 55243 | CT0007 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Gas Turbine Power | 55243 | CT0008 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Gas Turbine Power | 55243 | CT0010 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Gas Turbine Power | 55243 | CT0011 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Gas Turbine Power | 55243 | CT0012 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Gas Turbine Power | 55243 | CT0013 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-1A | Electric Utility | Yes | Yes | 81 | 220 | 80 | 0.4915 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-1B | Electric Utility | Yes | Yes | 81 | 220 | 80 | 0.4884 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-2A | Electric Utility | Yes | Yes | 102 | 114 | 56 | 0.4880 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-2B | Electric Utility | Yes | Yes | 102 | 114 | 56 | 0.4850 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-3A | Electric Utility | Yes | Yes | 60 | 160 | 67 | 0.4903 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-3B | Electric Utility | Yes | Yes | 60 | 160 | 67 | 0.4873 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-4A | Electric Utility | Yes | Yes | 69 | 174 | 61 | 0.4910 |
| NY | Astoria Gas Turbine Power | 55243 | CT2-4B | Electric Utility | Yes | Yes | 69 | 174 | 61 | 0.4878 |
| NY | Astoria Gas Turbine Power | 55243 | CT3-1A | Electric Utility | Yes | Yes | 104 | 106 | 44 | 0.4848 |
| NY | Astoria Gas Turbine Power | 55243 | CT3-1B | Electric Utility | Yes | Yes | 104 | 106 | 44 | 0.4878 |
| NY | Astoria Gas Turbine Power | 55243 | CT3-2A | Electric Utility | Yes | Yes | 97 | 99 | 48 | 0.4916 |
| NY | Astoria Gas Turbine Power | 55243 | CT3-2B | Electric Utility | Yes | Yes | 97 | 99 | 48 | 0.4821 |
| NY | Astoria Gas Turbine Power | 55243 | CT3-3A | Electric Utility | Yes | Yes | 70 | 57 | 28 | 0.4921 |
| NY | Astoria Gas Turbine Power | 55243 | CT3-3B | Electric Utility | Yes | Yes | 70 | 57 | 28 | 0.4889 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | Astoria Gas Turbine Power | 55243 | CT3-4A | Electric Utility | Yes | Yes | 53 | 83 | 46 | 0.4915 |
| NY | Astoria Gas Turbine Power | 55243 | CT3-4B | Electric Utility | Yes | Yes | 53 | 88 | 49 | 0.4833 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-1A | Electric Utility | Yes | Yes | 81 | 178 | 61 | 0.4670 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-1B | Electric Utility | Yes | Yes | 81 | 181 | 61 | 0.4640 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-2A | Electric Utility | Yes | Yes | 93 | 232 | 89 | 0.4362 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-2B | Electric Utility | Yes | Yes | 93 | 232 | 89 | 0.4556 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-3A | Electric Utility | Yes | Yes | 107 | 125 | 50 | 0.4903 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-3B | Electric Utility | Yes | Yes | 107 | 126 | 50 | 0.4878 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-4A | Electric Utility | Yes | Yes | 85 | 144 | 47 | 0.4918 |
| NY | Astoria Gas Turbine Power | 55243 | CT4-4B | Electric Utility | Yes | Yes | 85 | 144 | 47 | 0.4888 |
| NY | Astoria Generating Station | 8906 | 20 | Electric Utility | Yes | Yes | 71 | 268 | 176 | 0.0814 |
| NY | Astoria Generating Station | 8906 | 31RH | Electric Utility | Yes | Yes | 1141 | 4967 | 1111 | 0.0414 |
| NY | Astoria Generating Station | 8906 | 32SH | Electric Utility | Yes | Yes | 1141 | 4967 | 1111 | 0.0446 |
| NY | Astoria Generating Station | 8906 | 41SH | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Generating Station | 8906 | 42RH | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Astoria Generating Station | 8906 | 51RH | Electric Utility | Yes | Yes | 945 | 4070 | 1118 | 0.0473 |
| NY | Astoria Generating Station | 8906 | 52SH | Electric Utility | Yes | Yes | 943 | 4039 | 1106 | 0.0473 |
| NY | Astoria Generating Station | 8906 | CT0001 | Electric Utility | Yes | Yes | 55 | 125 | 40 | 0.4557 |
| NY | Athens Generating Company | 55405 | 1 | Electric Utility | No | Yes | 1191 | 4621 | 1476 | 0.0091 |
| NY | Athens Generating Company | 55405 | 2 | Electric Utility | No | Yes | 1304 | 3430 | 1327 | 0.0128 |
| NY | Athens Generating Company | 55405 | 3 | Electric Utility | No | Yes | 1179 | 5093 | 1416 | 0.0098 |
| NY | Batavia Energy | 54593 | 1 | Cogeneration | Yes | Yes | 673 | 832 | 660 | 0.1340 |
| NY | Bayswater Peaking Facility | 55699 | 1 | Electric Utility | No | Yes | 1257 | 3202 | 1046 | 0.0099 |
| NY | Bayswater Peaking Facility | 55699 | 2 | Electric Utility | No | Yes | 151 | 256 | 147 | 0.0313 |
| NY | Beaver Falls, LLC | 10617 | 1 | Cogeneration | Yes | Yes | 17 | 198 | 224 | 0.1048 |
| NY | Bethlehem Energy Center (Albany) | 2539 | 10001 | Electric Utility | No | Yes | 1371 | 6212 | 1385 | 0.0145 |
| NY | Bethlehem Energy Center (Albany) | 2539 | 10002 | Electric Utility | No | Yes | 1440 | 5958 | 1457 | 0.0116 |
| NY | Bethlehem Energy Center (Albany) | 2539 | 10003 | Electric Utility | No | Yes | 1474 | 7025 | 1454 | 0.0077 |
| NY | Bethpage Energy Center | 50292 | GT1 | Electric Utility | No | Yes | 1414 | 4587 | 1064 | 0.1204 |
| NY | Bethpage Energy Center | 50292 | GT2 | Electric Utility | No | Yes | 1449 | 4034 | 1007 | 0.1325 |
| NY | Bethpage Energy Center | 50292 | GT3 | Electric Utility | No | Yes | 1026 | 1922 | 695 | 0.0096 |
| NY | Bethpage Energy Center | 50292 | GT4 | Electric Utility | No | Yes | 1399 | 2057 | 774 | 0.0071 |
| NY | Binghamton Cogen Plant | 55600 | 1 | Cogeneration | No | Yes | 507 | | 0 | |
| NY | Black River Generation, LLC | 10464 | E0001 | Electric Utility | No | Yes | 1481 | 6886 | 1414 | 0.1376 |
| NY | Black River Generation, LLC | 10464 | E0002 | Electric Utility | No | Yes | 1365 | 6882 | 1440 | 0.1382 |
| NY | Black River Generation, LLC | 10464 | E0003 | Electric Utility | No | Yes | 1317 | 7104 | 1459 | 0.1378 |
| NY | Bowline Generating Station | 2625 | 1 | Electric Utility | Yes | Yes | 0 | 974 | 372 | 0.0819 |
| NY | Bowline Generating Station | 2625 | 2 | Electric Utility | Yes | Yes | 887 | 1354 | 727 | 0.0842 |
| NY | Brentwood | 7912 | BW01 | Electric Utility | No | Yes | 556 | 2037 | 701 | 0.0206 |
| NY | Brooklyn Navy Yard Cogeneration | 54914 | 1 | Cogeneration | No | Yes | 1488 | 7165 | 1487 | 0.0062 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | Brooklyn Navy Yard Cogeneration | 54914 | 2 | Cogeneration | No | Yes | 1470 | 6682 | 1488 | 0.0064 |
| NY | Caithness Long Island Energy Center | 56234 | 0001 | Electric Utility | No | Yes | 1488 | 7143 | 1488 | 0.0065 |
| NY | Carr Street Generating Station | 50978 | A | Electric Utility | No | Yes | 1121 | 1967 | 846 | 0.0289 |
| NY | Carr Street Generating Station | 50978 | B | Electric Utility | No | Yes | 690 | 1951 | 832 | 0.0302 |
| NY | Carthage Energy | 10620 | 1 | Cogeneration | Yes | Yes | 232 | 573 | 468 | 0.1412 |
| NY | Castleton Power, LLC | 10190 | 1 | Electric Utility | No | Yes | 1352 | 1678 | 1034 | 0.0631 |
| NY | Cayuga Operating Company, LLC | 2535 | 1 | Electric Utility | Yes | Yes | 1348 | 1491 | 798 | 0.2637 |
| NY | Cayuga Operating Company, LLC | 2535 | 2 | Electric Utility | Yes | Yes | 95 | 0 | 0 | 0.0000 |
| NY | Cornell University Ithaca Campus | 50368 | CT1 | Institutional | No | No | 1474 | 7008 | 1 | 0.0072 |
| NY | Cornell University Ithaca Campus | 50368 | CT2 | Institutional | No | No | 1471 | 6387 | 1 | 0.0077 |
| NY | Covanta Niagara | 50472 | BLR05 | Industrial Boiler | No | No | 818 | 4403 | 818 | 0.0293 |
| NY | Covanta Niagara | 50472 | R1B01 | Cogeneration | Yes | Yes | 625 | 1866 | 345 | 0.0504 |
| NY | Covanta Niagara | 50472 | R1B02 | Cogeneration | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Danskammer Generating Station | 2480 | 1 | Electric Utility | Yes | Yes | 96 | 105 | 0 | 0.0589 |
| NY | Danskammer Generating Station | 2480 | 2 | Electric Utility | Yes | Yes | 62 | 70 | 0 | 0.0822 |
| NY | Danskammer Generating Station | 2480 | 3 | Electric Utility | Yes | Yes | 89 | 275 | 74 | 0.1651 |
| NY | Danskammer Generating Station | 2480 | 4 | Electric Utility | Yes | Yes | 126 | 132 | 64 | 0.0736 |
| NY | E F Barrett | 2511 | 10 | Electric Utility | No | Yes | 1488 | 5977 | 1435 | 0.0761 |
| NY | E F Barrett | 2511 | 20 | Electric Utility | No | Yes | 1488 | 6015 | 1473 | 0.0467 |
| NY | E F Barrett | 2511 | U00004 | Electric Utility | Yes | Yes | 271 | 608 | 209 | 0.2948 |
| NY | E F Barrett | 2511 | U00005 | Electric Utility | Yes | Yes | 227 | 586 | 268 | 0.2967 |
| NY | E F Barrett | 2511 | U00006 | Electric Utility | Yes | Yes | 259 | 771 | 299 | 0.2976 |
| NY | E F Barrett | 2511 | U00007 | Electric Utility | Yes | Yes | 309 | 980 | 441 | 0.2980 |
| NY | E F Barrett | 2511 | U00008 | Electric Utility | Yes | Yes | 181 | 721 | 284 | 0.2987 |
| NY | E F Barrett | 2511 | U00009 | Electric Utility | Yes | Yes | 260 | 603 | 291 | 0.2975 |
| NY | E F Barrett | 2511 | U00010 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | E F Barrett | 2511 | U00011 | Electric Utility | Yes | Yes | 240 | 582 | 283 | 0.2975 |
| NY | E F Barrett | 2511 | U00012 | Electric Utility | Yes | Yes | 368 | 963 | 391 | 0.4356 |
| NY | E F Barrett | 2511 | U00013 | Electric Utility | Yes | Yes | 368 | 963 | 391 | 0.4356 |
| NY | E F Barrett | 2511 | U00014 | Electric Utility | Yes | Yes | 347 | 800 | 310 | 0.4368 |
| NY | E F Barrett | 2511 | U00015 | Electric Utility | Yes | Yes | 347 | 800 | 310 | 0.4368 |
| NY | E F Barrett | 2511 | U00016 | Electric Utility | No | Yes | 465 | 1499 | 547 | 0.4349 |
| NY | E F Barrett | 2511 | U00017 | Electric Utility | No | Yes | 465 | 1499 | 547 | 0.4349 |
| NY | E F Barrett | 2511 | U00018 | Electric Utility | Yes | Yes | 428 | 1069 | 394 | 0.4379 |
| NY | E F Barrett | 2511 | U00019 | Electric Utility | Yes | Yes | 428 | 1069 | 394 | 0.4379 |
| NY | East Hampton Facility | 2512 | UGT001 | Electric Utility | No | Yes | 546 | 1541 | 725 | 0.4787 |
| NY | East River | 2493 | 1 | Cogeneration | No | Yes | 1396 | 6496 | 1418 | 0.0077 |
| NY | East River | 2493 | 2 | Cogeneration | No | Yes | 1486 | 6362 | 1318 | 0.0080 |
| NY | East River | 2493 | 60 | Cogeneration | No | Yes | 1487 | 5855 | 1395 | 0.1114 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | East River | 2493 | 70 | Electric Utility | No | Yes | 1210 | 3912 | 953 | 0.0936 |
| NY | Edgewood Energy | 55786 | CT01 | Electric Utility | No | Yes | 609 | 1689 | 656 | 0.0200 |
| NY | Edgewood Energy | 55786 | CT02 | Electric Utility | No | Yes | 627 | 1569 | 611 | 0.0186 |
| NY | Empire Generating Co, LLC | 56259 | CT-1 | Electric Utility | No | Yes | 1386 | 6740 | 1483 | 0.0095 |
| NY | Empire Generating Co, LLC | 56259 | CT-2 | Electric Utility | No | Yes | 1263 | 5028 | 1161 | 0.0131 |
| NY | Equus Power I | 56032 | 0001 | Electric Utility | No | Yes | 904 | 1283 | 417 | 0.0241 |
| NY | Fortistar North Tonawanda Inc | 54131 | NTCT1 | Cogeneration | Yes | Yes | 1293 | 422 | 458 | 0.0901 |
| NY | Freeport Power Plant No. 2 | 2679 | 5 | Electric Utility | No | Yes | 567 | 805 | 376 | 0.0647 |
| NY | Glenwood Landing Energy Center | 7869 | UGT011 | Electric Utility | Yes | Yes | 10 | 33 | 32 | 1.1999 |
| NY | Glenwood Landing Energy Center | 7869 | UGT012 | Electric Utility | No | Yes | 947 | 1566 | 592 | 0.0393 |
| NY | Glenwood Landing Energy Center | 7869 | UGT013 | Electric Utility | No | Yes | 961 | 1695 | 616 | 0.0445 |
| NY | Glenwood | 2514 | U00020 | Electric Utility | Yes | Yes | 36 | 22 | 9 | 0.5746 |
| NY | Glenwood | 2514 | U00021 | Electric Utility | Yes | Yes | 22 | 36 | 9 | 0.5586 |
| NY | Gowanus Generating Station | 2494 | CT01-1 | Electric Utility | Yes | Yes | 0 | 11 | 2 | 0.5719 |
| NY | Gowanus Generating Station | 2494 | CT01-2 | Electric Utility | Yes | Yes | 6 | 14 | 0 | 0.5715 |
| NY | Gowanus Generating Station | 2494 | CT01-3 | Electric Utility | Yes | Yes | 4 | 6 | 0 | 0.5720 |
| NY | Gowanus Generating Station | 2494 | CT01-4 | Electric Utility | Yes | Yes | 0 | 12 | 0 | 0.5720 |
| NY | Gowanus Generating Station | 2494 | CT01-5 | Electric Utility | Yes | Yes | 0 | 6 | 0 | 0.5720 |
| NY | Gowanus Generating Station | 2494 | CT01-6 | Electric Utility | Yes | Yes | 3 | 6 | 0 | 0.5720 |
| NY | Gowanus Generating Station | 2494 | CT01-7 | Electric Utility | Yes | Yes | 0 | 8 | 6 | 0.5720 |
| NY | Gowanus Generating Station | 2494 | CT01-8 | Electric Utility | Yes | Yes | 8 | 6 | 6 | 0.5720 |
| NY | Gowanus Generating Station | 2494 | CT02-1 | Electric Utility | Yes | Yes | 38 | 182 | 117 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT02-2 | Electric Utility | Yes | Yes | 69 | 156 | 99 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT02-3 | Electric Utility | Yes | Yes | 62 | 114 | 86 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT02-4 | Electric Utility | Yes | Yes | 51 | 100 | 64 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT02-5 | Electric Utility | Yes | Yes | 85 | 71 | 27 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT02-6 | Electric Utility | Yes | Yes | 49 | 89 | 38 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT02-7 | Electric Utility | Yes | Yes | 101 | 101 | 58 | 0.3211 |
| NY | Gowanus Generating Station | 2494 | CT02-8 | Electric Utility | Yes | Yes | 49 | 51 | 23 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT03-1 | Electric Utility | Yes | Yes | 55 | 103 | 44 | 0.3210 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | Gowanus Generating Station | 2494 | CT03-2 | Electric Utility | Yes | Yes | 76 | 59 | 23 | 0.3209 |
| NY | Gowanus Generating Station | 2494 | CT03-3 | Electric Utility | Yes | Yes | 43 | 69 | 29 | 0.3209 |
| NY | Gowanus Generating Station | 2494 | CT03-4 | Electric Utility | Yes | Yes | 43 | 100 | 48 | 0.3209 |
| NY | Gowanus Generating Station | 2494 | CT03-5 | Electric Utility | Yes | Yes | 53 | 150 | 96 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT03-6 | Electric Utility | Yes | Yes | 29 | 93 | 40 | 0.3209 |
| NY | Gowanus Generating Station | 2494 | CT03-7 | Electric Utility | Yes | Yes | 55 | 51 | 23 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT03-8 | Electric Utility | Yes | Yes | 55 | 49 | 20 | 0.3210 |
| NY | Gowanus Generating Station | 2494 | CT04-1 | Electric Utility | Yes | Yes | 4 | 13 | 6 | 0.6902 |
| NY | Gowanus Generating Station | 2494 | CT04-2 | Electric Utility | Yes | Yes | 0 | 12 | 0 | 0.6902 |
| NY | Gowanus Generating Station | 2494 | CT04-3 | Electric Utility | Yes | Yes | 3 | 12 | 0 | 0.6898 |
| NY | Gowanus Generating Station | 2494 | CT04-4 | Electric Utility | Yes | Yes | 2 | 8 | 0 | 0.6903 |
| NY | Gowanus Generating Station | 2494 | CT04-5 | Electric Utility | Yes | Yes | 3 | 12 | 3 | 0.6900 |
| NY | Gowanus Generating Station | 2494 | CT04-6 | Electric Utility | Yes | Yes | 3 | 14 | 0 | 0.6901 |
| NY | Gowanus Generating Station | 2494 | CT04-7 | Electric Utility | Yes | Yes | 0 | 8 | 0 | 0.6898 |
| NY | Gowanus Generating Station | 2494 | CT04-8 | Electric Utility | Yes | Yes | 3 | 5 | 0 | 0.6900 |
| NY | Greenidge Generation LLC | 2527 | 6 | Electric Utility | No | Yes | 0 | 2478 | 1199 | 0.0986 |
| NY | Harlem River Yard | 7914 | HR01 | Electric Utility | No | Yes | 247 | 1155 | 525 | 0.0157 |
| NY | Harlem River Yard | 7914 | HR02 | Electric Utility | No | Yes | 294 | 737 | 401 | 0.0211 |
| NY | Hawkeye Energy Greenport, LLC | 55969 | U-01 | Electric Utility | No | Yes | 291 | 1086 | 561 | 0.0385 |
| NY | Hell Gate | 7913 | HG01 | Electric Utility | No | Yes | 308 | 1170 | 553 | 0.0181 |
| NY | Hell Gate | 7913 | HG02 | Electric Utility | No | Yes | 235 | 691 | 401 | 0.0213 |
| NY | Hillburn | 2628 | 001 | Electric Utility | Yes | Yes | 10 | 30 | 13 | 0.3100 |
| NY | Holtsville Facility | 8007 | U00001 | Electric Utility | Yes | Yes | 54 | 54 | 31 | 0.4153 |
| NY | Holtsville Facility | 8007 | U00002 | Electric Utility | Yes | Yes | 54 | 54 | 31 | 0.4153 |
| NY | Holtsville Facility | 8007 | U00003 | Electric Utility | Yes | Yes | 46 | 35 | 30 | 0.5314 |
| NY | Holtsville Facility | 8007 | U00004 | Electric Utility | Yes | Yes | 46 | 36 | 30 | 0.5335 |
| NY | Holtsville Facility | 8007 | U00005 | Electric Utility | Yes | Yes | 90 | 86 | 44 | 0.4761 |
| NY | Holtsville Facility | 8007 | U00006 | Electric Utility | Yes | Yes | 90 | 86 | 44 | 0.5065 |
| NY | Holtsville Facility | 8007 | U00007 | Electric Utility | Yes | Yes | 111 | 66 | 33 | 0.4782 |
| NY | Holtsville Facility | 8007 | U00008 | Electric Utility | Yes | Yes | 111 | 66 | 33 | 0.4907 |
| NY | Holtsville Facility | 8007 | U00009 | Electric Utility | Yes | Yes | 48 | 65 | 23 | 0.5954 |
| NY | Holtsville Facility | 8007 | U00010 | Electric Utility | Yes | Yes | 48 | 65 | 23 | 0.5649 |
| NY | Holtsville Facility | 8007 | U00011 | Electric Utility | Yes | Yes | 152 | 285 | 160 | 0.5888 |
| NY | Holtsville Facility | 8007 | U00012 | Electric Utility | Yes | Yes | 152 | 285 | 160 | 0.6216 |
| NY | Holtsville Facility | 8007 | U00013 | Electric Utility | Yes | Yes | 85 | 153 | 137 | 0.6160 |
| NY | Holtsville Facility | 8007 | U00014 | Electric Utility | Yes | Yes | 85 | 153 | 137 | 0.6048 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | Holtsville Facility | 8007 | U00015 | Electric Utility | Yes | Yes | 101 | 157 | 83 | 0.5081 |
| NY | Holtsville Facility | 8007 | U00016 | Electric Utility | Yes | Yes | 101 | 157 | 83 | 0.4425 |
| NY | Holtsville Facility | 8007 | U00017 | Electric Utility | Yes | Yes | 65 | 118 | 86 | 0.4362 |
| NY | Holtsville Facility | 8007 | U00018 | Electric Utility | Yes | Yes | 65 | 118 | 86 | 0.4940 |
| NY | Holtsville Facility | 8007 | U00019 | Electric Utility | Yes | Yes | | 196 | 117 | 0.6147 |
| NY | Holtsville Facility | 8007 | U00020 | Electric Utility | Yes | Yes | 140 | 196 | 117 | 0.5906 |
| NY | Hudson Avenue | 2496 | CT0003 | Electric Utility | Yes | Yes | 12 | 27 | 0 | 1.5000 |
| NY | Hudson Avenue | 2496 | CT0004 | Electric Utility | Yes | Yes | 2 | 0 | 0 | 0.0000 |
| NY | Hudson Avenue | 2496 | CT0005 | Electric Utility | Yes | Yes | 6 | 60 | 31 | 1.5000 |
| NY | Huntley Power | 2549 | 67 | Electric Utility | No | Yes | 0 | | 0 | |
| NY | Huntley Power | 2549 | 68 | Electric Utility | No | Yes | 0 | | 0 | |
| NY | Indeck-Corinth Energy Center | 50458 | 1 | Cogeneration | No | Yes | 1324 | 3716 | 1313 | 0.0256 |
| NY | Indeck-Olean Energy Center | 54076 | 1 | Cogeneration | No | Yes | 685 | 2240 | 864 | 0.0428 |
| NY | Indeck-Oswego Energy Center | 50450 | 1 | Cogeneration | Yes | Yes | 818 | 1518 | 694 | 0.1265 |
| NY | Indeck-Silver Springs Energy Center | 50449 | 1 | Cogeneration | No | Yes | 886 | 2103 | 949 | 0.1004 |
| NY | Indeck-Yerkes Energy Center | 50451 | 1 | Cogeneration | Yes | Yes | 891 | 1759 | 763 | 0.1581 |
| NY | Independence | 54547 | 1 | Cogeneration | No | Yes | 1463 | 5036 | 1401 | 0.0238 |
| NY | Independence | 54547 | 2 | Cogeneration | No | Yes | 1488 | 4875 | 1352 | 0.0260 |
| NY | Independence | 54547 | 3 | Cogeneration | No | Yes | 1486 | 4898 | 1292 | 0.0272 |
| NY | Independence | 54547 | 4 | Cogeneration | No | Yes | 1472 | 5172 | 1309 | 0.0252 |
| NY | KIAC Cogeneration | 54114 | GT1 | Cogeneration | No | Yes | 1254 | 4729 | 1135 | 0.0273 |
| NY | KIAC Cogeneration | 54114 | GT2 | Cogeneration | No | Yes | 1469 | 5773 | 1244 | 0.0274 |
| NY | Lehigh Northeast Cement Company | 880052 | 01070 | Cement Manufacturing | No | No | 1358 | 2821 | 0 | 0.0000 |
| NY | Lockport | 54041 | 011854 | Cogeneration | Yes | Yes | 1329 | 2760 | 1025 | 0.1160 |
| NY | Lockport | 54041 | 011855 | Cogeneration | Yes | Yes | 1418 | 2960 | 1217 | 0.2497 |
| NY | Lockport | 54041 | 011856 | Cogeneration | Yes | Yes | 1318 | 2701 | 1054 | 0.1014 |
| NY | Massena Energy Facility | 54592 | 001 | Cogeneration | Yes | Yes | 54 | 52 | 5 | 0.4999 |
| NY | Momentive Performance Materials | 880024 | U28006 | Industrial Boiler | No | No | 1392 | 2997 | 1389 | 0.0514 |
| NY | Narrows Generating Station | 2499 | CT01-1 | Electric Utility | Yes | Yes | 200 | 549 | 345 | 0.3350 |
| NY | Narrows Generating Station | 2499 | CT01-2 | Electric Utility | Yes | Yes | 278 | 357 | 244 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT01-3 | Electric Utility | Yes | Yes | 356 | 458 | 303 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT01-4 | Electric Utility | Yes | Yes | 238 | 303 | 198 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT01-5 | Electric Utility | Yes | Yes | 200 | 400 | 270 | 0.3350 |
| NY | Narrows Generating Station | 2499 | CT01-6 | Electric Utility | Yes | Yes | 183 | 387 | 271 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT01-7 | Electric Utility | Yes | Yes | 148 | 530 | 336 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT01-8 | Electric Utility | Yes | Yes | 307 | 436 | 285 | 0.3351 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | Narrows Generating Station | 2499 | CT02-1 | Electric Utility | Yes | Yes | 196 | 354 | 248 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT02-2 | Electric Utility | Yes | Yes | 276 | 351 | 244 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT02-3 | Electric Utility | Yes | Yes | 323 | 439 | 289 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT02-4 | Electric Utility | Yes | Yes | 160 | 644 | 422 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT02-5 | Electric Utility | Yes | Yes | 340 | 429 | 270 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT02-6 | Electric Utility | Yes | Yes | 109 | 271 | 175 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT02-7 | Electric Utility | Yes | Yes | 408 | 621 | 407 | 0.3351 |
| NY | Narrows Generating Station | 2499 | CT02-8 | Electric Utility | Yes | Yes | 172 | 660 | 393 | 0.3351 |
| NY | Nassau Energy Corporation | 52056 | 00004 | Cogeneration | No | Yes | 1461 | 6374 | 1265 | 0.1369 |
| NY | Niagara Generation, LLC | 50202 | 1 | Electric Utility | No | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Nissequogue Energy Center | 54149 | 1 | Cogeneration | No | Yes | 1448 | 6555 | 1394 | 0.0772 |
| NY | North 1st | 7915 | NO1 | Electric Utility | No | Yes | 521 | 1827 | 750 | 0.0146 |
| NY | Northport | 2516 | 1 | Electric Utility | No | Yes | 1189 | 2130 | 1001 | 0.0477 |
| NY | Northport | 2516 | 2 | Electric Utility | No | Yes | 1134 | 3420 | 1190 | 0.0479 |
| NY | Northport | 2516 | 3 | Electric Utility | No | Yes | 833 | 3828 | 1306 | 0.0575 |
| NY | Northport | 2516 | 4 | Electric Utility | No | Yes | 1420 | 4232 | 1171 | 0.0472 |
| NY | Northport | 2516 | UGT001 | Electric Utility | Yes | Yes | 14 | 24 | 10 | 1.2002 |
| NY | NRG Dunkirk Power | 2554 | 1 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | NRG Dunkirk Power | 2554 | 2 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | NRG Dunkirk Power | 2554 | 3 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | NRG Dunkirk Power | 2554 | 4 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Oswego Harbor Power | 2594 | 5 | Electric Utility | Yes | Yes | 41 | 145 | 89 | 0.1053 |
| NY | Oswego Harbor Power | 2594 | 6 | Electric Utility | Yes | Yes | 68 | 254 | 237 | 0.0681 |
| NY | Pinelawn Power | 56188 | 00001 | Electric Utility | No | Yes | 791 | 2327 | 619 | 0.0158 |
| NY | Poletti 500 MW CC | 56196 | CTG7A | Electric Utility | No | Yes | 1260 | 5994 | 1431 | 0.0100 |
| NY | Poletti 500 MW CC | 56196 | CTG7B | Electric Utility | No | Yes | 1354 | 6088 | 1407 | 0.0116 |
| NY | Port Jefferson Energy Center | 2517 | 3 | Electric Utility | Yes | Yes | 1293 | 1750 | 795 | 0.0543 |
| NY | Port Jefferson Energy Center | 2517 | 4 | Electric Utility | No | Yes | 894 | 2230 | 970 | 0.0457 |
| NY | Port Jefferson Energy Center | 2517 | UGT001 | Electric Utility | Yes | Yes | 28 | 29 | 15 | 1.1999 |
| NY | Port Jefferson Energy Center | 2517 | UGT002 | Electric Utility | No | Yes | 560 | 1151 | 481 | 0.0325 |
| NY | Port Jefferson Energy Center | 2517 | UGT003 | Electric Utility | No | Yes | 582 | 1192 | 459 | 0.0346 |
| NY | Pouch Terminal | 8053 | PT01 | Electric Utility | No | Yes | 802 | 2455 | 926 | 0.0126 |
| NY | Ravenswood Generating Station | 2500 | 10 | Electric Utility | No | Yes | 1347 | 3358 | 1245 | 0.0628 |
| NY | Ravenswood Generating Station | 2500 | 20 | Electric Utility | No | Yes | 1488 | 3851 | 1325 | 0.0625 |
| NY | Ravenswood Generating Station | 2500 | 30 | Electric Utility | Yes | Yes | 1488 | 2405 | 790 | 0.0638 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | Ravenswood Generating Station | 2500 | CT0001 | Electric Utility | Yes | Yes | 33 | 43 | 5 | 0.7000 |
| NY | Ravenswood Generating Station | 2500 | CT0004 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT0005 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT0006 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT0007 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT0008 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT0009 | Electric Utility | Yes | Yes | 100 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT0010 | Electric Utility | Yes | Yes | 93 | 172 | 79 | 0.4300 |
| NY | Ravenswood Generating Station | 2500 | CT0011 | Electric Utility | Yes | Yes | 86 | 215 | 82 | 0.4300 |
| NY | Ravenswood Generating Station | 2500 | CT02-1 | Electric Utility | Yes | Yes | 53 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT02-2 | Electric Utility | Yes | Yes | 59 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT02-3 | Electric Utility | Yes | Yes | 53 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT02-4 | Electric Utility | Yes | Yes | 57 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT03-1 | Electric Utility | Yes | Yes | 50 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT03-2 | Electric Utility | Yes | Yes | 16 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT03-3 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | CT03-4 | Electric Utility | Yes | Yes | 64 | 0 | 0 | 0.0000 |
| NY | Ravenswood Generating Station | 2500 | UCC001 | Electric Utility | No | Yes | 1422 | 7067 | 1467 | 0.0067 |
| NY | Ravenswood Steam Plant | 880100 | BLR001 | Industrial Boiler | No | No | 17 | 112 | 16 | 0.1075 |
| NY | Ravenswood Steam Plant | 880100 | BLR002 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| NY | Ravenswood Steam Plant | 880100 | BLR003 | Industrial Boiler | No | No | 19 | 56 | 19 | 0.0828 |
| NY | Ravenswood Steam Plant | 880100 | BLR004 | Industrial Boiler | No | No | 0 | 100 | 0 | 0.1024 |
| NY | RED-Rochester, LLC-Eastman Business Park | 10025 | 3B | Industrial Boiler | No | No | 1488 | 0 | 0 | 0.0000 |
| NY | RED-Rochester, LLC-Eastman Business Park | 10025 | 4A | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| NY | RED-Rochester, LLC-Eastman Business Park | 10025 | 4B | Industrial Boiler | No | No | 1488 | 6848 | 1470 | 0.0980 |
| NY | Rensselaer Cogen | 54034 | 1GTDBS | Electric Utility | Yes | Yes | 365 | 75 | 172 | 0.0607 |
| NY | Richard M Flynn (Holtsville) | 7314 | 001 | Electric Utility | No | Yes | 1461 | 4442 | 1333 | 0.0368 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| NY | Riverbay Corp. - Co-Op City | 52168 | 0003HP | Cogeneration | No | Yes | 1451 | 6766 | 1461 | 0.0418 |
| NY | Riverbay Corp. - Co-Op City | 52168 | 00001 | Institutional | No | No | 1488 | 5883 | 1488 | 0.0895 |
| NY | Riverbay Corp. - Co-Op City | 52168 | 00004 | Cogeneration | No | Yes | 758 | 2706 | 254 | 0.0117 |
| NY | Riverbay Corp. - Co-Op City | 52168 | 00006 | Cogeneration | No | Yes | 743 | 4452 | 1146 | 0.2194 |
| NY | Roseton Generating LLC | 8006 | 1 | Electric Utility | Yes | Yes | 372 | 846 | 384 | 0.0912 |
| NY | Roseton Generating LLC | 8006 | 2 | Electric Utility | Yes | Yes | 591 | 1039 | 595 | 0.0607 |
| NY | S A Carlson | 2682 | 10 | Electric Utility | Yes | Yes | 589 | 116 | 96 | 0.0506 |
| NY | S A Carlson | 2682 | 20 | Electric Utility | No | Yes | 1484 | 3027 | 1146 | 0.1247 |
| NY | S A Carlson | 2682 | 9 | Electric Utility | Yes | Yes | 47 | 54 | 35 | 0.0582 |
| NY | Saranac Power Partners, LP | 54574 | 00001 | Cogeneration | Yes | Yes | 179 | 264 | 85 | 0.0502 |
| NY | Saranac Power Partners, LP | 54574 | 00002 | Cogeneration | Yes | Yes | 204 | 149 | 69 | 0.0404 |
| NY | Selkirk Cogen Partners | 10725 | CTG101 | Cogeneration | Yes | Yes | 741 | 467 | 388 | 0.0815 |
| NY | Selkirk Cogen Partners | 10725 | CTG201 | Cogeneration | No | Yes | 904 | 2129 | 1043 | 0.0282 |
| NY | Selkirk Cogen Partners | 10725 | CTG301 | Cogeneration | No | Yes | 861 | 1984 | 969 | 0.0284 |
| NY | Shoemaker | 2632 | 1 | Electric Utility | Yes | Yes | 19 | 36 | 28 | 0.5144 |
| NY | Shoreham Energy | 55787 | CT01 | Electric Utility | No | Yes | 59 | 130 | 83 | 0.1081 |
| NY | Shoreham Energy | 55787 | CT02 | Electric Utility | No | Yes | 61 | 154 | 96 | 0.0897 |
| NY | Somerset Operating Company (Kintigh) | 6082 | 1 | Electric Utility | Yes | Yes | 1208 | 601 | 815 | 0.1921 |
| NY | Sterling Power Plant | 50744 | 00001 | Cogeneration | Yes | Yes | 218 | 663 | 655 | 0.1254 |
| NY | Syracuse, LLC | 10621 | 1 | Electric Utility | Yes | Yes | 306 | 637 | 463 | 0.1518 |
| NY | Ticonderoga Mill | 54099 | 000044 | Pulp & Paper Mill | No | No | 1488 | 6672 | 1485 | 0.1711 |
| NY | Valley Energy Center | 56940 | 1 | Electric Utility | No | Yes | | 3208 | 816 | 0.0123 |
| NY | Valley Energy Center | 56940 | 2 | Electric Utility | No | Yes | | 3196 | 829 | 0.0078 |
| NY | Vernon Boulevard | 7909 | VB01 | Electric Utility | No | Yes | 275 | 1007 | 485 | 0.0255 |
| NY | Vernon Boulevard | 7909 | VB02 | Electric Utility | No | Yes | 338 | 1523 | 626 | 0.0256 |
| NY | Wading River Facility | 7146 | UGT007 | Electric Utility | Yes | Yes | 99 | 73 | 40 | 0.1867 |
| NY | Wading River Facility | 7146 | UGT008 | Electric Utility | Yes | Yes | 125 | 92 | 25 | 0.2060 |
| NY | Wading River Facility | 7146 | UGT009 | Electric Utility | Yes | Yes | 109 | 102 | 52 | 0.2181 |
| NY | Wading River Facility | 7146 | UGT013 | Electric Utility | Yes | Yes | 100 | 34 | 9 | 0.8381 |
| NY | Wading River Facility | 7146 | UGT014 | Electric Utility | Yes | Yes | 108 | 55 | 19 | 0.7890 |
| NY | West Babylon Facility | 2521 | UGT001 | Electric Utility | Yes | Yes | 122 | 74 | 52 | 0.9024 |
| PA | AdvanSix Resins & Chemicals LLC | 880007 | 052 | Industrial Boiler | No | Yes | 1369 | | 0 | |
| PA | Armagh Compressor Station | 880071 | 31301 | Industrial Turbine | No | No | 0 | 0 | 0 | 0.0000 |
| PA | Armstrong Power, LLC | 55347 | 1 | Electric Utility | No | Yes | 969 | 1124 | 337 | 0.0373 |
| PA | Armstrong Power, LLC | 55347 | 2 | Electric Utility | No | Yes | 915 | 1273 | 346 | 0.0351 |
| PA | Armstrong Power, LLC | 55347 | 3 | Electric Utility | No | Yes | 898 | 1437 | 453 | 0.0373 |
| PA | Armstrong Power, LLC | 55347 | 4 | Electric Utility | No | Yes | 941 | 1355 | 419 | 0.0357 |
| PA | Bernville Station | 880049 | 32001 | Industrial Turbine | No | No | 0 | 1 | 0 | 0.7000 |
| PA | Bethlehem Power Plant | 55690 | 1 | Electric Utility | No | Yes | 1439 | 5221 | 1199 | 0.0055 |
| PA | Bethlehem Power Plant | 55690 | 2 | Electric Utility | No | Yes | 1402 | 5483 | 1190 | 0.0062 |
| PA | Bethlehem Power Plant | 55690 | 3 | Electric Utility | No | Yes | 1422 | 5619 | 1223 | 0.0047 |
| PA | Bethlehem Power Plant | 55690 | 5 | Electric Utility | No | Yes | 1409 | 4661 | 1232 | 0.0058 |
| PA | Bethlehem Power Plant | 55690 | 6 | Electric Utility | No | Yes | 1411 | 5257 | 1248 | 0.0052 |
| PA | Bethlehem Power Plant | 55690 | 7 | Electric Utility | No | Yes | 1404 | 5104 | 1215 | 0.0057 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| PA | Bruce Mansfield | 6094 | 1 | Electric Utility | No | Yes | 1276 | 201 | 0 | 0.1749 |
| PA | Bruce Mansfield | 6094 | 2 | Electric Utility | No | Yes | 1164 | 150 | 38 | 0.1023 |
| PA | Bruce Mansfield | 6094 | 3 | Electric Utility | No | Yes | 1361 | 3288 | 675 | 0.0942 |
| PA | Brunner Island, LLC | 3140 | 1 | Electric Utility | No | Yes | 104 | 2755 | 1021 | 0.1370 |
| PA | Brunner Island, LLC | 3140 | 2 | Electric Utility | No | Yes | 1488 | 2086 | 748 | 0.1383 |
| PA | Brunner Island, LLC | 3140 | 3 | Electric Utility | No | Yes | 1484 | 2013 | 746 | 0.0912 |
| PA | Brunot Island Power Station | 3096 | 2A | Electric Utility | Yes | Yes | 256 | 576 | 141 | 0.0540 |
| PA | Brunot Island Power Station | 3096 | 2B | Electric Utility | Yes | Yes | 248 | 571 | 140 | 0.0513 |
| PA | Brunot Island Power Station | 3096 | 3 | Electric Utility | Yes | Yes | 266 | 536 | 109 | 0.0473 |
| PA | Cambria Cogen | 10641 | 1 | Cogeneration | No | Yes | 1486 | 3705 | 624 | 0.1505 |
| PA | Cambria Cogen | 10641 | 2 | Cogeneration | No | Yes | 1485 | 3618 | 624 | 0.1527 |
| PA | Chambersburg Units 12 & 13 | 55654 | 12 | Electric Utility | No | Yes | 813 | 2824 | 697 | 0.0819 |
| PA | Chambersburg Units 12 & 13 | 55654 | 13 | Electric Utility | No | Yes | 825 | 3062 | 726 | 0.0805 |
| PA | Cheswick | 8226 | 1 | Electric Utility | No | Yes | 1239 | 3262 | 790 | 0.2042 |
| PA | Colver Green Energy | 10143 | AAB01 | Electric Utility | No | Yes | 1318 | 6473 | 1332 | 0.1559 |
| PA | Conemaugh | 3118 | 1 | Electric Utility | No | Yes | 1164 | 5973 | 1458 | 0.1104 |
| PA | Conemaugh | 3118 | 2 | Electric Utility | No | Yes | 1488 | 6993 | 1488 | 0.1139 |
| PA | Croydon Generating Station | 8012 | 11 | Electric Utility | Yes | Yes | 9 | 6 | 0 | 0.5900 |
| PA | Croydon Generating Station | 8012 | 12 | Electric Utility | Yes | Yes | 25 | 7 | 0 | 0.5901 |
| PA | Croydon Generating Station | 8012 | 21 | Electric Utility | Yes | Yes | 24 | 14 | 5 | 0.5907 |
| PA | Croydon Generating Station | 8012 | 22 | Electric Utility | Yes | Yes | 14 | 4 | 4 | 0.5900 |
| PA | Croydon Generating Station | 8012 | 31 | Electric Utility | Yes | Yes | 17 | 17 | 8 | 0.5966 |
| PA | Croydon Generating Station | 8012 | 32 | Electric Utility | Yes | Yes | 23 | 9 | 5 | 0.5901 |
| PA | Croydon Generating Station | 8012 | 41 | Electric Utility | Yes | Yes | 5 | 6 | 3 | 0.5900 |
| PA | Croydon Generating Station | 8012 | 42 | Electric Utility | Yes | Yes | 13 | 8 | 2 | 0.5899 |
| PA | Domtar Paper Company, LLC | 54638 | 040 | Pulp & Paper Mill | No | No | 1488 | 6919 | 1488 | 0.0682 |
| PA | Domtar Paper Company, LLC | 54638 | 041 | Pulp & Paper Mill | No | No | 1488 | 7258 | 1486 | 0.0697 |
| PA | Dynegy Fayette II, LLC | 55516 | CTG1 | Electric Utility | No | Yes | 1488 | 7319 | 1481 | 0.0069 |
| PA | Dynegy Fayette II, LLC | 55516 | CTG2 | Electric Utility | No | Yes | 1486 | 7300 | 1480 | 0.0069 |
| PA | Ebensburg Power Company | 10603 | 031 | Cogeneration | No | Yes | 1415 | 6726 | 1480 | 0.0929 |
| PA | Eddystone Generating Station | 3161 | 3 | Electric Utility | Yes | Yes | 805 | 213 | 102 | 0.0489 |
| PA | Eddystone Generating Station | 3161 | 4 | Electric Utility | Yes | Yes | 677 | 272 | 138 | 0.0514 |
| PA | Entriken Compressor Station | 880072 | 31601 | Industrial Turbine | No | No | 0 | 0 | 0 | 0.0000 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| PA | Fairless Energy Center | 55298 | 1A | Electric Utility | No | Yes | 1488 | 6762 | 1298 | 0.0073 |
| PA | Fairless Energy Center | 55298 | 1B | Electric Utility | No | Yes | 1488 | 5786 | 1136 | 0.0071 |
| PA | Fairless Energy Center | 55298 | 2A | Electric Utility | No | Yes | 1481 | 5997 | 1473 | 0.0085 |
| PA | Fairless Energy Center | 55298 | 2B | Electric Utility | No | Yes | 1480 | 6415 | 1472 | 0.0080 |
| PA | Fairless Hills Generating Station | 7701 | PHBLR4 | Electric Utility | No | Yes | 1448 | 5490 | 1327 | 0.0462 |
| PA | Fairless Hills Generating Station | 7701 | PHBLR5 | Electric Utility | No | Yes | 1293 | 2824 | 670 | 0.0566 |
| PA | Gans Generating Facility | 55377 | 8 | Electric Utility | No | Yes | 337 | 2362 | 638 | 0.0814 |
| PA | Gans Generating Facility | 55377 | 9 | Electric Utility | No | Yes | 304 | 2393 | 638 | 0.0742 |
| PA | Gilberton Power Company | 10113 | 031 | Cogeneration | No | Yes | 1478 | 7045 | 1378 | 0.0748 |
| PA | Gilberton Power Company | 10113 | 032 | Cogeneration | No | Yes | 1481 | 7120 | 1410 | 0.0748 |
| PA | Grays Ferry Cogen Partnership | 54785 | 2 | Cogeneration | No | Yes | 1283 | 6543 | 1299 | 0.0305 |
| PA | Grays Ferry Cogen Partnership | 54785 | 25 | Cogeneration | No | Yes | 1484 | 6717 | 1488 | 0.0580 |
| PA | Hamilton Liberty Generation Plant | 58420 | CT1 | Electric Utility | No | Yes | 1429 | 5952 | 1415 | 0.0064 |
| PA | Hamilton Liberty Generation Plant | 58420 | CT2 | Electric Utility | No | Yes | 744 | 5808 | 1327 | 0.0064 |
| PA | Hamilton Patriot Generation Plant | 58426 | CT1 | Electric Utility | No | Yes | 605 | 6202 | 1406 | 0.0078 |
| PA | Hamilton Patriot Generation Plant | 58426 | CT2 | Electric Utility | No | Yes | 647 | 5749 | 1412 | 0.0077 |
| PA | Handsome Lake Energy | 55233 | EU-1A | Electric Utility | No | Yes | 349 | 1179 | 447 | 0.4795 |
| PA | Handsome Lake Energy | 55233 | EU-1B | Electric Utility | No | Yes | 349 | 1199 | 447 | 0.4699 |
| PA | Handsome Lake Energy | 55233 | EU-2A | Electric Utility | No | Yes | 498 | 667 | 250 | 0.5741 |
| PA | Handsome Lake Energy | 55233 | EU-2B | Electric Utility | No | Yes | 495 | 667 | 251 | 0.4901 |
| PA | Handsome Lake Energy | 55233 | EU-3A | Electric Utility | No | Yes | 83 | 649 | 246 | 0.4094 |
| PA | Handsome Lake Energy | 55233 | EU-3B | Electric Utility | No | Yes | 508 | 645 | 242 | 0.4851 |
| PA | Handsome Lake Energy | 55233 | EU-4A | Electric Utility | No | Yes | 833 | 647 | 259 | 0.4575 |
| PA | Handsome Lake Energy | 55233 | EU-4B | Electric Utility | No | Yes | 828 | 610 | 260 | 0.5008 |
| PA | Handsome Lake Energy | 55233 | EU-5A | Electric Utility | No | Yes | 132 | 1192 | 447 | 0.5114 |
| PA | Handsome Lake Energy | 55233 | EU-5B | Electric Utility | No | Yes | 133 | 1211 | 447 | 0.5344 |
| PA | Hazleton Generation | 10870 | TURB2 | Cogeneration | No | Yes | 4 | 72 | 11 | 0.0827 |
| PA | Hazleton Generation | 10870 | TURB3 | Cogeneration | No | Yes | 4 | 46 | 11 | 0.0832 |
| PA | Hazleton Generation | 10870 | TURB4 | Cogeneration | No | Yes | 4 | 46 | 2 | 0.0846 |
| PA | Hazleton Generation | 10870 | TURBIN | Cogeneration | Yes | Yes | 10 | 39 | 20 | 0.2409 |
| PA | Helix Ironwood LLC | 55337 | 0001 | Electric Utility | No | Yes | 1488 | 6544 | 1482 | 0.0128 |
| PA | Helix Ironwood LLC | 55337 | 0002 | Electric Utility | No | Yes | 1488 | 7011 | 1481 | 0.0129 |
| PA | Homer City | 3122 | 1 | Electric Utility | No | Yes | 996 | 5172 | 1033 | 0.1401 |
| PA | Homer City | 3122 | 2 | Electric Utility | No | Yes | 1358 | 4579 | 1295 | 0.1549 |
| PA | Homer City | 3122 | 3 | Electric Utility | No | Yes | 1399 | 4376 | 1262 | 0.0966 |
| PA | Hunlock Creek Energy Center | 3176 | CT5 | Electric Utility | No | Yes | 1325 | 3309 | 788 | 0.0188 |
| PA | Hunlock Creek Energy Center | 3176 | CT6 | Electric Utility | No | Yes | 1314 | 3363 | 788 | 0.0212 |
| PA | Hunlock Unit 4 | 56397 | 4 | Electric Utility | No | Yes | 63 | 602 | 250 | 0.0954 |
| PA | Hunterstown Combined Cycle | 55976 | CT101 | Electric Utility | No | Yes | 1382 | 6672 | 1488 | 0.0060 |
| PA | Hunterstown Combined Cycle | 55976 | CT201 | Electric Utility | No | Yes | 1391 | 6588 | 1488 | 0.0054 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| PA | Hunterstown Combined Cycle | 55976 | CT301 | Electric Utility | No | Yes | 1310 | 6746 | 1488 | 0.0037 |
| PA | Keystone | 3136 | 1 | Electric Utility | No | Yes | 1488 | 7086 | 1429 | 0.1259 |
| PA | Keystone | 3136 | 2 | Electric Utility | No | Yes | 1485 | 6035 | 1390 | 0.1292 |
| PA | Kimberly-Clark Tissue Company | 50410 | 034 | Pulp & Paper Mill | No | No | 69 | 808 | 64 | 1.5264 |
| PA | Kimberly-Clark Tissue Company | 50410 | 035 | Cogeneration | No | No | 1488 | 6427 | 1413 | 0.0866 |
| PA | Lackawanna Energy Center | 60357 | 1 | Electric Utility | No | Yes | | 6574 | 1424 | 0.0052 |
| PA | Lackawanna Energy Center | 60357 | 2 | Electric Utility | No | Yes | | 3842 | 864 | 0.0057 |
| PA | Lackawanna Energy Center | 60357 | 3 | Electric Utility | No | Yes | | 2365 | 744 | 0.0054 |
| PA | Liberty Electric Power Plant | 55231 | 0001 | Electric Utility | No | Yes | 1452 | 7143 | 1470 | 0.0108 |
| PA | Liberty Electric Power Plant | 55231 | 0002 | Electric Utility | No | Yes | 1485 | 7213 | 1470 | 0.0108 |
| PA | Lower Mount Bethel Energy, LLC | 55667 | CT01 | Electric Utility | No | Yes | 1472 | 5569 | 1478 | 0.0098 |
| PA | Lower Mount Bethel Energy, LLC | 55667 | CT02 | Electric Utility | No | Yes | 1486 | 6093 | 1488 | 0.0096 |
| PA | Marcus Hook 50, L.P. | 50074 | 001 | Cogeneration | No | Yes | 8 | 22 | 0 | 0.4178 |
| PA | Marcus Hook Energy, LP | 55801 | 0001 | Cogeneration | No | Yes | 1482 | 5740 | 1425 | 0.0200 |
| PA | Marcus Hook Energy, LP | 55801 | 0002 | Cogeneration | No | Yes | 1484 | 5744 | 1340 | 0.0202 |
| PA | Marcus Hook Energy, LP | 55801 | 0003 | Cogeneration | No | Yes | 1482 | 5866 | 1344 | 0.0193 |
| PA | Martins Creek, LLC | 3148 | 3 | Electric Utility | Yes | Yes | 1484 | 1476 | 641 | 0.0725 |
| PA | Martins Creek, LLC | 3148 | 4 | Electric Utility | Yes | Yes | 950 | 1312 | 433 | 0.0928 |
| PA | Merck & Company - West Point | 52149 | 039 | Industrial Turbine | No | No | 555 | 1021 | 555 | 0.0820 |
| PA | Merck & Company - West Point | 52149 | 040 | Industrial Turbine | No | No | 1488 | 7010 | 1200 | 0.0259 |
| PA | Montour, LLC | 3149 | 1 | Electric Utility | No | Yes | 1439 | 2088 | 567 | 0.1236 |
| PA | Montour, LLC | 3149 | 2 | Electric Utility | Yes | Yes | 943 | 1246 | 144 | 0.1283 |
| PA | Mountain | 3111 | 031 | Electric Utility | Yes | Yes | 60 | 0 | 0 | 0.0000 |
| PA | Mountain | 3111 | 032 | Electric Utility | Yes | Yes | 52 | 58 | 8 | 0.6928 |
| PA | Moxie Freedom Generation Plant | 59906 | 201 | Electric Utility | No | Yes | | 5042 | 1128 | 0.0063 |
| PA | Moxie Freedom Generation Plant | 59906 | 202 | Electric Utility | No | Yes | | 4649 | 1002 | 0.0207 |
| PA | Mt. Carmel Cogeneration | 10343 | SG-101 | Cogeneration | No | Yes | 1295 | 4267 | 765 | 0.0641 |
| PA | New Castle | 3138 | 3 | Electric Utility | No | Yes | 1011 | 2914 | 871 | 0.0669 |
| PA | New Castle | 3138 | 4 | Electric Utility | No | Yes | 1311 | 2504 | 810 | 0.0508 |
| PA | New Castle | 3138 | 5 | Electric Utility | No | Yes | 1348 | 3005 | 912 | 0.0480 |
| PA | North East Cogeneration Plant | 54571 | 001 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| PA | North East Cogeneration Plant | 54571 | 002 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| PA | Northampton Generating Plant | 50888 | NGC01 | Cogeneration | Yes | Yes | 1220 | 463 | 354 | 0.0648 |
| PA | Northeastern Power Company | 50039 | 031 | Electric Utility | No | Yes | 1488 | 2592 | 550 | 0.0700 |
| PA | Ontelaunee Energy Center | 55193 | CT1 | Electric Utility | No | Yes | 1467 | 7180 | 1472 | 0.0068 |
| PA | Ontelaunee Energy Center | 55193 | CT2 | Electric Utility | No | Yes | 1467 | 7051 | 1478 | 0.0070 |
| PA | Panda Hummel Station | 60368 | CT1 | Electric Utility | No | Yes | | 6483 | 1416 | 0.0074 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| PA | Panda Hummel Station | 60368 | CT2 | Electric Utility | No | Yes | | 5952 | 1348 | 0.0077 |
| PA | Panther Creek Energy Facility | 50776 | 1 | Small Power Producer | Yes | Yes | 742 | 273 | 91 | 0.1153 |
| PA | Panther Creek Energy Facility | 50776 | 2 | Small Power Producer | Yes | Yes | 750 | 373 | 32 | 0.1099 |
| PA | PEI Power Corporation | 50279 | 2 | Electric Utility | No | Yes | 0 | 1556 | 513 | 0.0840 |
| PA | Philadelphia Refinery | 52106 | 150137 | Petroleum Refinery | No | No | 1485 | 6537 | 1485 | 0.0340 |
| PA | Philadelphia Refinery | 52106 | 150138 | Petroleum Refinery | No | No | 0 | 0 | 0 | 0.0000 |
| PA | Philadelphia Refinery | 52106 | 150139 | Petroleum Refinery | No | No | 1488 | 6807 | 1488 | 0.0338 |
| PA | Philadelphia Refinery | 52106 | 150140 | Petroleum Refinery | No | No | 1488 | 4479 | 732 | 0.0344 |
| PA | Philadelphia Refinery | 52106 | 150145 | Petroleum Refinery | No | No | 1488 | 5868 | 1436 | 0.0056 |
| PA | Pixelle Specialty Solutions | 50397 | 034 | Pulp & Paper Mill | No | No | 1488 | 0 | 0 | 0.0000 |
| PA | Pixelle Specialty Solutions | 50397 | 035 | Pulp & Paper Mill | No | No | 903 | 0 | 0 | 0.0000 |
| PA | Pixelle Specialty Solutions | 50397 | 036 | Pulp & Paper Mill | No | No | 1488 | 6850 | 1477 | 0.1569 |
| PA | Pixelle Specialty Solutions | 50397 | 038 | Pulp & Paper Mill | No | No | | 6895 | 1488 | 0.0283 |
| PA | Pixelle Specialty Solutions | 50397 | 039 | Pulp & Paper Mill | No | No | | 6811 | 1488 | 0.0287 |
| PA | Portland | 3113 | 5 | Electric Utility | Yes | Yes | 16 | 8 | 6 | 1.2065 |
| PA | Procter & Gamble Paper Products | 50463 | 328001 | Cogeneration | No | Yes | 1488 | 7279 | 1488 | 0.1196 |
| PA | Procter & Gamble Paper Products | 50463 | 328002 | Cogeneration | No | Yes | 1462 | 7156 | 1484 | 0.0087 |
| PA | Richmond | 3168 | 91 | Electric Utility | Yes | Yes | 4 | 6 | 0 | 0.5897 |
| PA | Richmond | 3168 | 92 | Electric Utility | Yes | Yes | 2 | 4 | 0 | 0.5900 |
| PA | Scrubgrass Generating Plant | 50974 | 1 | Small Power Producer | No | Yes | 1485 | 5135 | 1166 | 0.1275 |
| PA | Scrubgrass Generating Plant | 50974 | 2 | Small Power Producer | No | Yes | 1477 | 5122 | 1328 | 0.1371 |
| PA | Seward | 3130 | 1 | Electric Utility | No | Yes | 1414 | 3955 | 622 | 0.0937 |
| PA | Seward | 3130 | 2 | Electric Utility | No | Yes | 1486 | 3657 | 697 | 0.0910 |
| PA | Shawville | 3131 | 1 | Electric Utility | Yes | Yes | 0 | 762 | 184 | 0.0566 |
| PA | Shawville | 3131 | 2 | Electric Utility | Yes | Yes | 0 | 1516 | 275 | 0.0688 |
| PA | Shawville | 3131 | 3 | Electric Utility | Yes | Yes | 0 | 1288 | 221 | 0.0525 |
| PA | Shawville | 3131 | 4 | Electric Utility | Yes | Yes | 0 | 1221 | 128 | 0.0503 |
| PA | Shermans Dale Station | 880050 | 31801 | Industrial Turbine | No | No | 0 | 1 | 0 | 0.7000 |
| PA | SPMT Marcus Hook Industrial Complex | 880107 | AB01 | Industrial Boiler | No | No | 1184 | 5115 | 1184 | 0.0256 |
| PA | SPMT Marcus Hook Industrial Complex | 880107 | AB02 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| PA | SPMT Marcus Hook Industrial Complex | 880107 | AB03 | Industrial Boiler | No | No | 749 | 3777 | 598 | 0.0235 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| PA | SPMT Marcus Hook Industrial Complex | 880107 | AB04 | Industrial Boiler | No | No | 1014 | 5483 | 975 | 0.0174 |
| PA | Springdale Generating Station (55196) | 55196 | 1 | Electric Utility | No | Yes | 616 | 2057 | 604 | 0.0793 |
| PA | Springdale Generating Station (55196) | 55196 | 2 | Electric Utility | No | Yes | 617 | 2088 | 600 | 0.0842 |
| PA | Springdale Generating Station (55710) | 55710 | 3 | Electric Utility | No | Yes | 1472 | 6970 | 1358 | 0.0088 |
| PA | Springdale Generating Station (55710) | 55710 | 4 | Electric Utility | No | Yes | 1453 | 7202 | 1452 | 0.0085 |
| PA | St. Nicholas Cogeneration Project | 54634 | 1 | Small Power Producer | No | Yes | 1432 | 6775 | 1440 | 0.0516 |
| PA | Tolna | 3116 | 031 | Electric Utility | Yes | Yes | 5 | 59 | 33 | 0.6928 |
| PA | Tolna | 3116 | 032 | Electric Utility | Yes | Yes | 7 | 60 | 32 | 0.6927 |
| PA | Trainer Refinery | 880025 | 034 | Industrial Boiler | No | No | 1488 | 7035 | 0 | 0.0043 |
| PA | Trainer Refinery | 880025 | 035 | Industrial Boiler | No | No | 1488 | 6597 | 0 | 0.0045 |
| PA | Trainer Refinery | 880025 | 053 | Petroleum Refinery | No | No |  | 6455 | 1486 | 0.0029 |
| PA | US Steel (Clairton Coke) | 50729 | CLBLR1 | Iron & Steel | No | No | 1488 | 5484 | 1486 | 0.2117 |
| PA | US Steel (Clairton Coke) | 50729 | CLBLR2 | Iron & Steel | No | No | 1488 | 6375 | 1438 | 0.1382 |
| PA | US Steel (Edgar Thomson) | 50732 | ETBLR1 | Iron & Steel | No | No | 1484 | 5333 | 1484 | 0.0299 |
| PA | US Steel (Edgar Thomson) | 50732 | ETBLR2 | Iron & Steel | No | No | 1070 | 6417 | 1069 | 0.0320 |
| PA | US Steel (Edgar Thomson) | 50732 | ETBLR3 | Iron & Steel | No | No | 1488 | 7185 | 1476 | 0.0289 |
| PA | Veolia Energy Philadelphia - Edison Sta | 880006 | 1 | Industrial Boiler | No | No | 0 | 6 | 0 | 0.3097 |
| PA | Veolia Energy Philadelphia - Edison Sta | 880006 | 2 | Industrial Boiler | No | No | 1 | 2 | 0 | 0.3890 |
| PA | Veolia Energy Philadelphia - Edison Sta | 880006 | 3 | Industrial Boiler | No | No | 1 | 273 | 0 | 0.2547 |
| PA | Veolia Energy Philadelphia - Edison Sta | 880006 | 4 | Industrial Boiler | No | No | 0 | 168 | 0 | 0.3559 |
| PA | Veolia Energy Philadelphia - Schuylkill | 50607 | 23 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| PA | Veolia Energy Philadelphia - Schuylkill | 50607 | 24 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| PA | Veolia Energy Philadelphia - Schuylkill | 50607 | 26 | Industrial Boiler | No | No | 0 | 1193 | 0 | 0.0790 |
| PA | Veolia Energy Philadelphia - Schuylkill | 50607 | RSB1 | Industrial Boiler | No | No | 125 | 801 | 122 | 0.0089 |
| PA | Veolia Energy Philadelphia - Schuylkill | 50607 | RSB2 | Electric Utility | No | No | 128 | 1028 | 119 | 0.0112 |
| PA | Warren | 3132 | 005 | Electric Utility | No | Yes | 12 | 111 | 25 | 0.4305 |
| PA | Wheelabrator Frackville Energy | 50879 | GEN1 | Cogeneration | No | Yes | 1488 | 6830 | 1488 | 0.1395 |
| PA | WPS Westwood Generation, LLC | 50611 | 031 | Electric Utility | No | Yes | 751 | 4395 | 917 | 0.1205 |
| PA | York Energy Center | 55524 | 1 | Electric Utility | No | Yes | 1247 | 4235 | 1048 | 0.0115 |
| PA | York Energy Center | 55524 | 2 | Electric Utility | No | Yes | 1218 | 4086 | 1015 | 0.0114 |
| PA | York Energy Center | 55524 | 3 | Electric Utility | No | Yes | 1205 | 4090 | 1010 | 0.0101 |
| PA | York Energy Center | 55524 | 5 | Electric Utility | No | Yes |  | 3115 | 1032 | 0.0056 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| PA | York Energy Center | 55524 | 6 | Electric Utility | No | Yes | | 2998 | 984 | 0.0057 |
| RI | Manchester Street Station | 3236 | 10 | Electric Utility | No | Yes | 1083 | 5315 | 1186 | 0.0336 |
| RI | Manchester Street Station | 3236 | 11 | Electric Utility | No | Yes | 1073 | 4749 | 697 | 0.0350 |
| RI | Manchester Street Station | 3236 | 9 | Electric Utility | No | Yes | 1032 | 5142 | 1159 | 0.0417 |
| RI | Ocean State Power II | 54324 | 3 | Electric Utility | No | Yes | 442 | 4218 | 1166 | 0.0265 |
| RI | Ocean State Power II | 54324 | 4 | Electric Utility | No | Yes | 437 | 4311 | 1128 | 0.0309 |
| RI | Ocean State Power | 51030 | 1 | Electric Utility | No | Yes | 910 | 3556 | 1039 | 0.0231 |
| RI | Ocean State Power | 51030 | 2 | Electric Utility | No | Yes | 886 | 3476 | 1077 | 0.0238 |
| RI | Pawtucket Power Associates, LP | 54056 | 1 | Electric Utility | Yes | Yes | 257 | 220 | 152 | 0.0546 |
| RI | Rhode Island State Energy Center | 55107 | RISEP1 | Electric Utility | No | Yes | 1234 | 5792 | 1364 | 0.0092 |
| RI | Rhode Island State Energy Center | 55107 | RISEP2 | Electric Utility | No | Yes | 1232 | 5791 | 1377 | 0.0090 |
| RI | Tiverton Power, LLC | 55048 | 1 | Electric Utility | No | Yes | 1338 | 5813 | 1397 | 0.0140 |
| VA | AdvanSix Resins and Chemicals - Hopewell | 880093 | 10D | Industrial Boiler | No | No | | 1593 | 801 | 0.0380 |
| VA | Altavista Power Station | 10773 | 1 | Electric Utility | No | Yes | 1026 | 5960 | 1131 | 0.1164 |
| VA | Altavista Power Station | 10773 | 2 | Electric Utility | No | Yes | 1110 | 6080 | 1131 | 0.1163 |
| VA | Bear Garden Generating Station | 56807 | 1A | Electric Utility | No | Yes | 1487 | 6560 | 1297 | 0.0083 |
| VA | Bear Garden Generating Station | 56807 | 1B | Electric Utility | No | Yes | 1487 | 6502 | 1287 | 0.0069 |
| VA | Bellemeade Power Station | 50966 | 1 | Electric Utility | No | Yes | 1021 | 0 | 0 | 0.0000 |
| VA | Bellemeade Power Station | 50966 | 2 | Electric Utility | No | Yes | 1232 | 0 | 0 | 0.0000 |
| VA | Birchwood Power Facility | 54304 | 001 | Electric Utility | No | Yes | 1111 | 2398 | 122 | 0.1253 |
| VA | Bremo Power Station | 3796 | 3 | Electric Utility | No | Yes | 301 | 0 | 0 | 0.0000 |
| VA | Bremo Power Station | 3796 | 4 | Electric Utility | No | Yes | 876 | 0 | 0 | 0.0000 |
| VA | Brunswick County Power Station | 58260 | 1A | Electric Utility | No | Yes | 1439 | 7081 | 1488 | 0.0067 |
| VA | Brunswick County Power Station | 58260 | 1B | Electric Utility | No | Yes | 1386 | 7084 | 1488 | 0.0064 |
| VA | Brunswick County Power Station | 58260 | 1C | Electric Utility | No | Yes | 1447 | 7139 | 1488 | 0.0062 |
| VA | Buchanan Units 1 & 2 | 55738 | 1 | Electric Utility | No | Yes | 662 | 3397 | 558 | 0.0768 |
| VA | Buchanan Units 1 & 2 | 55738 | 2 | Electric Utility | No | Yes | 651 | 3129 | 559 | 0.0731 |
| VA | Celanese Acetate LLC | 52089 | BLR010 | Industrial Boiler | No | No | 1301 | 6806 | 1300 | 0.0301 |
| VA | Celanese Acetate LLC | 52089 | BLR011 | Industrial Boiler | No | No | 1335 | 5499 | 1334 | 0.0290 |
| VA | Celanese Acetate LLC | 52089 | BLR012 | Industrial Boiler | No | No | 975 | 6844 | 974 | 0.0300 |
| VA | Celanese Acetate LLC | 52089 | BLR013 | Industrial Boiler | No | No | 963 | 6699 | 961 | 0.0320 |
| VA | Celanese Acetate LLC | 52089 | BLR014 | Industrial Boiler | No | No | 1288 | 6009 | 1287 | 0.0310 |
| VA | Chesterfield Power Station | 3797 | **8A | Electric Utility | No | Yes | 1434 | | 0 | |
| VA | Chesterfield Power Station | 3797 | 3 | Electric Utility | No | Yes | 644 | 23 | 0 | 0.1872 |
| VA | Chesterfield Power Station | 3797 | 4 | Electric Utility | No | Yes | 1408 | 462 | 0 | 0.0850 |
| VA | Chesterfield Power Station | 3797 | 5 | Electric Utility | No | Yes | 1195 | 3002 | 567 | 0.0680 |
| VA | Chesterfield Power Station | 3797 | 6 | Electric Utility | No | Yes | 1381 | 2992 | 1020 | 0.0657 |
| VA | Chesterfield Power Station | 3797 | 7 | Electric Utility | No | Yes | 1454 | 6128 | 1229 | 0.1196 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| VA | City Point Energy Center | 10377 | BLR01A | Cogeneration | No | Yes | 1464 | 4303 | 235 | 0.3808 |
| VA | City Point Energy Center | 10377 | BLR01B | Cogeneration | No | Yes | 1360 | 4143 | 335 | 0.3808 |
| VA | City Point Energy Center | 10377 | BLR01C | Cogeneration | No | Yes | 1372 | 4434 | 231 | 0.3825 |
| VA | City Point Energy Center | 10377 | BLR02A | Cogeneration | No | Yes | 472 | 2261 | 77 | 0.3764 |
| VA | City Point Energy Center | 10377 | BLR02B | Cogeneration | No | Yes | 315 | 1435 | 60 | 0.3638 |
| VA | City Point Energy Center | 10377 | BLR02C | Cogeneration | No | Yes | 256 | 1481 | 32 | 0.3820 |
| VA | Clinch River | 3775 | 1 | Electric Utility | No | Yes | 196 | 2715 | 272 | 0.1173 |
| VA | Clinch River | 3775 | 2 | Electric Utility | No | Yes | 486 | 3088 | 348 | 0.1209 |
| VA | Clover Power Station | 7213 | 1 | Electric Utility | No | Yes | 1488 | 3336 | 145 | 0.2560 |
| VA | Clover Power Station | 7213 | 2 | Electric Utility | No | Yes | 1473 | 3642 | 288 | 0.2575 |
| VA | Commonwealth Chesapeake | 55381 | CT-001 | Electric Utility | No | Yes | 143 | 245 | 80 | 0.1232 |
| VA | Commonwealth Chesapeake | 55381 | CT-002 | Electric Utility | No | Yes | 103 | 154 | 50 | 0.4649 |
| VA | Commonwealth Chesapeake | 55381 | CT-003 | Electric Utility | No | Yes | 79 | 118 | 44 | 0.1195 |
| VA | Commonwealth Chesapeake | 55381 | CT-004 | Electric Utility | No | Yes | 120 | 247 | 81 | 0.3471 |
| VA | Commonwealth Chesapeake | 55381 | CT-005 | Electric Utility | No | Yes | 124 | 239 | 60 | 0.0981 |
| VA | Commonwealth Chesapeake | 55381 | CT-006 | Electric Utility | No | Yes | 93 | 189 | 69 | 0.1052 |
| VA | Commonwealth Chesapeake | 55381 | CT-007 | Electric Utility | No | Yes | 94 | 171 | 49 | 0.0937 |
| VA | Darbytown Combustion Turbine | 7212 | 1 | Electric Utility | Yes | Yes | 68 | 81 | 17 | 0.3187 |
| VA | Darbytown Combustion Turbine | 7212 | 2 | Electric Utility | Yes | Yes | 62 | 176 | 14 | 0.2172 |
| VA | Darbytown Combustion Turbine | 7212 | 3 | Electric Utility | Yes | Yes | 57 | 250 | 20 | 0.2130 |
| VA | Darbytown Combustion Turbine | 7212 | 4 | Electric Utility | Yes | Yes | 76 | 414 | 136 | 0.2073 |
| VA | Doswell Limited Partnership | 52019 | 501 | Electric Utility | No | Yes | 1458 | 6642 | 1482 | 0.0315 |
| VA | Doswell Limited Partnership | 52019 | 502 | Electric Utility | No | Yes | 1441 | 6612 | 1473 | 0.0328 |
| VA | Doswell Limited Partnership | 52019 | 601 | Electric Utility | No | Yes | 1470 | 5923 | 1473 | 0.0310 |
| VA | Doswell Limited Partnership | 52019 | 602 | Electric Utility | No | Yes | 1469 | 5885 | 1406 | 0.0280 |
| VA | Doswell Limited Partnership | 52019 | CT1 | Electric Utility | No | Yes | 806 | 2584 | 699 | 0.0380 |
| VA | Doswell Limited Partnership | 52019 | CT2 | Electric Utility | No | Yes |  | 2900 | 799 | 0.0417 |
| VA | Doswell Limited Partnership | 52019 | CT3 | Electric Utility | No | Yes |  | 2813 | 782 | 0.0398 |
| VA | Elizabeth River Combustion Turbine Sta | 52087 | CT-1 | Electric Utility | Yes | Yes | 121 | 814 | 363 | 0.2019 |
| VA | Elizabeth River Combustion Turbine Sta | 52087 | CT-2 | Electric Utility | Yes | Yes | 276 | 824 | 359 | 0.2002 |
| VA | Elizabeth River Combustion Turbine Sta | 52087 | CT-3 | Electric Utility | Yes | Yes | 305 | 723 | 204 | 0.2061 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| VA | Gordonsville Power Station | 54844 | 1 | Electric Utility | No | Yes | 1061 | 5121 | 1148 | 0.0277 |
| VA | Gordonsville Power Station | 54844 | 2 | Electric Utility | No | Yes | 1063 | 5895 | 1211 | 0.0271 |
| VA | GP Big Island, LLC | 50479 | 6 | Pulp & Paper Mill | No | No | 1480 | 7324 | 1480 | 0.0252 |
| VA | Gravel Neck Combustion Turbine | 7032 | 3 | Electric Utility | Yes | Yes | 297 | 658 | 361 | 0.2060 |
| VA | Gravel Neck Combustion Turbine | 7032 | 4 | Electric Utility | Yes | Yes | 285 | 39 | 8 | 0.2805 |
| VA | Gravel Neck Combustion Turbine | 7032 | 5 | Electric Utility | Yes | Yes | 264 | 565 | 338 | 0.2115 |
| VA | Gravel Neck Combustion Turbine | 7032 | 6 | Electric Utility | Yes | Yes | 186 | 299 | 97 | 0.2085 |
| VA | Greensville County Power Station | 59913 | 1A | Electric Utility | No | Yes |  | 3089 | 1292 | 0.0061 |
| VA | Greensville County Power Station | 59913 | 1B | Electric Utility | No | Yes |  | 3077 | 1296 | 0.0056 |
| VA | Greensville County Power Station | 59913 | 1C | Electric Utility | No | Yes |  | 3075 | 1295 | 0.0061 |
| VA | Hopewell Cogeneration Facility | 10633 | 1 | Cogeneration | No | Yes | 1372 | 5130 | 1339 | 0.1080 |
| VA | Hopewell Cogeneration Facility | 10633 | 2 | Cogeneration | No | Yes | 1378 | 5230 | 1334 | 0.1105 |
| VA | Hopewell Cogeneration Facility | 10633 | 3 | Cogeneration | No | Yes | 1343 | 5210 | 1325 | 0.1040 |
| VA | Hopewell Power Station | 10771 | 1 | Electric Utility | No | Yes | 1488 | 6617 | 1390 | 0.1160 |
| VA | Hopewell Power Station | 10771 | 2 | Electric Utility | No | Yes | 1439 | 6741 | 1419 | 0.1158 |
| VA | International Paper-Franklin Mill | 52152 | 029 | Cogeneration | No | Yes | 17 |  | 0 |  |
| VA | Ladysmith Combustion Turbine Sta | 7839 | 1 | Electric Utility | No | Yes | 521 | 1685 | 584 | 0.0360 |
| VA | Ladysmith Combustion Turbine Sta | 7839 | 2 | Electric Utility | No | Yes | 765 | 1582 | 393 | 0.0365 |
| VA | Ladysmith Combustion Turbine Sta | 7839 | 3 | Electric Utility | No | Yes | 494 | 1512 | 753 | 0.0334 |
| VA | Ladysmith Combustion Turbine Sta | 7839 | 4 | Electric Utility | No | Yes | 717 | 825 | 391 | 0.0338 |
| VA | Ladysmith Combustion Turbine Sta | 7839 | 5 | Electric Utility | No | Yes | 721 | 268 | 181 | 0.0417 |
| VA | Louisa Generation Facility | 7837 | EU1 | Electric Utility | No | Yes | 213 | 1431 | 138 | 0.0279 |
| VA | Louisa Generation Facility | 7837 | EU2 | Electric Utility | No | Yes | 223 | 1649 | 187 | 0.0315 |
| VA | Louisa Generation Facility | 7837 | EU3 | Electric Utility | No | Yes | 212 | 1539 | 164 | 0.0257 |
| VA | Louisa Generation Facility | 7837 | EU4 | Electric Utility | No | Yes | 214 | 1634 | 202 | 0.0238 |
| VA | Louisa Generation Facility | 7837 | EU5 | Electric Utility | No | Yes | 458 | 1401 | 144 | 0.0383 |
| VA | Marsh Run Generation Facility | 7836 | EU1 | Electric Utility | No | Yes | 570 | 1784 | 653 | 0.0389 |
| VA | Marsh Run Generation Facility | 7836 | EU2 | Electric Utility | No | Yes | 558 | 1608 | 638 | 0.0388 |
| VA | Marsh Run Generation Facility | 7836 | EU3 | Electric Utility | No | Yes | 577 | 1817 | 708 | 0.0412 |
| VA | Mecklenburg Power Station | 52007 | 1 | Electric Utility | Yes | Yes | 1224 | 0 | 0 | 0.0000 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| VA | Mecklenburg Power Station | 52007 | 2 | Electric Utility | Yes | Yes | 1300 | 0 | 0 | 0.0000 |
| VA | Panda Stonewall Power Project | 59004 | CT1 | Electric Utility | No | Yes | | 5331 | 1270 | 0.0046 |
| VA | Panda Stonewall Power Project | 59004 | CT2 | Electric Utility | No | Yes | | 4974 | 1196 | 0.0050 |
| VA | Possum Point Power Station | 3804 | 3 | Electric Utility | No | Yes | 317 | | 0 | |
| VA | Possum Point Power Station | 3804 | 4 | Electric Utility | No | Yes | 529 | | 0 | |
| VA | Possum Point Power Station | 3804 | 5 | Electric Utility | No | Yes | 182 | 189 | 86 | 0.1515 |
| VA | Possum Point Power Station | 3804 | 6A | Electric Utility | No | Yes | 1399 | 6265 | 1320 | 0.0103 |
| VA | Possum Point Power Station | 3804 | 6B | Electric Utility | No | Yes | 1443 | 6190 | 1320 | 0.0107 |
| VA | Remington Combustion Turbine Station | 7838 | 1 | Electric Utility | No | Yes | 430 | 1621 | 494 | 0.0395 |
| VA | Remington Combustion Turbine Station | 7838 | 2 | Electric Utility | No | Yes | 433 | 1291 | 342 | 0.0385 |
| VA | Remington Combustion Turbine Station | 7838 | 3 | Electric Utility | No | Yes | 391 | 1664 | 595 | 0.0322 |
| VA | Remington Combustion Turbine Station | 7838 | 4 | Electric Utility | No | Yes | 427 | 1457 | 418 | 0.0368 |
| VA | RockTenn West Point Mill | 10017 | 002 | Pulp & Paper Mill | No | No | 1488 | 7341 | 1488 | 0.1796 |
| VA | Southampton Power Station | 10774 | 1 | Electric Utility | No | Yes | 1342 | 5761 | 1319 | 0.1162 |
| VA | Southampton Power Station | 10774 | 2 | Electric Utility | No | Yes | 1420 | 5871 | 1377 | 0.1162 |
| VA | Spruance Genco, LLC | 54081 | BLR01A | Cogeneration | No | Yes | 1082 | 5254 | 1086 | 0.2905 |
| VA | Spruance Genco, LLC | 54081 | BLR01B | Cogeneration | No | Yes | 902 | 5280 | 1208 | 0.2876 |
| VA | Spruance Genco, LLC | 54081 | BLR02A | Cogeneration | No | Yes | 946 | 5465 | 1255 | 0.2918 |
| VA | Spruance Genco, LLC | 54081 | BLR02B | Cogeneration | No | Yes | 858 | 5702 | 1205 | 0.2925 |
| VA | Spruance Genco, LLC | 54081 | BLR03A | Cogeneration | Yes | Yes | 783 | 1356 | 227 | 0.1526 |
| VA | Spruance Genco, LLC | 54081 | BLR03B | Cogeneration | Yes | Yes | 1064 | 1558 | 250 | 0.1480 |
| VA | Spruance Genco, LLC | 54081 | BLR04A | Cogeneration | Yes | Yes | 865 | 1409 | 558 | 0.1213 |
| VA | Spruance Genco, LLC | 54081 | BLR04B | Cogeneration | Yes | Yes | 792 | 1446 | 703 | 0.1203 |
| VA | Tasley Energy Center | 3785 | TA10 | Electric Utility | Yes | Yes | 10 | 15 | 0 | 1.2000 |
| VA | Tenaska Virginia Generating Station | 55439 | CTGDB1 | Electric Utility | No | Yes | 1488 | 6798 | 1223 | 0.0092 |
| VA | Tenaska Virginia Generating Station | 55439 | CTGDB2 | Electric Utility | No | Yes | 1488 | 6826 | 1211 | 0.0093 |
| VA | Tenaska Virginia Generating Station | 55439 | CTGDB3 | Electric Utility | No | Yes | 1488 | 6821 | 1232 | 0.0106 |
| VA | Virginia City Hybrid Energy Center | 56808 | 1 | Electric Utility | No | Yes | 1293 | 3339 | 611 | 0.0720 |
| VA | Virginia City Hybrid Energy Center | 56808 | 2 | Electric Utility | No | Yes | 1488 | 4924 | 622 | 0.0700 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01A | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0000 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01B | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0000 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01C | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0000 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02A | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0000 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02B | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0000 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02C | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0000 |
| VA | Warren County Power Station | 55939 | 1A | Electric Utility | No | Yes | 1488 | 6554 | 1440 | 0.0056 |
| VA | Warren County Power Station | 55939 | 1B | Electric Utility | No | Yes | 1440 | 6320 | 1418 | 0.0067 |
| VA | Warren County Power Station | 55939 | 1C | Electric Utility | No | Yes | 1488 | 6496 | 1414 | 0.0058 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 001 | Industrial Boiler | No | No | 1343 | 6901 | 1343 | 0.2847 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 011 | Industrial Boiler | No | No | 1327 | 5356 | 1327 | 0.0335 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 002 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 003 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 004 | Industrial Boiler | No | No | 1488 | 6886 | 1484 | 0.2804 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 005 | Industrial Boiler | No | No | 1488 | 6002 | 1486 | 0.1256 |
| VA | Wolf Hills Energy | 55285 | WH01 | Electric Utility | No | Yes | 239 | 1188 | 146 | 0.3184 |
| VA | Wolf Hills Energy | 55285 | WH02 | Electric Utility | No | Yes | 239 | 1167 | 139 | 0.3151 |
| VA | Wolf Hills Energy | 55285 | WH03 | Electric Utility | No | Yes | 257 | 1187 | 152 | 0.3151 |
| VA | Wolf Hills Energy | 55285 | WH04 | Electric Utility | No | Yes | 258 | 1171 | 148 | 0.3230 |
| VA | Wolf Hills Energy | 55285 | WH05 | Electric Utility | No | Yes | 236 | 1174 | 146 | 0.3240 |
| VA | Wolf Hills Energy | 55285 | WH06 | Electric Utility | No | Yes | 235 | 1161 | 149 | 0.3199 |
| VA | Wolf Hills Energy | 55285 | WH07 | Electric Utility | No | Yes | 244 | 1000 | 113 | 0.3340 |
| VA | Wolf Hills Energy | 55285 | WH08 | Electric Utility | No | Yes | 245 | 988 | 110 | 0.3396 |
| VA | Wolf Hills Energy | 55285 | WH09 | Electric Utility | No | Yes | 166 | 952 | 85 | 0.3249 |
| VA | Wolf Hills Energy | 55285 | WH10 | Electric Utility | No | Yes | 167 | 903 | 75 | 0.3019 |
| VA | Yorktown Power Station | 3809 | 1 | Electric Utility | No | Yes | 205 | 647 | 116 | 0.4978 |
| VA | Yorktown Power Station | 3809 | 2 | Electric Utility | No | Yes | 405 | 1664 | 192 | 0.4510 |
| VA | Yorktown Power Station | 3809 | 3 | Electric Utility | Yes | Yes | 181 | 834 | 241 | 0.1234 |
| VT | Berlin 5 | 3734 | A | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| VT | Berlin 5 | 3734 | B | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| VT | J C McNeil | 589 | 1 | Electric Utility | No | Yes | 1301 | 3815 | 1239 | 0.0673 |
| VT | Penny Lane Gas Turbine | 3754 | CT1 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| VT | Penny Lane Gas Turbine | 3754 | CT2 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0000 |
| VA | Spruance Genco, LLC | 54081 | BLR01B | Cogeneration | No | Yes | 902 | 5280 | 1208 | 0.0491 |
| VA | Spruance Genco, LLC | 54081 | BLR02A | Cogeneration | No | Yes | 946 | 5465 | 1255 | 0.1386 |
| VA | Spruance Genco, LLC | 54081 | BLR02B | Cogeneration | No | Yes | 858 | 5702 | 1205 | 0.6780 |
| VA | Spruance Genco, LLC | 54081 | BLR03A | Cogeneration | Yes | Yes | 783 | 1356 | 227 | 0.0184 |
| VA | Spruance Genco, LLC | 54081 | BLR03B | Cogeneration | Yes | Yes | 1064 | 1558 | 250 | 0.0187 |
| VA | Spruance Genco, LLC | 54081 | BLR04A | Cogeneration | Yes | Yes | 865 | 1409 | 558 | 0.1271 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| VA | Spruance Genco, LLC | 54081 | BLR04B | Cogeneration | Yes | Yes | 792 | 1446 | 703 | 0.6987 |
| VA | Tasley Energy Center | 3785 | TA10 | Electric Utility | Yes | Yes | 10 | 15 | 0 | 0.0964 |
| VA | Tenaska Virginia Generating Station | 55439 | CTGDB1 | Electric Utility | No | Yes | 1488 | 6798 | 1223 | 0.1520 |
| VA | Tenaska Virginia Generating Station | 55439 | CTGDB2 | Electric Utility | No | Yes | 1488 | 6826 | 1211 | 0.1730 |
| VA | Tenaska Virginia Generating Station | 55439 | CTGDB3 | Electric Utility | No | Yes | 1488 | 6821 | 1232 | 0.1880 |
| VA | Virginia City Hybrid Energy Center | 56808 | 1 | Electric Utility | No | Yes | 1293 | 3339 | 611 | 0.1530 |
| VA | Virginia City Hybrid Energy Center | 56808 | 2 | Electric Utility | No | Yes | 1488 | 4924 | 622 | 0.1880 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01A | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0070 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01B | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0072 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR01C | Cogeneration | No | Yes | 0 | 0 | 0 | 0.7120 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02A | Cogeneration | No | Yes | 0 | 0 | 0 | 0.1022 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02B | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0938 |
| VA | Virginia Renewable Power-Portsmouth LLC | 10071 | BLR02C | Cogeneration | No | Yes | 0 | 0 | 0 | 0.0910 |
| VA | Warren County Power Station | 55939 | 1A | Electric Utility | No | Yes | 1488 | 6554 | 1440 | 0.1061 |
| VA | Warren County Power Station | 55939 | 1B | Electric Utility | No | Yes | 1440 | 6320 | 1418 | 0.0174 |
| VA | Warren County Power Station | 55939 | 1C | Electric Utility | No | Yes | 1488 | 6496 | 1414 | 0.0166 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 001 | Industrial Boiler | No | No | 1343 | 6901 | 1343 | 0.0216 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 011 | Industrial Boiler | No | No | 1327 | 5356 | 1327 | 0.0188 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 002 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 003 | Industrial Boiler | No | No | 0 | 0 | 0 | 0.0000 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 004 | Industrial Boiler | No | No | 1488 | 6886 | 1484 | 0.6590 |
| VA | WestRock Virginia Corp Covington Ops | 50900 | 005 | Industrial Boiler | No | No | 1488 | 6002 | 1486 | 0.0103 |
| VA | Wolf Hills Energy | 55285 | WH01 | Electric Utility | No | Yes | 239 | 1188 | 146 | 0.0100 |
| VA | Wolf Hills Energy | 55285 | WH02 | Electric Utility | No | Yes | 239 | 1167 | 139 | 0.0071 |
| VA | Wolf Hills Energy | 55285 | WH03 | Electric Utility | No | Yes | 257 | 1187 | 152 | 0.0064 |
| VA | Wolf Hills Energy | 55285 | WH04 | Electric Utility | No | Yes | 258 | 1171 | 148 | 0.0059 |
| VA | Wolf Hills Energy | 55285 | WH05 | Electric Utility | No | Yes | 236 | 1174 | 146 | 0.6470 |
| VA | Wolf Hills Energy | 55285 | WH06 | Electric Utility | No | Yes | 235 | 1161 | 149 | 0.0079 |
| VA | Wolf Hills Energy | 55285 | WH07 | Electric Utility | No | Yes | 244 | 1000 | 113 | 0.0099 |
| VA | Wolf Hills Energy | 55285 | WH08 | Electric Utility | No | Yes | 245 | 988 | 110 | 0.0108 |
| VA | Wolf Hills Energy | 55285 | WH09 | Electric Utility | No | Yes | 166 | 952 | 85 | 0.0067 |
| VA | Wolf Hills Energy | 55285 | WH10 | Electric Utility | No | Yes | 167 | 903 | 75 | 0.0825 |

| St | Facility Name | Oris | Unit ID | Category | Peaker ? | Electric ? | Hr Count 2016 | Hr Count 2018 /19 | Hr Count Run 2 R | Avg Rate 2018/ 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| VA | Yorktown Power Station | 3809 | 1 | Electric Utility | No | Yes | 205 | 647 | 116 | 0.1402 |
| VA | Yorktown Power Station | 3809 | 2 | Electric Utility | No | Yes | 405 | 1664 | 192 | 0.1269 |
| VA | Yorktown Power Station | 3809 | 3 | Electric Utility | Yes | Yes | 181 | 834 | 241 | 0.0154 |
| VT | Berlin 5 | 3734 | A | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0133 |
| VT | Berlin 5 | 3734 | B | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0682 |
| VT | J C McNeil | 589 | 1 | Electric Utility | No | Yes | 1301 | 3815 | 1239 | 0.1397 |
| VT | Penny Lane Gas Turbine | 3754 | CT1 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0468 |
| VT | Penny Lane Gas Turbine | 3754 | CT2 | Electric Utility | Yes | Yes | 0 | 0 | 0 | 0.0402 |

## Appendix G. *Non-Part-75 Units Tagged as Peaking Units for Tagged Modeling*

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| AL | Ala Power - Theodore Cogen | | | 1062911 | 47282413 | SESARM Gas Peaking |
| AL | Alabama Power Company | 26 | GT4 | 949211 | 47874713 | SESARM Oil Peaking |
| AR | Entergy Arkansas, Inc. - Hot Spring Energy Facility | 55418 | ST1 | 1119311 | 46771413 | South Gas Peaking |
| AR | ENTERGY ARK-MABELVALE | | | 863611 | 47485613 | South Gas Peaking |
| AR | ENTERGY ARK-MABELVALE | | | 863611 | 47485713 | South Oil Peaking |
| AR | ENTERGY ARK-MABELVALE | | | 863611 | 47485913 | South Gas Peaking |
| AR | JONESBORO CITY WATER AND LIGHT-NW SUBSTA | 56505 | SN01 | 976311 | 112831113 | South Gas Peaking |
| AR | JONESBORO CITY WATER AND LIGHT-NW SUBSTA | 56505 | SN02 | 976311 | 112830913 | South Oil Peaking |
| CO | ALTAGAS BRUSH ENERGY - 1500 S CLAYTON ST | 10682 | GT1 | 3936111 | 36928213 | Southwest Gas Peaking |
| CO | BLACK HILLS ELECTRIC- AIRPORT INDUSTRIAL | 7995 | IC4 | 4295211 | 36355913 | Southwest Composite Peaking |
| CO | BLACK HILLS ELECTRIC- PUEBLO POWER PLANT | 460 | IC5 | 4368111 | 36419413 | Southwest Composite Peaking |
| CO | COLO SPRINGS UTILITIES - BIRDSALL PLANT | 493 | 1 | 4391611 | 36145613 | Southwest Gas Peaking |
| CO | COLO SPRINGS UTILITIES - BIRDSALL PLANT | 493 | 2 | 4391611 | 36145713 | Southwest Gas Peaking |
| CO | COLO SPRINGS UTILITIES - BIRDSALL PLANT | 493 | 3 | 4391611 | 36145813 | Southwest Gas Peaking |
| CO | LAMAR LIGHT & POWER/ARKANSAS RIVER POWER | | | 4229911 | 36114313 | Southwest Gas Peaking |
| CO | PLAINS END, LLC | 55650 | GE20 | 3834311 | 36962913 | Southwest Gas Peaking |
| CO | PLAINS END, LLC | 56516 | 2G14 | 3834311 | 96071213 | Southwest Gas Peaking |
| CO | PUBLIC SERV - ROCKY MOUNTAIN ENERGY | 55835 | STG1 | 12868211 | 68880013 | Southwest Gas Peaking |
| CO | PUBLIC SERVICE CO - FT LUPTON STATION | 8067 | 1 | 3551311 | 36795313 | Southwest Gas Peaking |
| CO | PUBLIC SERVICE CO - FT LUPTON STATION | 8067 | 2 | 3551311 | 36795213 | Southwest Gas Peaking |
| CO | PUBLIC SERVICE CO - VALMONT STATION | 477 | 6 | 778211 | 45916213 | Southwest Gas Peaking |
| CO | PUBLIC SERVICE CO ALAMOSA PLT | 464 | CT1 | 2136511 | 43024113 | Southwest Gas Peaking |
| CO | PUBLIC SERVICE CO ALAMOSA PLT | 464 | CT2 | 2136511 | 43024213 | Southwest Gas Peaking |
| CO | PUBLIC SERVICE CO FRUITA STA | 471 | 1 | 4456711 | 36379513 | Southwest Gas Peaking |
| CO | THERMO POWER & ELEC (SEE ALSO 123/0321) | | | 2568111 | 40903213 | Southwest Gas Peaking |
| CO | THERMO POWER & ELEC (SEE ALSO 123/0321) | | | 2568111 | 40903313 | Southwest Gas Peaking |
| CO | TRI STATE GENERATION BURLINGTON | 6619 | 1 | 2761411 | 40836613 | Southwest Composite Peaking |
| CO | TRI STATE GENERATION BURLINGTON | 6619 | 2 | 2761411 | 40836513 | Southwest Composite Peaking |
| CT | MONTVILLE POWER, LLC | 546 | 10 | 552611 | 48259413 | MANE-VU Oil Peaking |
| CT | MONTVILLE POWER, LLC | 546 | 11 | 552611 | 48259213 | MANE-VU Oil Peaking |
| FL | CITY OF LAKE WORTH UTILITIES | 673 | GT2 | 919411 | 46529013 | SESARM Oil Peaking |
| FL | CITY OF LAKE WORTH UTILITIES | 673 | MU1 | 919411 | 46529513 | SESARM Oil Peaking |
| FL | CITY OF LAKE WORTH UTILITIES | 673 | MU2 | 919411 | 46529813 | SESARM Oil Peaking |
| FL | CITY OF LAKE WORTH UTILITIES | 673 | MU3 | 919411 | 46529213 | SESARM Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| FL | CITY OF LAKE WORTH UTILITIES | 673 | MU4 | 919411 | 46529413 | SESARM Oil Peaking |
| FL | CITY OF LAKE WORTH UTILITIES | 673 | MU5 | 919411 | 46529313 | SESARM Oil Peaking |
| GA | Ga Power Company - Plant Boulevard | 732 | 1 | 15504311 | 97066413 | SESARM Gas Peaking |
| IA | CEDAR FALLS MUNICIPAL ELECTRIC UTILITY | 1131 | 6 | 12806211 | 67676513 | West North Central Composite Peaking |
| IA | CEDAR FALLS MUNICIPAL ELECTRIC UTILITY | | | 12806211 | 67677213 | West North Central Gas Peaking |
| IA | CEDAR FALLS MUNICIPAL ELECTRIC UTILITY | | | 12806211 | 67677913 | West North Central Gas Peaking |
| IA | INDIANOLA MUNICIPAL UTILITIES | 1150 | 8 | 15474111 | 98111513 | West North Central Oil Peaking |
| IA | IPL - BURLINGTON GENERATING STATION | | | 5511811 | 27179313 | West North Central Gas Peaking |
| IA | IPL - BURLINGTON GENERATING STATION | | | 5511811 | 27179513 | West North Central Gas Peaking |
| IA | IPL - BURLINGTON GENERATING STATION | | | 5511811 | 27179713 | West North Central Gas Peaking |
| IA | IPL - BURLINGTON GENERATING STATION | | | 5511811 | 27181713 | West North Central Gas Peaking |
| IA | IPL - CENTERVILLE COMBUSTION TURBINES AND DIESELS | | | 5523711 | 27493213 | West North Central Oil Peaking |
| IA | IPL - CENTERVILLE COMBUSTION TURBINES AND DIESELS | | | 5523711 | 27493313 | West North Central Oil Peaking |
| IA | IPL - CENTERVILLE COMBUSTION TURBINES AND DIESELS | | | 5523711 | 27493413 | West North Central Oil Peaking |
| IA | IPL - MARSHALLTOWN GENERATING STATION | | | 3779111 | 124117513 | West North Central Gas Peaking |
| IA | IPL - MARSHALLTOWN GENERATING STATION | | | 3779111 | 124118013 | West North Central Gas Peaking |
| IA | IPL - PRAIRIE CREEK GENERATING STATION | | | 3940211 | 37605213 | West North Central Gas Peaking |
| IA | IPL - PRAIRIE CREEK GENERATING STATION | | | 3940211 | 37605713 | West North Central Composite Peaking |
| IA | MIDAMERICAN ENERGY CO - CORALVILLE TURBINES | 1079 | 1 | 3925111 | 37692113 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - CORALVILLE TURBINES | 1079 | 2 | 3925111 | 37692213 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - CORALVILLE TURBINES | 1079 | 3 | 3925111 | 37692313 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - CORALVILLE TURBINES | 1079 | 4 | 3925111 | 37692413 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 1 | 3163711 | 38794513 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 2 | 3163711 | 38794613 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 3 | 3163711 | 38794713 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 4 | 3163711 | 38794813 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 5 | 3163711 | 38794913 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 6 | 3163711 | 38795013 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 7 | 3163711 | 38795113 | West North Central Gas Peaking |
| IA | MIDAMERICAN ENERGY CO - RIVER HILLS TURBINES | 1084 | 8 | 3163711 | 38794213 | West North Central Gas Peaking |
| IA | MUSCATINE POWER & WATER | 1167 | 7 | 7892811 | 2592713 | West North Central Composite Peaking |
| IL | Breese Municipal Power Plant | 934 | 2 | 1946811 | 41583313 | LADCO Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| IL | Breese Municipal Power Plant | 934 | 6 | 1946811 | 41583713 | LADCO Oil Peaking |
| IL | Breese Municipal Power Plant | 934 | IC3 | 1946811 | 41583513 | LADCO Oil Peaking |
| IL | Bushnell Municipal Electric Light & Power | 935 | 1 | 4702711 | 27765013 | LADCO Oil Peaking |
| IL | Bushnell Municipal Electric Light & Power | 935 | 7 | 4702711 | 27765113 | LADCO Oil Peaking |
| IL | Carlyle Municipal Electric Plant | 936 | 1 | 2612711 | 40726313 | LADCO Oil Peaking |
| IL | Carlyle Municipal Electric Plant | 936 | 7 | 2612711 | 40726413 | LADCO Oil Peaking |
| IL | Carlyle Municipal Electric Plant | 936 | 8 | 2612711 | 40726113 | LADCO Oil Peaking |
| IL | Carlyle Municipal Electric Plant | 936 | 9 | 2612711 | 40726213 | LADCO Oil Peaking |
| IL | City of Casey | 56053 | 2 | 1929611 | 41598513 | LADCO Oil Peaking |
| IL | City of Flora | 56117 | 1 | 1944811 | 41588513 | LADCO Oil Peaking |
| IL | City of Flora | 56117 | 2 | 1944811 | 41588313 | LADCO Oil Peaking |
| IL | City of Flora | 56117 | 3 | 1944811 | 41588413 | LADCO Oil Peaking |
| IL | City of Flora | 56118 | 4 | 1944811 | 41588613 | LADCO Oil Peaking |
| IL | City of Flora | 56118 | 5 | 1944811 | 41588213 | LADCO Oil Peaking |
| IL | City Of Peru Generating Station | | | 5431911 | 27563313 | LADCO Oil Peaking |
| IL | Cordova Energy Co LLC | 55188 | PT31 | 4594711 | 28237413 | LADCO Gas Peaking |
| IL | Corn Belt Energy Corp | | | 4907511 | 31538013 | LADCO Oil Peaking |
| IL | Dynegy Midwest Generation LLC Havana Power Station | | | 7337411 | 8279913 | LADCO Oil Peaking |
| IL | Fairfield Municipal Light | 940 | IC6 | 5573711 | 26943813 | LADCO Oil Peaking |
| IL | Fisk Electric Generating Station | | | 1731811 | 41553513 | LADCO Coal Peaking |
| IL | Geneva Generating Plant | 56462 | GEN 1 | 9731711 | 53868813 | LADCO Gas Peaking |
| IL | Geneva Generating Plant | 56462 | GEN 2 | 9731711 | 53868913 | LADCO Gas Peaking |
| IL | Geneva Generating Plant | 56462 | GEN 3 | 9731711 | 53869013 | LADCO Gas Peaking |
| IL | Geneva Generating Plant | 56462 | GEN 4 | 9731711 | 53869113 | LADCO Gas Peaking |
| IL | Geneva Generating Plant | 56462 | GEN 5 | 9731711 | 53869213 | LADCO Gas Peaking |
| IL | Highland Electric Light Plant | 946 | IC5 | 3955311 | 33702813 | LADCO Oil Peaking |
| IL | Illinois Municipal Electric Agency | 56116 | 8 | 1944711 | 41588713 | LADCO Oil Peaking |
| IL | Illinois Power Resources Generating LLC | | | 5422711 | 26814513 | LADCO Coal Peaking |
| IL | Marshall Municipal Utilities | 949 | 10 | 1845411 | 41691713 | LADCO Oil Peaking |
| IL | Marshall Municipal Utilities | 949 | 11 | 1845411 | 41692113 | LADCO Oil Peaking |
| IL | Marshall Municipal Utilities | 949 | 5 | 1845411 | 41692313 | LADCO Oil Peaking |
| IL | Marshall Municipal Utilities | 949 | 6 | 1845411 | 41692013 | LADCO Oil Peaking |
| IL | Marshall Municipal Utilities | 949 | 7 | 1845411 | 41692213 | LADCO Oil Peaking |
| IL | Marshall Municipal Utilities | 949 | 8 | 1845411 | 41692413 | LADCO Oil Peaking |
| IL | Marshall Municipal Utilities | 949 | 9 | 1845411 | 41692513 | LADCO Oil Peaking |
| IL | McLeansboro Power Plant | 948 | 7 | 3351111 | 38897713 | LADCO Oil Peaking |
| IL | Moline Combustion Turbines | 899 | GT1 | 4574611 | 28253113 | LADCO Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| IL | Moline Combustion Turbines | 899 | GT2 | 4574611 | 28253313 | LADCO Gas Peaking |
| IL | Moline Combustion Turbines | 899 | GT3 | 4574611 | 28253213 | LADCO Gas Peaking |
| IL | Moline Combustion Turbines | 899 | GT4 | 4574611 | 28253413 | LADCO Gas Peaking |
| IL | Morris Cogeneration LLC | | | 3348811 | 38906313 | LADCO Gas Peaking |
| IL | Morris Cogeneration LLC | | | 3348811 | 91319813 | LADCO Gas Peaking |
| IL | Prairie Power Inc | 6238 | GT1 | 7807411 | 2246613 | LADCO Oil Peaking |
| IL | Prairie Power Inc | 7818 | 3 | 5457411 | 27026613 | LADCO Gas Peaking |
| IL | Prairie Power Inc | 7818 | 4 | 5457411 | 27026513 | LADCO Gas Peaking |
| IL | Prairie Power Inc | 7818 | 6 | 5457411 | 123323613 | LADCO Oil Peaking |
| IL | Prairie Power Inc | | | 7807411 | 2246313 | LADCO Coal Peaking |
| IL | Princeton Muncipal Electric Utility | 957 | 8 | 2363611 | 40498313 | LADCO Gas Peaking |
| IL | Rochelle Municipal Diesel Plant | 960 | 10 | 5039111 | 29822513 | LADCO Oil Peaking |
| IL | Rochelle Municipal Diesel Plant | 960 | 3 | 5039111 | 29822313 | LADCO Gas Peaking |
| IL | Rochelle Municipal Diesel Plant | 960 | 4 | 5039111 | 29822013 | LADCO Oil Peaking |
| IL | Rochelle Municipal Diesel Plant | 960 | 7 | 5039111 | 29822613 | LADCO Gas Peaking |
| IL | Rochelle Municipal Diesel Plant | 960 | 8 | 5039111 | 29821813 | LADCO Oil Peaking |
| IL | Rochelle Municipal Diesel Plant | 960 | 9 | 5039111 | 29822213 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 1 | 4657211 | 28182813 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 10 | 4657211 | 28182513 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 12 | 4657211 | 28182313 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 2 | 4657211 | 28183113 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 3 | 4657211 | 28183013 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 4 | 4657211 | 28182913 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 5 | 4657211 | 28182213 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 6 | 4657211 | 28182413 | LADCO Oil Peaking |
| IL | Sullivan Power Plant | 969 | 9 | 4657211 | 28182713 | LADCO Oil Peaking |
| IL | Union Electric Co | | | 7338011 | 8266713 | LADCO Oil Peaking |
| IL | Village of Freeburg | 943 | 1 | 4909511 | 31529213 | LADCO Oil Peaking |
| IL | Village of Freeburg | 943 | 2 | 4909511 | 31529313 | LADCO Oil Peaking |
| IL | Village of Freeburg | 943 | 3 | 4909511 | 31529613 | LADCO Oil Peaking |
| IL | Village of Freeburg | 943 | 4 | 4909511 | 31529513 | LADCO Oil Peaking |
| IL | Village of Freeburg | 943 | 6 | 4909511 | 31529113 | LADCO Oil Peaking |
| IL | Village of Freeburg | 943 | 8 | 4909511 | 31529413 | LADCO Oil Peaking |
| IL | Waterloo City Light Plant | 971 | 1 | 5546111 | 27442013 | LADCO Oil Peaking |
| IL | Waterloo City Light Plant | 971 | 2 | 5546111 | 27441413 | LADCO Oil Peaking |
| IL | Waterloo City Light Plant | 971 | 3 | 5546111 | 27441913 | LADCO Oil Peaking |
| IL | Waterloo City Light Plant | 971 | 4 | 5546111 | 27441813 | LADCO Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| IL | Waterloo City Light Plant | 971 | 5 | 5546111 | 27441713 | LADCO Oil Peaking |
| IL | Waterloo City Light Plant | 971 | 6 | 5546111 | 27442213 | LADCO Gas Peaking |
| IL | Waterloo City Light Plant | 971 | 7 | 5546111 | 27441613 | LADCO Oil Peaking |
| IL | Waterloo City Light Plant | 971 | 8 | 5546111 | 27441513 | LADCO Oil Peaking |
| IL | Winnetka Electric Plant | 972 | 5 | 2701711 | 41212413 | LADCO Gas Peaking |
| IL | Wood River | | | 7791011 | 2330513 | LADCO Oil Peaking |
| IN | Duke Energy Indiana LLC - Miami Wabash | 1006 | 1 | 8181711 | 5862913 | LADCO Oil Peaking |
| IN | Duke Energy Indiana LLC - Miami Wabash | 1006 | 2 | 8181711 | 5862813 | LADCO Oil Peaking |
| IN | Duke Energy Indiana LLC - Miami Wabash | 1006 | 3 | 8181711 | 5862513 | LADCO Oil Peaking |
| IN | Duke Energy Indiana LLC - Miami Wabash | 1006 | 5 | 8181711 | 5863013 | LADCO Oil Peaking |
| IN | Duke Energy Indiana LLC - Miami Wabash | 1006 | 6 | 8181711 | 5862713 | LADCO Oil Peaking |
| IN | Duke Energy Indiana LLC - Miami Wabash | | | 8181711 | 5862413 | LADCO Oil Peaking |
| IN | Indianapolis Power & Light AES Eagle Valley | | | 8225111 | 4234313 | LADCO Oil Peaking |
| IN | Indianapolis Power & Light AES Eagle Valley | | | 8225111 | 4234513 | LADCO Oil Peaking |
| IN | INDIANAPOLIS POWER & LIGHT CO HARDIN | 990 | GT1 | 7255211 | 91608213 | LADCO Oil Peaking |
| IN | INDIANAPOLIS POWER & LIGHT CO HARDIN | 990 | GT2 | 7255211 | 91608313 | LADCO Oil Peaking |
| IN | INDIANAPOLIS POWER & LIGHT CO HARDIN | | | 7255211 | 91188413 | LADCO Oil Peaking |
| IN | INDIANAPOLIS POWER & LIGHT CO HARDIN | | | 7255211 | 91188513 | LADCO Oil Peaking |
| IN | INDIANAPOLIS POWER & LIGHT CO HARDIN | | | 7255211 | 91608413 | LADCO Oil Peaking |
| IN | PERU UTILITIES POWER PLANT | | | 4552711 | 28437313 | LADCO Coal Peaking |
| IN | Wabash River Combined Cycle Plant | | | 12766611 | 65429413 | LADCO Gas Peaking |
| KS | Anthony Mun. Power Plant | 1258 | IC1 | 2975211 | 38086913 | South Oil Peaking |
| KS | Anthony Mun. Power Plant | 1258 | IC2 | 2975211 | 38086813 | South Oil Peaking |
| KS | Anthony Mun. Power Plant | 1258 | IC3 | 2975211 | 38086713 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #1 | 1261 | 1 | 3670411 | 37388313 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #1 | 1261 | 3 | 3670411 | 37388213 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #1 | 1261 | 5 | 3670411 | 37388113 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #1 | 1261 | 6 | 3670411 | 37387913 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #1 | 1261 | 7 | 3670411 | 37388013 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #2 | 6791 | 1 | 3670511 | 37387613 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #2 | 6791 | 2 | 3670511 | 37387713 | South Oil Peaking |
| KS | Augusta Mun. Power Plant #2 | 6791 | 3 | 3670511 | 37387813 | South Oil Peaking |
| KS | Beloit Mun. Power Plant | 1264 | 1 | 4527711 | 27615113 | South Oil Peaking |
| KS | Beloit Mun. Power Plant | 1264 | 2 | 4527711 | 27615713 | South Oil Peaking |
| KS | Beloit Mun. Power Plant | 1264 | 3 | 4527711 | 27615613 | South Oil Peaking |
| KS | Beloit Mun. Power Plant | 1264 | 4 | 4527711 | 27615513 | South Oil Peaking |
| KS | Beloit Mun. Power Plant | 1264 | 5 | 4527711 | 27615413 | South Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| KS | Beloit Mun. Power Plant | 1264 | 6 | 4527711 | 27615313 | South Oil Peaking |
| KS | Beloit Mun. Power Plant | 1264 | 7 | 4527711 | 27615213 | South Oil Peaking |
| KS | Chanute Mun. Power Plant #2 | 1268 | 7 | 5414711 | 27353913 | South Oil Peaking |
| KS | Chanute Mun. Power Plant #2 | 1268 | 8 | 5414711 | 27354113 | South Oil Peaking |
| KS | Chanute Mun. Power Plant #3 | 7018 | 10 | 5414611 | 27354313 | South Oil Peaking |
| KS | Chanute Mun. Power Plant #3 | 7018 | 11 | 5414611 | 27354413 | South Oil Peaking |
| KS | Chanute Mun. Power Plant #3 | 7018 | 12 | 5414611 | 27354213 | South Oil Peaking |
| KS | Chanute Mun. Power Plant #3 | 7018 | 13 | 5414611 | 27354613 | South Oil Peaking |
| KS | Chanute Mun. Power Plant #3 | 7018 | 9 | 5414611 | 27354513 | South Oil Peaking |
| KS | Clay Center Mun. Power Plant | 1270 | IC1 | 4499711 | 28277113 | South Oil Peaking |
| KS | Clay Center Mun. Power Plant | 1270 | IC2 | 4499711 | 28276813 | South Oil Peaking |
| KS | Clay Center Mun. Power Plant | 1270 | IC3 | 4499711 | 28276913 | South Oil Peaking |
| KS | Clay Center Mun. Power Plant | 1270 | IC4 | 4499711 | 28277313 | South Oil Peaking |
| KS | Clay Center Mun. Power Plant | 1270 | IC5 | 4499711 | 28277013 | South Oil Peaking |
| KS | Empire District Electric - Riverton | 1239 | 11 | 3878111 | 37460613 | South Gas Peaking |
| KS | Empire District Electric - Riverton | | | 3878111 | 37460713 | South Gas Peaking |
| KS | Gardner Energy Center | 7281 | CT1 | 4538111 | 28270413 | South Gas Peaking |
| KS | Kansas City BPU - Kaw | | | 4628011 | 63914113 | South Gas Peaking |
| KS | Kingman Mun. Power Plant | 1296 | 2 | 4878111 | 30474813 | South Oil Peaking |
| KS | Kingman Mun. Power Plant | 1296 | 4 | 4878111 | 30474513 | South Oil Peaking |
| KS | Kingman Mun. Power Plant | 1296 | 6 | 4878111 | 30474313 | South Oil Peaking |
| KS | Kingman Mun. Power Plant | 1296 | 7 | 4878111 | 30474613 | South Oil Peaking |
| KS | Kingman Mun. Power Plant | 1296 | 8 | 4878111 | 30474713 | South Oil Peaking |
| KS | Mid-Kansas Electric - Cimarron River | 1230 | 2 | 3772011 | 37527513 | South Gas Peaking |
| KS | Mid-Kansas Electric - Clifton | 8037 | 2 | 4126711 | 34105213 | South Oil Peaking |
| KS | Midwest Energy - Colby | 1225 | GT1 | 9615511 | 53881313 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 1 | 12657411 | 98357013 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 2 | 12657411 | 108775313 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 3 | 12657411 | 108775013 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 4 | 12657411 | 108775613 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 5 | 12657411 | 108775513 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 6 | 12657411 | 108775413 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 7 | 12657411 | 108775713 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 8 | 12657411 | 108775113 | South Gas Peaking |
| KS | Midwest Energy - Hays (Goodman Energy Center) | 56497 | 9 | 12657411 | 108775213 | South Gas Peaking |
| KS | Ottawa Mun. Power Plant | 1316 | IC3 | 3734911 | 37538313 | South Oil Peaking |
| KS | Ottawa Mun. Power Plant | 1316 | IC4 | 3734911 | 37537913 | South Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| KS | Ottawa Mun. Power Plant | 1316 | IC6 | 3734911 | 37538113 | South Oil Peaking |
| KS | Ottawa Mun. Power Plant | 1316 | IC7 | 3734911 | 37538213 | South Oil Peaking |
| KS | Pratt Mun. Power Plant | | | 5372811 | 27388213 | South Gas Peaking |
| KS | Pratt Mun. Power Plant | | | 5372811 | 27388413 | South Gas Peaking |
| KS | Pratt Mun. Power Plant | | | 5372811 | 98342813 | South Oil Peaking |
| KS | Pratt Mun. Power Plant | | | 5372811 | 98342913 | South Oil Peaking |
| KS | Russell Mun. Power Plant #1 | 1319 | 11 | 3105611 | 38158013 | South Oil Peaking |
| KS | Russell Mun. Power Plant #1 | 1319 | 7 | 3105611 | 38157913 | South Oil Peaking |
| KS | Sunflower Electric - Garden City | 1336 | S3 | 3167811 | 38764813 | South Gas Peaking |
| KS | Sunflower Electric - Garden City | | | 3167811 | 38764713 | South Gas Peaking |
| KS | Wellington Mun. Power Plant #1 | 1330 | 4 | 5444311 | 26795713 | South Gas Peaking |
| KS | Wellington Mun. Power Plant #2 | 7339 | 6 | 5444811 | 26794813 | South Gas Peaking |
| KY | Tennessee Valley Authority (TVA) - Shawnee Fossil Plant | | | 6037011 | 24137613 | SESARM Coal Peaking |
| LA | CLECO Power LLC - Teche Power Station | | | 7204011 | 80795613 | South Gas Peaking |
| LA | Joseph J Cefalu Sr Municipal Steam Plant | | | 5060411 | 80432713 | South Gas Peaking |
| LA | NRG Sterlington Power LLC - Sterlington Power Plant | 55099 | 01 | 5836111 | 82087213 | South Gas Peaking |
| LA | NRG Sterlington Power LLC - Sterlington Power Plant | 55099 | 02 | 5836111 | 82087713 | South Gas Peaking |
| LA | NRG Sterlington Power LLC - Sterlington Power Plant | 55099 | 04 | 5836111 | 82087913 | South Gas Peaking |
| LA | NRG Sterlington Power LLC - Sterlington Power Plant | 55099 | 06 | 5836111 | 82087413 | South Gas Peaking |
| LA | NRG Sterlington Power LLC - Sterlington Power Plant | 55099 | 07 | 5836111 | 82087113 | South Gas Peaking |
| LA | NRG Sterlington Power LLC - Sterlington Power Plant | 55099 | 09 | 5836111 | 82087613 | South Gas Peaking |
| LA | NRG Sterlington Power LLC - Sterlington Power Plant | 55099 | 10 | 5836111 | 82088013 | South Gas Peaking |
| MA | BRAINTREE ELECTRIC | 1660 | IC1 | 6569511 | 87608113 | MANE-VU Oil Peaking |
| MA | CHICOPEE ELECTRIC LIGHT | 7396 | 1 | 5920611 | 87848413 | MANE-VU Oil Peaking |
| MA | CHICOPEE ELECTRIC LIGHT | 7396 | 2 | 5920611 | 87848513 | MANE-VU Oil Peaking |
| MA | CHICOPEE ELECTRIC LIGHT | 7396 | 3 | 5920611 | 87848613 | MANE-VU Oil Peaking |
| MA | HUDSON LIGHT & POWER DEPARTMENT | 9038 | 10 | 4100911 | 87365013 | MANE-VU Oil Peaking |
| MA | HUDSON LIGHT & POWER DEPARTMENT | 9038 | 11 | 4100911 | 87365113 | MANE-VU Oil Peaking |
| MA | HUDSON LIGHT & POWER DEPARTMENT | 9038 | 12 | 4100911 | 87365213 | MANE-VU Oil Peaking |
| MA | HUDSON LIGHT & POWER DEPARTMENT | 9038 | 7 | 4100911 | 87365513 | MANE-VU Oil Peaking |
| MA | HUDSON LIGHT & POWER DEPARTMENT | 9038 | 8 | 4100911 | 87364813 | MANE-VU Gas Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 1 | 6521911 | 87725013 | MANE-VU Oil Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 10 | 6521911 | 87725813 | MANE-VU Oil Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 11 | 6521911 | 18016113 | MANE-VU Oil Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 12 | 6521911 | 18016213 | MANE-VU Oil Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 2 | 6521911 | 87725113 | MANE-VU Oil Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 6 | 6521911 | 87725413 | MANE-VU Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 7 | 6521911 | 87725513 | MANE-VU Oil Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 8 | 6521911 | 87725613 | MANE-VU Oil Peaking |
| MA | IPSWICH MUNICIPAL LIGHT | 1670 | 9 | 6521911 | 87725713 | MANE-VU Oil Peaking |
| MA | MARBLEHEAD MUNICIPAL WILKINS | 6586 | 1 | 6523111 | 87588913 | MANE-VU Oil Peaking |
| MA | MARBLEHEAD MUNICIPAL WILKINS | 6586 | 2 | 6523111 | 87589013 | MANE-VU Oil Peaking |
| MA | NANTUCKET ELECTRIC COMPANY | 1615 | 12 | 6110111 | 87827013 | MANE-VU Oil Peaking |
| MA | NANTUCKET ELECTRIC COMPANY | 1615 | 13 | 6110111 | 87827113 | MANE-VU Oil Peaking |
| MA | NRG CANAL LLC - OAK BLUFFS | 1597 | UN1 | 5238711 | 87806113 | MANE-VU Oil Peaking |
| MA | NRG CANAL LLC - OAK BLUFFS | 1597 | UN2 | 5238711 | 87806213 | MANE-VU Oil Peaking |
| MA | NRG CANAL LLC - OAK BLUFFS | 1597 | UN3 | 5238711 | 87806313 | MANE-VU Oil Peaking |
| MA | NRG CANAL LLC - WEST TISBURY | 6049 | UN1 | 5239211 | 87594513 | MANE-VU Oil Peaking |
| MA | NRG CANAL LLC - WEST TISBURY | 6049 | UN2 | 5239211 | 87594613 | MANE-VU Oil Peaking |
| MA | SHREWSBURY ELECTRIC AND CABLE OPERATIONS | 6125 | 1 | 5096411 | 87700513 | MANE-VU Oil Peaking |
| MA | SHREWSBURY ELECTRIC AND CABLE OPERATIONS | 6125 | 2 | 5096411 | 87700613 | MANE-VU Oil Peaking |
| MA | SHREWSBURY ELECTRIC AND CABLE OPERATIONS | 6125 | 3 | 5096411 | 87700713 | MANE-VU Oil Peaking |
| MA | SHREWSBURY ELECTRIC AND CABLE OPERATIONS | 6125 | 4 | 5096411 | 87701013 | MANE-VU Oil Peaking |
| MA | SHREWSBURY ELECTRIC AND CABLE OPERATIONS | 6125 | 5 | 5096411 | 87700813 | MANE-VU Oil Peaking |
| MD | Berlin Town Power Plant | 6565 | 1A | 6572311 | 88042713 | MANE-VU Oil Peaking |
| MD | Berlin Town Power Plant | 6565 | 2A | 6572311 | 88042813 | MANE-VU Oil Peaking |
| MD | Berlin Town Power Plant | 6565 | 4A | 6572311 | 88043013 | MANE-VU Oil Peaking |
| MD | Berlin Town Power Plant | 6565 | 5A | 6572311 | 88042613 | MANE-VU Oil Peaking |
| MD | Berlin Town Power Plant | | | 6572311 | 88042913 | MANE-VU Oil Peaking |
| MD | C.P. Crane LLC | 1552 | GT1 | 5155011 | 87895413 | MANE-VU Oil Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT1 | 5154811 | 87894013 | MANE-VU Gas Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT2 | 5154811 | 87894113 | MANE-VU Gas Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT3 | 5154811 | 87894213 | MANE-VU Gas Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT4 | 5154811 | 87894313 | MANE-VU Gas Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT5 | 5154811 | 87894413 | MANE-VU Gas Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT6 | 5154811 | 87894513 | MANE-VU Gas Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT7 | 5154811 | 87894613 | MANE-VU Gas Peaking |
| MD | Constellation - Notch Cliff | 1555 | GT8 | 5154811 | 87894713 | MANE-VU Gas Peaking |
| MD | Constellation - Riverside | 1559 | GT7 | 5154911 | 87894813 | MANE-VU Oil Peaking |
| MD | Constellation - Riverside | 1559 | GT8 | 5154911 | 87894913 | MANE-VU Oil Peaking |
| MD | Constellation - Riverside | | | 5154911 | 87895113 | MANE-VU Gas Peaking |
| MD | Constellation Energy Group - Philadelphia Road | 1557 | GT1 | 6435511 | 88059913 | MANE-VU Oil Peaking |
| MD | Constellation Energy Group - Philadelphia Road | 1557 | GT2 | 6435511 | 88060013 | MANE-VU Oil Peaking |
| MD | Constellation Energy Group - Philadelphia Road | 1557 | GT3 | 6435511 | 88060113 | MANE-VU Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| MD | Constellation Energy Group - Philadelphia Road | 1557 | GT4 | 6435511 | 88060213 | MANE-VU Oil Peaking |
| MD | CPV Maryland, LLC - St. Charles Project | 56846 | GTG1 | 17878111 | 125590313 | MANE-VU Gas Peaking |
| MD | CPV Maryland, LLC - St. Charles Project | 56846 | GTG2 | 17878111 | 125590413 | MANE-VU Gas Peaking |
| MD | CPV Maryland, LLC - St. Charles Project | 56846 | STGEN | 17878111 | 125590513 | MANE-VU Gas Peaking |
| MD | CPV Maryland, LLC - St. Charles Project | | | 17878111 | 125590613 | MANE-VU Gas Peaking |
| MD | Crisfield Energy Center | 1563 | CRIS | 6414911 | 88023513 | MANE-VU Oil Peaking |
| MD | Crisfield Energy Center | 1563 | CRS2 | 6414911 | 88023613 | MANE-VU Oil Peaking |
| MD | Crisfield Energy Center | 1563 | CRS3 | 6414911 | 88023713 | MANE-VU Oil Peaking |
| MD | Crisfield Energy Center | 1563 | CRS4 | 6414911 | 88023813 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 201 | 6415411 | 88028913 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 202 | 6415411 | 88029013 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 203 | 6415411 | 88028313 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 204 | 6415411 | 88028413 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 21 | 6415411 | 88028513 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 22 | 6415411 | 88028613 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 23 | 6415411 | 88028713 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Airport Park | 4257 | 24 | 6415411 | 88028813 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 10 | 6415311 | 88027613 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 101 | 6415311 | 88028113 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 102 | 6415311 | 88028213 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 11 | 6415311 | 88027713 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 12 | 6415311 | 88027813 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 13 | 6415311 | 88027913 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 14 | 6415311 | 88028013 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 7 | 6415311 | 88027313 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 8 | 6415311 | 88027413 | MANE-VU Oil Peaking |
| MD | Easton Utilities - Washington Street | 1580 | 9 | 6415311 | 88027513 | MANE-VU Oil Peaking |
| MD | NRG Chalk Point, LLC | 1571 | GT1 | 6011911 | 88002113 | MANE-VU Oil Peaking |
| MD | NRG Dickerson Generating Station | | | 5998011 | 87978413 | MANE-VU Oil Peaking |
| MD | NRG Morgantown Generating Station | 1573 | GT1 | 6011511 | 87935713 | MANE-VU Oil Peaking |
| MD | NRG Morgantown Generating Station | 1573 | GT2 | 6011511 | 87935613 | MANE-VU Oil Peaking |
| MD | Raven Power Fort Smallwood LLC | 1554 | GT1 | 6084311 | 87886613 | MANE-VU Oil Peaking |
| ME | FPL ENERGY CAPE LLC | 1484 | GT4 | 5824011 | 22915713 | MANE-VU Oil Peaking |
| ME | FPL ENERGY CAPE LLC | 1484 | GT5 | 5824011 | 22915613 | MANE-VU Oil Peaking |
| ME | MAINE INDEPENDENCE STATION | 55068 | GEN3 | 7719211 | 2941613 | MANE-VU Gas Peaking |
| ME | VERSO ANDROSCOGGIN, LLC (COGENERATION) | | | 5677011 | 94542213 | MANE-VU Gas Peaking |
| ME | VERSO ANDROSCOGGIN, LLC (COGENERATION) | | | 5677011 | 94542313 | MANE-VU Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| ME | VERSO ANDROSCOGGIN, LLC (COGENERATION) | | | 5677011 | 94542413 | MANE-VU Gas Peaking |
| MI | B. C. Cobb Plant | | | 7384111 | 82890713 | LADCO Gas Peaking |
| MI | CLINTON VILLAGE OF | 1818 | 1 | 5821211 | 20145813 | LADCO Oil Peaking |
| MI | CLINTON VILLAGE OF | | | 5821211 | 20145713 | LADCO Oil Peaking |
| MI | Consumers Energy Gaylord Combustion Turbine Plant | 1706 | 1 | 7024811 | 15163813 | LADCO Gas Peaking |
| MI | Consumers Energy Karn-Weadock Facility | | | 8172811 | 4492713 | LADCO Gas Peaking |
| MI | DETROIT PUBLIC LIGHTING DEPARTMENT | | | 8522911 | 242513 | LADCO Oil Peaking |
| MI | Diesel Plant | 1826 | 1 | 7087311 | 14145613 | LADCO Gas Peaking |
| MI | DTE Electric Company - Northeast Peaking Facility | 1734 | 5 | 5689511 | 23065913 | LADCO Gas Peaking |
| MI | HILLSDALE CITY OF PUBLIC UTILITIES | 1829 | 2 | 6056111 | 23806613 | LADCO Oil Peaking |
| MI | HILLSDALE CITY OF PUBLIC UTILITIES | 1829 | 3 | 6056111 | 23806713 | LADCO Oil Peaking |
| MI | HILLSDALE CITY OF PUBLIC UTILITIES | 1829 | 4 | 6056111 | 23806813 | LADCO Gas Peaking |
| MI | HILLSDALE CITY OF PUBLIC UTILITIES | 1829 | 5 | 6056111 | 23807113 | LADCO Gas Peaking |
| MI | HILLSDALE CITY OF PUBLIC UTILITIES | 1829 | 6 | 6056111 | 23807013 | LADCO Oil Peaking |
| MI | HOLLAND BOARD OF PUBLIC WORKS | 6356 | 1 | 7087011 | 14146113 | LADCO Oil Peaking |
| MI | Holland BPW, Generating Station & WWTP | 1830 | 4 | 8129311 | 6902813 | LADCO Coal Peaking |
| MI | Holland BPW, Generating Station & WWTP | | | 8129311 | 6903113 | LADCO Coal Peaking |
| MI | J. H. Campbell Plant | 1710 | A | 8125511 | 6964913 | LADCO Oil Peaking |
| MI | J.R. WHITING CO | | | 7285811 | 8570513 | LADCO Oil Peaking |
| MI | MARQUETTE BOARD OF LIGHT & POWER | 1843 | 2 | 7779711 | 3628213 | LADCO Coal Peaking |
| MI | Marshall City, Electric Powerplant | 1844 | IC3 | 6416311 | 18094413 | LADCO Gas Peaking |
| MI | ST. CLAIR / BELLE RIVER POWER PLANT | 1743 | 11 | 7239111 | 7536013 | LADCO Gas Peaking |
| MI | Sturgis Municipal Power Plant | | | 6356811 | 15701413 | LADCO Oil Peaking |
| MI | THUMB ELECTRIC COOPERATIVE | 1875 | 1 | 5984511 | 24542613 | LADCO Oil Peaking |
| MI | THUMB ELECTRIC COOPERATIVE | 1875 | 8 | 5984511 | 24542713 | LADCO Gas Peaking |
| MI | Vandyke Generating Plant | 1880 | 6 | 5749211 | 20405913 | LADCO Gas Peaking |
| MI | Vandyke Generating Plant | 1880 | 8 | 5749211 | 20405713 | LADCO Gas Peaking |
| MI | WHITE PINE ELECTRIC POWER LLC | | | 7870111 | 3372213 | LADCO Gas Peaking |
| MI | WHITE PINE ELECTRIC POWER LLC | | | 7870111 | 3372613 | LADCO Gas Peaking |
| MI | Wolverine Power Supply - Hersey | 1877 | 10 | 7824811 | 2847613 | LADCO Gas Peaking |
| MI | Wolverine Power, Gaylord Generating Station | 7932 | 1 | 8062511 | 7179513 | LADCO Gas Peaking |
| MI | Wolverine Power, Gaylord Generating Station | 7932 | 2 | 8062511 | 7179613 | LADCO Gas Peaking |
| MI | Wolverine Power, Gaylord Generating Station | 7932 | 3 | 8062511 | 7179713 | LADCO Gas Peaking |
| MI | Wolverine Power, Tower Power Plant | 1873 | GT4 | 4184811 | 32644613 | LADCO Oil Peaking |
| MI | Wolverine Power, Vestaburg Power Plant | 1881 | 6 | 5215711 | 25695813 | LADCO Oil Peaking |
| MI | Wolverine Power, Vestaburg Power Plant | 1881 | 7 | 5215711 | 25695713 | LADCO Oil Peaking |
| MI | Wolverine Power, Vestaburg Power Plant | 1881 | 8 | 5215711 | 25695913 | LADCO Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| MI | ZEELAND BOARD OF PUBLIC WORKS | 1867 | 10 | 6348411 | 16365413 | LADCO Oil Peaking |
| MN | Hutchinson Utilities Commission -Plant 2 | 6358 | 9 | 7626711 | 11449113 | LADCO Gas Peaking |
| MN | Otter Tail Power Co | | | 7072311 | 15102613 | LADCO Oil Peaking |
| MN | Otter Tail Power Co | | | 7072311 | 15102713 | LADCO Oil Peaking |
| MN | Rochester Public Utilities - Silver Lake Plant | | | 7149811 | 14414013 | LADCO Gas Peaking |
| MN | Worthington Diesel Generating Plant | 2024 | 1 | 7148211 | 14421713 | LADCO Oil Peaking |
| MN | Worthington Diesel Generating Plant | 2024 | 2 | 7148211 | 14421613 | LADCO Oil Peaking |
| MN | Worthington Diesel Generating Plant | 2024 | 3 | 7148211 | 14421213 | LADCO Oil Peaking |
| MN | Worthington Diesel Generating Plant | 2024 | 4 | 7148211 | 14421513 | LADCO Oil Peaking |
| MN | Worthington Diesel Generating Plant | 2024 | 5 | 7148211 | 14421813 | LADCO Oil Peaking |
| MN | Worthington Diesel Generating Plant | 2024 | 6 | 7148211 | 14421413 | LADCO Oil Peaking |
| MN | Worthington Diesel Generating Plant | 2024 | 7 | 7148211 | 14421313 | LADCO Oil Peaking |
| MN | Xcel Energy - Granite City Generating | 1910 | 1 | 6190211 | 15246513 | LADCO Gas Peaking |
| MN | Xcel Energy - Granite City Generating | 1910 | 2 | 6190211 | 15246413 | LADCO Gas Peaking |
| MN | Xcel Energy - Granite City Generating | 1910 | 3 | 6190211 | 15246313 | LADCO Gas Peaking |
| MN | Xcel Energy - Granite City Generating | 1910 | 4 | 6190211 | 15246213 | LADCO Gas Peaking |
| MO | AMEREN MISSOURI KIRKSVILLE COMBUSTION TURBINE | 2083 | 1 | 6996211 | 14719913 | South Gas Peaking |
| MO | BUTLER MUNICIPAL POWER PLANT-BUTLER | 2115 | NG1 | 7131711 | 14438313 | South Oil Peaking |
| MO | BUTLER MUNICIPAL POWER PLANT-BUTLER | 2115 | NG2 | 7131711 | 14438113 | South Oil Peaking |
| MO | BUTLER MUNICIPAL POWER PLANT-BUTLER | 2115 | SG1 | 7131711 | 14437613 | South Oil Peaking |
| MO | BUTLER MUNICIPAL POWER PLANT-BUTLER | 2115 | SG2 | 7131711 | 14438213 | South Oil Peaking |
| MO | CARROLLTON MUNICIPAL UTILITIES | 2120 | 10 | 7326011 | 11021213 | South Oil Peaking |
| MO | CARROLLTON MUNICIPAL UTILITIES | 2120 | 11 | 7326011 | 11020613 | South Oil Peaking |
| MO | CARROLLTON MUNICIPAL UTILITIES | 2120 | 7 | 7326011 | 11021713 | South Gas Peaking |
| MO | CARROLLTON MUNICIPAL UTILITIES | 2120 | 8 | 7326011 | 11021513 | South Gas Peaking |
| MO | CARROLLTON MUNICIPAL UTILITIES | 2120 | 9 | 7326011 | 11021413 | South Oil Peaking |
| MO | CARTHAGE WATER AND ELECTRIC | 2121 | 10 | 5339111 | 26480313 | South Gas Peaking |
| MO | CHILLICOTHE MUNICIPAL UTILITIES | 2122 | D5 | 7297211 | 59066113 | South Oil Peaking |
| MO | CITY OF WEST PLAINS-POWER STATION-POWER STATION | 59664 | UNIT1 | 7544611 | 11572513 | South Gas Peaking |
| MO | CITY OF WEST PLAINS-POWER STATION-POWER STATION | 59664 | UNIT2 | 7544611 | 11572213 | South Gas Peaking |
| MO | DOGWOOD ENERGY FACILITY PLEASANT HILL | 55178 | ST-1 | 7359211 | 10993913 | South Gas Peaking |
| MO | EMPIRE DISTRICT ELECTRIC CO STATE LINE FACILITY | 7296 | 2-3 | 5339011 | 26480813 | South Oil Peaking |
| MO | FULTON POWER PLANT FULTON | 2126 | GT4 | 6323111 | 15999013 | South Oil Peaking |
| MO | FULTON POWER PLANT FULTON | 2126 | IC3 | 6323111 | 15998713 | South Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| MO | HIGGINSVILLE MUNICIPAL POWER FACILITY | 2131 | 5 | 7269411 | 59062913 | South Oil Peaking |
| MO | HIGGINSVILLE MUNICIPAL POWER FACILITY | 2131 | 6 | 7269411 | 59063213 | South Oil Peaking |
| MO | INDEPENDENCE POWER AND LIGHT BLUE VALLEY STATION | 2132 | 1 | 8100311 | 6089413 | South Gas Peaking |
| MO | INDEPENDENCE POWER AND LIGHT BLUE VALLEY STATION | 2132 | 2 | 8100311 | 6089813 | South Gas Peaking |
| MO | INDEPENDENCE POWER AND LIGHT SUB STATION H | 2135 | 1 | 7577311 | 11540013 | South Gas Peaking |
| MO | INDEPENDENCE POWER AND LIGHT SUB STATION H | 2135 | 2 | 7577311 | 11539913 | South Gas Peaking |
| MO | INDEPENDENCE POWER AND LIGHT SUB STATION I | 2136 | 1 | 7577211 | 11540113 | South Oil Peaking |
| MO | INDEPENDENCE POWER AND LIGHT SUB STATION I | 2136 | 2 | 7577211 | 11540213 | South Oil Peaking |
| MO | INDEPENDENCE POWER AND LIGHT SUB STATION J | 2134 | 1 | 7577411 | 11539713 | South Oil Peaking |
| MO | INDEPENDENCE POWER AND LIGHT SUB STATION J | 2134 | 2 | 7577411 | 11539813 | South Oil Peaking |
| MO | JACKSON MUNICIPAL UTILITIES-JACKSON | 2137 | 7 | 6339311 | 15967313 | South Oil Peaking |
| MO | KCP AND L GREATER MISSOURI OPERATIONS CO LAKE ROAD GENERATING STATION | 2098 | 7 | 6346411 | 15422113 | South Oil Peaking |
| MO | KCP AND L GREATER MISSOURI OPERATIONS CO LAKE ROAD GENERATING STATION | | | 6346411 | 15422313 | South Oil Peaking |
| MO | KCP AND L GREATER MISSOURI OPERATIONS CO NEVADA GAS TURBINE | 2090 | 1 | 5204311 | 25407613 | South Oil Peaking |
| MO | KENNETT GENERATING PLANT ANTHONY STREET | 2139 | 10 | 6031511 | 24467713 | South Oil Peaking |
| MO | KENNETT GENERATING PLANT ANTHONY STREET | 2139 | 11 | 6031511 | 24467413 | South Gas Peaking |
| MO | KENNETT GENERATING PLANT ANTHONY STREET | 2139 | 12 | 6031511 | 24467313 | South Gas Peaking |
| MO | KENNETT GENERATING PLANT ANTHONY STREET | 2139 | 13 | 6031511 | 24467213 | South Gas Peaking |
| MO | MALDEN MUNICIPAL POWER AND LIGHT S BECKWITH | 2142 | 8 | 6031211 | 24468213 | South Oil Peaking |
| MO | MARSHALL MUNICIPAL UTILITIES | 2144 | 10 | 7593811 | 11517413 | South Oil Peaking |
| MO | MARSHALL MUNICIPAL UTILITIES | 2144 | 11 | 7593811 | 11517813 | South Oil Peaking |
| MO | MARSHALL MUNICIPAL UTILITIES | 2144 | 7 | 7593811 | 11517913 | South Oil Peaking |
| MO | MARSHALL MUNICIPAL UTILITIES | 2144 | 8 | 7593811 | 11518113 | South Oil Peaking |
| MO | MARSHALL MUNICIPAL UTILITIES | 2144 | 9 | 7593811 | 11517313 | South Oil Peaking |
| MO | MARSHALL MUNICIPAL UTILITIES | 2144 | GT1 | 7593811 | 11517513 | South Gas Peaking |
| MO | MARSHALL MUNICIPAL UTILITIES | | | 7593811 | 11516913 | South Gas Peaking |
| MO | POPLAR BLUFF MUNICIPAL UTILITIES GENERATING PLANT | 7392 | 1 | 6321511 | 16016813 | South Gas Peaking |
| MO | POPLAR BLUFF MUNICIPAL UTILITIES GENERATING PLANT | 7392 | 2 | 6321511 | 16016613 | South Gas Peaking |
| MO | SHELBINA POWER PLANT | 7405 | G1 | 5052711 | 25601213 | South Oil Peaking |
| MO | SHELBINA POWER PLANT | 7405 | G2 | 5052711 | 25601113 | South Oil Peaking |
| MO | SHELBINA POWER PLANT | 7406 | G3 | 5052711 | 25600813 | South Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| MO | SHELBINA POWER PLANT | 7406 | G4 | 5052711 | 25600913 | South Oil Peaking |
| MO | SHELBINA POWER PLANT | 7406 | G5 | 5052711 | 25601013 | South Oil Peaking |
| MO | SHELBINA POWER PLANT | 7406 | G6 | 5052711 | 25601413 | South Oil Peaking |
| MO | SHELBINA POWER PLANT | 7860 | G7 | 5052711 | 25601613 | South Oil Peaking |
| MO | SHELBINA POWER PLANT | 7860 | G8 | 5052711 | 25602313 | South Oil Peaking |
| MO | TRENTON MUNICIPAL UTILITIES TRENTON PEAKING PLANT | 698 | 1 | 7528911 | 11609113 | South Oil Peaking |
| MO | TRENTON MUNICIPAL UTILITIES TRENTON PEAKING PLANT | 698 | 2 | 7528911 | 11609613 | South Oil Peaking |
| MO | TRENTON MUNICIPAL UTILITIES TRENTON PEAKING PLANT | 698 | 3 | 7528911 | 11609513 | South Oil Peaking |
| MO | TRENTON MUNICIPAL UTILITIES TRENTON PEAKING PLANT | 698 | 4 | 7528911 | 11609013 | South Oil Peaking |
| MO | TRENTON MUNICIPAL UTILITIES TRENTON PEAKING PLANT | 698 | 5 | 7528911 | 11609313 | South Oil Peaking |
| MS | Clarksdale Public Utilities, Lewis L Wilkins Generating Station | 2059 | 8 | 7167411 | 14340013 | SESARM Gas Peaking |
| MS | Clarksdale Public Utilities, Lewis L Wilkins Generating Station | 2059 | 9 | 7167411 | 14339813 | SESARM Gas Peaking |
| MS | Cooperative Energy, Benndale Peaking Station | 2068 | 1 | 7490811 | 11257413 | SESARM Gas Peaking |
| MS | Cooperative Energy, Paulding Peaking Station | 2071 | 1 | 6252611 | 16460313 | SESARM Oil Peaking |
| MS | Entergy Mississippi Attala Plant | 55220 | A03 | 7036511 | 14202413 | SESARM Gas Peaking |
| MS | Entergy Mississippi Inc, Rex Brown Plant | 2053 | GT1 | 6802311 | 13571113 | SESARM Gas Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H1 | 8231311 | 5674613 | SESARM Gas Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H10 | 8231311 | 5674813 | SESARM Gas Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H11 | 8231311 | 5674713 | SESARM Gas Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H3 | 8231311 | 5675413 | SESARM Gas Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H4 | 8231311 | 5675213 | SESARM Oil Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H5 | 8231311 | 5675513 | SESARM Oil Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H6 | 8231311 | 5675113 | SESARM Oil Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H7 | 8231311 | 5675013 | SESARM Oil Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H8 | 8231311 | 5674913 | SESARM Oil Peaking |
| MS | Greenwood Utilities, Henderson Station | 2062 | H9 | 8231311 | 5674313 | SESARM Gas Peaking |
| MS | Mississippi Power Company, Plant Jack Watson | | | 6788111 | 13581513 | SESARM Gas Peaking |
| MS | Mississippi Power Company, Plant Jack Watson | | | 6788111 | 13581713 | SESARM Gas Peaking |
| MS | South Mississippi Electric Power Association, Moselle Plant | | | 7139511 | 14101513 | SESARM Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| MS | South Mississippi Electric Power Association, Moselle Plant | | | 7139511 | 14101913 | SESARM Gas Peaking |
| MS | TVA Southaven Combined Cycle Plant | 55269 | STG2 | 7184711 | 14318913 | SESARM Gas Peaking |
| MS | Yazoo City Public Service Commission | 2067 | GT1 | 6314111 | 15463113 | SESARM Gas Peaking |
| MS | Yazoo City Public Service Commission | | | 6314111 | 15463213 | SESARM Gas Peaking |
| MT | COLSTRIP ENERGY LTD PARTNERSHIP | 10784 | BLR1 | 7854911 | 2808213 | West North Central Composite Peaking |
| MT | MDU - GLENDIVE | 2176 | GT1 | 8150511 | 5485713 | West North Central Gas Peaking |
| MT | MDU - MILES CITY | 2177 | 1 | 7398611 | 9302913 | West North Central Gas Peaking |
| NC | Duke Energy Progress, LLC - L.V. Sutton Electric Plant | | | 8547211 | 1554113 | SESARM Oil Peaking |
| NC | Plant Rowan County | 7826 | STG | 8508011 | 74216313 | SESARM Gas Peaking |
| NC | Rosemary Power Station | 50555 | GEN3 | 8286911 | 454813 | SESARM Gas Peaking |
| ND | Peak Load Generators | 56098 | 1 | 10613311 | 64319513 | West North Central Oil Peaking |
| ND | Peak Load Generators | 56098 | 2 | 10613311 | 64319613 | West North Central Oil Peaking |
| ND | RM Heskett Station | 2790 | B1 | 8087011 | 64287213 | West North Central Composite Peaking |
| NE | Auburn Generating Plant | 2215 | 1 | 5105811 | 24688813 | West North Central Oil Peaking |
| NE | Auburn Generating Plant | 2215 | 2 | 5105811 | 24688413 | West North Central Oil Peaking |
| NE | Auburn Generating Plant | 2215 | 4A | 5105811 | 24688313 | West North Central Oil Peaking |
| NE | Auburn Generating Plant | 2215 | 5 | 5105811 | 24688513 | West North Central Oil Peaking |
| NE | Auburn Generating Plant | 2215 | 6 | 5105811 | 24688613 | West North Central Oil Peaking |
| NE | Auburn Generating Plant | 2215 | 7 | 5105811 | 24688713 | West North Central Oil Peaking |
| NE | Benkelman Municipal Power | | | 6712511 | 12869613 | West North Central Oil Peaking |
| NE | Burwell Light Plant | 2222 | 1 | 6714511 | 12865613 | West North Central Oil Peaking |
| NE | Burwell Light Plant | 2222 | 2 | 6714511 | 12865413 | West North Central Oil Peaking |
| NE | Burwell Light Plant | 2222 | 3 | 6714511 | 12865713 | West North Central Oil Peaking |
| NE | Burwell Light Plant | 2222 | 4 | 6714511 | 12865313 | West North Central Oil Peaking |
| NE | C W Burdick Generating Station | 2241 | B-1 | 6714711 | 12864013 | West North Central Gas Peaking |
| NE | C W Burdick Generating Station | 2241 | B-2 | 6714711 | 12864213 | West North Central Gas Peaking |
| NE | C W Burdick Generating Station | 2241 | GT1 | 6714711 | 12864613 | West North Central Gas Peaking |
| NE | Crete Municipal Plant | | | 7630111 | 12540713 | West North Central Oil Peaking |
| NE | David City Municipal Power | 2233 | 5 | 7574511 | 11904113 | West North Central Oil Peaking |
| NE | David City Municipal Power | 2233 | 6 | 7574511 | 11903913 | West North Central Gas Peaking |
| NE | David City Municipal Power | 2233 | 7 | 7574511 | 11904013 | West North Central Oil Peaking |
| NE | Laurel Municipal Plant | 2249 | 1 | 7575311 | 11899513 | West North Central Oil Peaking |
| NE | Lon D Wright Power Plant | 2240 | 6 | 7766111 | 1753613 | West North Central Composite Peaking |

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|---|---|---|---|---|---|---|
| NE | Lon D Wright Power Plant | 2240 | 7 | 7766111 | 1753313 | West North Central Composite Peaking |
| NE | Madison Light & Power Plant | 7469 | FM1 | 5298011 | 25611213 | West North Central Oil Peaking |
| NE | Madison Light & Power Plant | 7469 | FM2 | 5298011 | 25611113 | West North Central Oil Peaking |
| NE | Nebraska City Power Plant No 1 | 2255 | 10 | 5106711 | 24685313 | West North Central Oil Peaking |
| NE | Nebraska City Power Plant No 1 | 2255 | 2 | 5106711 | 24685013 | West North Central Oil Peaking |
| NE | Nebraska City Power Plant No 1 | 2255 | 3 | 5106711 | 24685613 | West North Central Oil Peaking |
| NE | Nebraska City Power Plant No 1 | 2255 | 4 | 5106711 | 24685513 | West North Central Oil Peaking |
| NE | Nebraska City Power Plant No 1 | 2255 | 5 | 5106711 | 24685413 | West North Central Oil Peaking |
| NE | Nebraska City Power Plant No 1 | 2255 | 8 | 5106711 | 24685213 | West North Central Oil Peaking |
| NE | Nebraska City Power Plant No 1 | 2255 | 9 | 5106711 | 24685113 | West North Central Oil Peaking |
| NE | OPPD Sarpy County Station | 2292 | 3 | 7631011 | 12532613 | West North Central Gas Peaking |
| NE | OPPD Sarpy County Station | | | 7631011 | 12532513 | West North Central Oil Peaking |
| NE | Red Cloud Municipal Plant | 2299 | 2 | 7515011 | 12751713 | West North Central Oil Peaking |
| NE | Red Cloud Municipal Plant | 2299 | 3 | 7515011 | 12751813 | West North Central Oil Peaking |
| NE | Red Cloud Municipal Plant | 2299 | 4 | 7515011 | 12751913 | West North Central Oil Peaking |
| NE | Red Cloud Municipal Plant | 2299 | 5 | 7515011 | 12752013 | West North Central Oil Peaking |
| NE | Wakefield Municipal Power | 2311 | 5 | 6703511 | 12886313 | West North Central Oil Peaking |
| NE | Wakefield Municipal Power | 2311 | 6 | 6703511 | 12886213 | West North Central Oil Peaking |
| NE | Wisner Municipal Power Plant | 2316 | 3 | 7460111 | 11696213 | West North Central Oil Peaking |
| NH | ESSENTIAL POWER NEWINGTON LLC | 55661 | ST | 7458511 | 12074113 | MANE-VU Gas Peaking |
| NH | GRANITE RIDGE ENERGY LLC | 55170 | STG | 7458411 | 12075013 | MANE-VU Oil Peaking |
| NM | Southwestern Public Service Co - Maddox Station | 2446 | 2 | 5228411 | 82518513 | Southwest Gas Peaking |
| NM | Southwestern Public Service Co - Maddox Station | 2446 | 3 | 5228411 | 82518413 | Southwest Gas Peaking |
| NY | Caithness Long Island Energy Center | 56234 | ST01 | 15488311 | 96986813 | MANE-VU Oil Peaking |
| NY | CARTHAGE ENERGY COGEN FACILITY | 10620 | GEN2 | 8036811 | 3684213 | MANE-VU Gas Peaking |
| NY | EPCOR POWER CASTLETON | 10190 | GEN2 | 7864311 | 3599813 | MANE-VU Gas Peaking |
| NY | FREEPORT POWER PLANT #1 | 2678 | 2 | 7221211 | 7565913 | MANE-VU Oil Peaking |
| NY | FREEPORT POWER PLANT #1 | 2678 | 3 | 7221211 | 7565813 | MANE-VU Oil Peaking |
| NY | FREEPORT POWER PLANT #2 | 2679 | 3 | 7221311 | 7565613 | MANE-VU Oil Peaking |
| NY | ROCKVILLE CENTRE POWER PLANT | 2695 | 8 | 7221911 | 7561913 | MANE-VU Oil Peaking |
| NY | SARANAC POWER PARTNERS COGENERATION FAC | 54574 | GEN3 | 8375111 | 1671413 | MANE-VU Gas Peaking |
| NY | SOUTHAMPTON GT FACILITY | 2519 | 1 | 7942611 | 2539113 | MANE-VU Gas Peaking |
| NY | SOUTHOLD GT FACILITY | 2520 | 1 | 7942711 | 2538913 | MANE-VU Gas Peaking |
| NY | WPS SYRACUSE GENERATION LLC | 10621 | GEN2 | 7435911 | 7947613 | MANE-VU Gas Peaking |
| OH | AMP Bowling Green Peaking Plant (0387020378) | 55262 | CT2 | 9253611 | 55202813 | LADCO Gas Peaking |
| OH | AMP Galion Generation Station (0317030060) | 55263 | CT2 | 9289211 | 55698413 | LADCO Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| OH | AMP Napoleon Peaking Plant (0335010056) | 55264 | CT2 | 9291911 | 55775113 | LADCO Gas Peaking |
| OH | Cleveland Public Power - Service Center (1318000133) | 2909 | 1 | 8250711 | 62813 | LADCO Gas Peaking |
| OH | Department of Public Utilities, City of Orrville, Ohio (0285010188) | 2935 | 10 | 3950711 | 34858413 | LADCO Coal Peaking |
| OH | Department of Public Utilities, City of Orrville, Ohio (0285010188) | 2935 | 11 | 3950711 | 34858513 | LADCO Coal Peaking |
| OH | Department of Public Utilities, City of Orrville, Ohio (0285010188) | 2935 | 12 | 3950711 | 34858213 | LADCO Coal Peaking |
| OH | Department of Public Utilities, City of Orrville, Ohio (0285010188) | 2935 | 13 | 3950711 | 34858313 | LADCO Coal Peaking |
| OH | Dicks Creek Energy Facility (1409010078) | 2831 | 3 | 9303211 | 55575713 | LADCO Gas Peaking |
| OH | Dicks Creek Energy Facility (1409010078) | 2831 | 4 | 9303211 | 55575813 | LADCO Gas Peaking |
| OH | Dicks Creek Energy Facility (1409010078) | 2831 | 5 | 9303211 | 55575913 | LADCO Gas Peaking |
| OH | Dover Municipal Light Plant (0679010146) | 2914 | 4 | 7345511 | 10655413 | LADCO Coal Peaking |
| OH | DP&L, Killen Generating Station (0701000060) | | | 8101411 | 89864113 | LADCO Oil Peaking |
| OH | Miami Fort Power Station (1431350093) | 2832 | GT6 | 7738711 | 2470913 | LADCO Oil Peaking |
| OH | OMEGA JV2-NAPOLEON (0335010055) | 7776 | 4 | 14755911 | 106016313 | LADCO Oil Peaking |
| OH | OMEGA JV2-NAPOLEON (0335010055) | 7776 | 5 | 14755911 | 106016413 | LADCO Oil Peaking |
| OH | OMEGA JV2-NAPOLEON (0335010055) | 7776 | 6 | 14755911 | 106016513 | LADCO Oil Peaking |
| OH | PAINESVILLE MUNICIPAL ELECTRIC PLANT (0243110008) | 2936 | 4 | 8149311 | 5945413 | LADCO Coal Peaking |
| OH | PAINESVILLE MUNICIPAL ELECTRIC PLANT (0243110008) | 2936 | 5 | 8149311 | 5945213 | LADCO Coal Peaking |
| OH | Piqua Municipal Power System (0855100041) | 2937 | 8 | 8497311 | 1570113 | LADCO Oil Peaking |
| OK | BOOMER LAKE STATION | 3000 | 3 | 5615011 | 98406313 | South Oil Peaking |
| OK | BOOMER LAKE STATION | 3000 | 4 | 5615011 | 98406413 | South Oil Peaking |
| OK | BOOMER LAKE STATION | 3000 | 5 | 5615011 | 98406513 | South Oil Peaking |
| OK | BOOMER LAKE STATION | | | 5615011 | 21312413 | South Gas Peaking |
| OK | BOOMER LAKE STATION | | | 5615011 | 21312513 | South Gas Peaking |
| OK | GREEN COUNTRY ENERGY PROJECT | 55146 | STG1 | 7218011 | 10018913 | South Gas Peaking |
| OK | MCCLAIN ENGRY FACLTY | 55457 | ST1 | 882511 | 47401413 | South Gas Peaking |
| PA | BRUNNER ISLAND LLC/BRUNNER ISLAND | 3140 | BID1 | 3193911 | 38702213 | MANE-VU Oil Peaking |
| PA | BRUNNER ISLAND LLC/BRUNNER ISLAND | 3140 | BID2 | 3193911 | 38702313 | MANE-VU Oil Peaking |
| PA | BRUNNER ISLAND LLC/BRUNNER ISLAND | 3140 | BID3 | 3193911 | 38702413 | MANE-VU Oil Peaking |
| PA | CHAMBERSBURG BORO/FALLING SPRING 2ND ST DIESEL POWER PLT | 7397 | 5 | 3769511 | 37866713 | MANE-VU Gas Peaking |
| PA | CHAMBERSBURG BORO/FALLING SPRING 2ND ST DIESEL POWER PLT | 7397 | 6 | 3769511 | 37866613 | MANE-VU Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| PA | CHAMBERSBURG BORO/FALLING SPRING 2ND ST DIESEL POWER PLT | 7397 | 7 | 3769511 | 37866813 | MANE-VU Oil Peaking |
| PA | CHAMBERSBURG BORO/ORCHARD PARK GENERATING STA | 55997 | 10 | 10722111 | 58850613 | MANE-VU Gas Peaking |
| PA | CHAMBERSBURG BORO/ORCHARD PARK GENERATING STA | 55997 | 11 | 10722111 | 58850713 | MANE-VU Gas Peaking |
| PA | CHAMBERSBURG BORO/ORCHARD PARK GENERATING STA | 55997 | 8 | 10722111 | 58850413 | MANE-VU Gas Peaking |
| PA | CHAMBERSBURG BORO/ORCHARD PARK GENERATING STA | 55997 | 9 | 10722111 | 58850513 | MANE-VU Gas Peaking |
| PA | EXELON GENERATION CO/EDDYSTONE | 3161 | 10 | 6662011 | 17764213 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/EDDYSTONE | 3161 | 20 | 6662011 | 17764113 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/EDDYSTONE | 3161 | 30 | 6662011 | 17765213 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/EDDYSTONE | 3161 | 40 | 6662011 | 17765113 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/FALLS TWP PEAK PWR PLT | 3162 | 1 | 2878411 | 37949613 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/FALLS TWP PEAK PWR PLT | 3162 | 2 | 2878411 | 37949513 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/FALLS TWP PEAK PWR PLT | 3162 | 3 | 2878411 | 37949413 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/MOSER GENERATING STATION | 3163 | 1 | 3692211 | 37043713 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/MOSER GENERATING STATION | 3163 | 2 | 3692211 | 37043513 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/MOSER GENERATING STATION | 3163 | 3 | 3692211 | 37043613 | MANE-VU Oil Peaking |
| PA | EXELON GENERATION CO/PENNSBURY POWER PLT | 7690 | 1 | 2918911 | 38124713 | MANE-VU Gas Peaking |
| PA | EXELON GENERATION CO/PENNSBURY POWER PLT | 7690 | 2 | 2918911 | 38124813 | MANE-VU Gas Peaking |
| PA | GENON NE MGMT CO/CONEMAUGH PLT | 3118 | A | 2905911 | 38672913 | MANE-VU Oil Peaking |
| PA | GENON NE MGMT CO/CONEMAUGH PLT | 3118 | B | 2905911 | 38672413 | MANE-VU Oil Peaking |
| PA | GENON NE MGMT CO/CONEMAUGH PLT | 3118 | C | 2905911 | 38673113 | MANE-VU Oil Peaking |
| PA | GENON NE MGMT CO/CONEMAUGH PLT | 3118 | D | 2905911 | 38673213 | MANE-VU Oil Peaking |
| PA | GENON NE MGMT CO/KEYSTONE STA | 3136 | 3 | 3866111 | 37165013 | MANE-VU Oil Peaking |
| PA | GENON NE MGMT CO/KEYSTONE STA | 3136 | 4 | 3866111 | 37164813 | MANE-VU Oil Peaking |
| PA | GENON NE MGMT CO/KEYSTONE STA | 3136 | 5 | 3866111 | 37165113 | MANE-VU Oil Peaking |
| PA | GENON NE MGMT CO/KEYSTONE STA | 3136 | 6 | 3866111 | 37165513 | MANE-VU Oil Peaking |
| PA | LIBERTY ELEC POWER LLC/EDDYSTONE PLT | 55231 | STG | 4724611 | 27721313 | MANE-VU Gas Peaking |
| PA | LOWER MT BETHEL ENERGY LLC/BANGOR | 55667 | G3 | 12796911 | 89392613 | MANE-VU Gas Peaking |
| PA | LOWER MT BETHEL ENERGY LLC/BANGOR | | | 12796911 | 89392713 | MANE-VU Gas Peaking |
| PA | MARTINS CREEK LLC/ALLENTOWN CTG SITE | 3139 | CTG1 | 5452111 | 27541713 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/ALLENTOWN CTG SITE | 3139 | CTG2 | 5452111 | 27541513 | MANE-VU Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| PA | MARTINS CREEK LLC/ALLENTOWN CTG SITE | 3139 | CTG3 | 5452111 | 27541813 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/ALLENTOWN CTG SITE | 3139 | CTG4 | 5452111 | 27541613 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/FISHBACH CTS | 3142 | UNT1 | 4736011 | 27907713 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/FISHBACH CTS | 3142 | UNT2 | 4736011 | 27907813 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/HARRISBURG CTG SITE | 3143 | CTG1 | 6660711 | 17773513 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/HARRISBURG CTG SITE | 3143 | CTG2 | 6660711 | 17773413 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/HARRISBURG CTG SITE | 3143 | CTG3 | 6660711 | 17773213 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/HARRISBURG CTG SITE | | | 6660711 | 17773313 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/HARWOOD CTS | 3144 | CTG1 | 4473111 | 27692413 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/HARWOOD CTS | 3144 | CTG2 | 4473111 | 27692313 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/MARTINS CREEK | 3148 | CTG1 | 3881711 | 37150713 | MANE-VU Gas Peaking |
| PA | MARTINS CREEK LLC/MARTINS CREEK | 3148 | CTG2 | 3881711 | 37151413 | MANE-VU Gas Peaking |
| PA | MARTINS CREEK LLC/MARTINS CREEK | 3148 | CTG3 | 3881711 | 37151313 | MANE-VU Gas Peaking |
| PA | MARTINS CREEK LLC/MARTINS CREEK | 3148 | CTG4 | 3881711 | 37150413 | MANE-VU Gas Peaking |
| PA | MARTINS CREEK LLC/WEST SHORE CTG SITE | 3154 | CTG1 | 6464511 | 18718913 | MANE-VU Oil Peaking |
| PA | MARTINS CREEK LLC/WEST SHORE CTG SITE | 3154 | CTG2 | 6464511 | 18719013 | MANE-VU Oil Peaking |
| PA | NRG POWER MIDWEST LP/NEW CASTLE POWER PLT | 3138 | EMDA | 3776611 | 37248913 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/BLOSSBURG GEN STA | 3120 | 1 | 3878511 | 37458813 | MANE-VU Gas Peaking |
| PA | NRG REMA LLC/HAMILTON | 3109 | 1 | 4713311 | 28152013 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/ORRTANNA | 3112 | 1 | 4713411 | 28151913 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/SHAWNEE | 3114 | 1 | 3748611 | 37854913 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/SHAWVILLE GEN STA | 3131 | 5 | 2985011 | 38387513 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/SHAWVILLE GEN STA | 3131 | 6 | 2985011 | 38388013 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/SHAWVILLE GEN STA | 3131 | 7 | 2985011 | 38388113 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/TITUS GEN STA | 3115 | 4 | 3857011 | 37800113 | MANE-VU Oil Peaking |
| PA | NRG REMA LLC/TITUS GEN STA | 3115 | 5 | 3857011 | 37799613 | MANE-VU Oil Peaking |
| PA | NRG WHOLESALE GEN LP/HUNTERSTOWN PLT | 3110 | 1 | 4713111 | 94841513 | MANE-VU Oil Peaking |
| PA | NRG WHOLESALE GEN LP/HUNTERSTOWN PLT | 3110 | 2 | 4713111 | 94841613 | MANE-VU Oil Peaking |
| PA | NRG WHOLESALE GEN LP/HUNTERSTOWN PLT | 3110 | 3 | 4713111 | 94841713 | MANE-VU Oil Peaking |
| PA | NRG WHOLESALE GEN LP/HUNTERSTOWN PLT | 55976 | 401 | 4713111 | 67433413 | MANE-VU Gas Peaking |
| PA | PPL MARTINS CREEK LLC/LOCK HAVEN CTS | 3147 | CTG | 6602011 | 19033913 | MANE-VU Oil Peaking |
| PA | PPL MARTINS CREEK LLC/WILLIAMSPORT CTS | 3155 | CTG1 | 5450811 | 27550213 | MANE-VU Oil Peaking |
| PA | PPL MARTINS CREEK LLC/WILLIAMSPORT CTS | 3155 | CTG2 | 5450811 | 27550113 | MANE-VU Oil Peaking |
| PA | YORK PLT HOLDINGS LLC/SPRINGETTSBURY TWP | 54693 | GT#1 | 2986311 | 38380913 | MANE-VU Gas Peaking |
| PA | YORK PLT HOLDINGS LLC/SPRINGETTSBURY TWP | 54693 | GT#2 | 2986311 | 38381013 | MANE-VU Gas Peaking |
| PA | YORK PLT HOLDINGS LLC/SPRINGETTSBURY TWP | 54693 | GT#5 | 2986311 | 38381313 | MANE-VU Gas Peaking |
| PA | YORK PLT HOLDINGS LLC/SPRINGETTSBURY TWP | 54693 | GT#6 | 2986311 | 38380813 | MANE-VU Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| SC | SANTEE COOPER MYRTLE BEACH | 3320 | 1 | 4760911 | 32047213 | SESARM Oil Peaking |
| SC | SANTEE COOPER MYRTLE BEACH | 3320 | 2 | 4760911 | 32047113 | SESARM Oil Peaking |
| SC | SCE&G COIT | 3281 | 1 | 3426211 | 38861013 | SESARM Oil Peaking |
| SC | SCE&G HARDEEVILLE | 3286 | 1 | 4508311 | 27624213 | SESARM Oil Peaking |
| SC | SCE&G PARR COMBUSTION TURBINE FACILITY | 3291 | GT1 | 8332811 | 100013 | SESARM Oil Peaking |
| SC | SCE&G URQUHART | 3295 | GT1 | 5045611 | 32105713 | SESARM Gas Peaking |
| SC | SCE&G URQUHART | 3295 | GT2 | 5045611 | 32105513 | SESARM Gas Peaking |
| SC | SCE&G URQUHART | 3295 | GT3 | 5045611 | 32105213 | SESARM Oil Peaking |
| SD | Basin Electric Power Cooperative - Spirit Mound | 6092 | 1 | 15647011 | 99777613 | West North Central Oil Peaking |
| SD | Basin Electric Power Cooperative - Spirit Mound | 6092 | 2 | 15647011 | 99777713 | West North Central Oil Peaking |
| SD | Black Hill Power & Light Company (Ben French) | 3325 | GT1 | 6195711 | 15200113 | West North Central Gas Peaking |
| SD | Black Hill Power & Light Company (Ben French) | 3325 | GT2 | 6195711 | 15200213 | West North Central Gas Peaking |
| SD | Black Hill Power & Light Company (Ben French) | 3325 | GT3 | 6195711 | 15200313 | West North Central Gas Peaking |
| SD | Black Hill Power & Light Company (Ben French) | 3325 | GT4 | 6195711 | 15200413 | West North Central Oil Peaking |
| SD | Black Hill Power & Light Company (Ben French) | | | 6195711 | 15199913 | West North Central Composite Peaking |
| TN | Allen Fossil Plant | 3393 | G10 | 5720111 | 23031013 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | G11 | 5720111 | 23031313 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | G12 | 5720111 | 23029213 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | G13 | 5720111 | 23028913 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | G14 | 5720111 | 23029013 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | G15 | 5720111 | 23030013 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | G16 | 5720111 | 23030613 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT1 | 5720111 | 23030113 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT2 | 5720111 | 23029613 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT3 | 5720111 | 23029913 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT4 | 5720111 | 23031113 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT5 | 5720111 | 23030913 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT6 | 5720111 | 23031213 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT7 | 5720111 | 23029313 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT8 | 5720111 | 23028613 | SESARM Gas Peaking |
| TN | Allen Fossil Plant | 3393 | GT9 | 5720111 | 23028713 | SESARM Gas Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 1 | 3787211 | 37840213 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 10 | 3787211 | 37839613 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 11 | 3787211 | 37839813 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 2 | 3787211 | 37839913 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 3 | 3787211 | 37840113 | SESARM Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 4 | 3787211 | 37840013 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 5 | 3787211 | 37840613 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 6 | 3787211 | 37840413 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 7 | 3787211 | 37840513 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 8 | 3787211 | 37840313 | SESARM Oil Peaking |
| TN | POWELL VALLEY ELECTRIC COOPERATIVE, INC. | 7883 | 9 | 3787211 | 37839713 | SESARM Oil Peaking |
| TX | ANTELOPE STATION | 57865 | E01 | 15625011 | 99191313 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E02 | 15625011 | 99192213 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E03 | 15625011 | 99192313 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E04 | 15625011 | 99192413 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E05 | 15625011 | 99192513 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E06 | 15625011 | 99192613 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E07 | 15625011 | 99192713 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E08 | 15625011 | 99192813 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E09 | 15625011 | 99192913 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E10 | 15625011 | 99191413 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E11 | 15625011 | 99191513 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E12 | 15625011 | 99191613 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E13 | 15625011 | 99191713 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E14 | 15625011 | 99191813 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E15 | 15625011 | 99191213 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E16 | 15625011 | 99191913 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E17 | 15625011 | 99192013 | South Gas Peaking |
| TX | ANTELOPE STATION | 57865 | E18 | 15625011 | 99192113 | South Gas Peaking |
| TX | ATKINS POWER STATION | 3561 | 7 | 6598311 | 17346513 | South Gas Peaking |
| TX | BASTROP ENERGY CENTER | 55168 | 0003 | 3981411 | 35538813 | South Oil Peaking |
| TX | CHANNELVIEW COGENERATION FACILITY | | | 4057511 | 33490113 | South Gas Peaking |
| TX | CHANNELVIEW COGENERATION FACILITY | | | 4057511 | 33490413 | South Gas Peaking |
| TX | CHANNELVIEW COGENERATION FACILITY | | | 4057511 | 33490513 | South Gas Peaking |
| TX | COOKE STATION 2 | 3602 | GT2 | 5655211 | 19731113 | South Gas Peaking |
| TX | JACK COUNTY GENERATION FACILITY | 55230 | ST1 | 13385011 | 71004013 | South Gas Peaking |
| TX | JACK COUNTY GENERATION FACILITY | 55230 | ST2 | 13385011 | 99311113 | South Gas Peaking |
| TX | JACK COUNTY GENERATION FACILITY | | | 13385011 | 71004213 | South Gas Peaking |
| TX | JACK COUNTY GENERATION FACILITY | | | 13385011 | 99311213 | South Gas Peaking |
| TX | JOHNSON COUNTY GENERATION FACILITY | 54817 | ST-1 | 6364211 | 15353213 | South Gas Peaking |
| TX | LAMAR POWER PLANT | 55097 | STG1 | 7910611 | 2567813 | South Oil Peaking |
| TX | LAMAR POWER PLANT | 55097 | STG2 | 7910611 | 2567913 | South Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| TX | PARIS GENERATION | 50109 | GEN3 | 6431011 | 16595413 | South Oil Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 1 | 3930211 | 37423513 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 10A | 3930211 | 92108013 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 11A | 3930211 | 92108113 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 12A | 3930211 | 92108213 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 13A | 3930211 | 92108313 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 14A | 3930211 | 92108413 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 15A | 3930211 | 92109613 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 16A | 3930211 | 92108513 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 17A | 3930211 | 92108613 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 18A | 3930211 | 92108713 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 19A | 3930211 | 92108813 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 1A | 3930211 | 92107113 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 2 | 3930211 | 37423713 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 20A | 3930211 | 92108913 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 21A | 3930211 | 92109013 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 22A | 3930211 | 92109113 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 23A | 3930211 | 92109213 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 24A | 3930211 | 92109313 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 2A | 3930211 | 92107213 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 3 | 3930211 | 37423613 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 3A | 3930211 | 92107313 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 4A | 3930211 | 92107413 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 5A | 3930211 | 92107513 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 6A | 3930211 | 92107613 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 7A | 3930211 | 92107713 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 8A | 3930211 | 92107813 | South Gas Peaking |
| TX | PEARSALL POWER PLANT | 3630 | 9A | 3930211 | 92107913 | South Gas Peaking |
| TX | PH ROBINSON STATION ELECTRIC GENERATING STATION | 3466 | PHR1 | 4021011 | 126664313 | South Gas Peaking |
| TX | PH ROBINSON STATION ELECTRIC GENERATING STATION | 3466 | PHR2 | 4021011 | 126664413 | South Gas Peaking |
| TX | POWER LANE STEAM PLANT | 4195 | 1 | 5655711 | 19719813 | South Gas Peaking |
| TX | POWER LANE STEAM PLANT | 4195 | EP | 5655711 | 91523413 | South Gas Peaking |
| TX | POWER LANE STEAM PLANT | 4195 | EP2 | 5655711 | 91523513 | South Gas Peaking |
| TX | POWER LANE STEAM PLANT | 4195 | EP3 | 5655711 | 91523613 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG01 | 17910611 | 126703713 | South Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| TX | RED GATE POWER PLANT | 59391 | ENG02 | 17910611 | 126703813 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG03 | 17910611 | 126703913 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG04 | 17910611 | 126704013 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG05 | 17910611 | 126704113 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG06 | 17910611 | 126704213 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG07 | 17910611 | 126704313 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG08 | 17910611 | 126704413 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG09 | 17910611 | 126704513 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG10 | 17910611 | 126704613 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG11 | 17910611 | 126704713 | South Gas Peaking |
| TX | RED GATE POWER PLANT | 59391 | ENG12 | 17910611 | 126704813 | South Gas Peaking |
| TX | SOUTH TEXAS ELECTRIC COOP | 3631 | 1 | 5863011 | 22230713 | South Gas Peaking |
| TX | SOUTH TEXAS ELECTRIC COOP | 3631 | 2 | 5863011 | 22230513 | South Gas Peaking |
| TX | SOUTH TEXAS ELECTRIC COOP | 3631 | 4 | 5863011 | 22230213 | South Oil Peaking |
| TX | SOUTH TEXAS ELECTRIC COOP | 3631 | 5 | 5863011 | 22230313 | South Oil Peaking |
| TX | STRYKER CREEK ELECTRIC STATION | 3504 | D1 | 5729511 | 21908213 | South Oil Peaking |
| TX | STRYKER CREEK ELECTRIC STATION | 3504 | D2 | 5729511 | 21908013 | South Oil Peaking |
| TX | STRYKER CREEK ELECTRIC STATION | 3504 | D3 | 5729511 | 21907913 | South Oil Peaking |
| TX | STRYKER CREEK ELECTRIC STATION | 3504 | D4 | 5729511 | 21907813 | South Oil Peaking |
| TX | STRYKER CREEK ELECTRIC STATION | 3504 | D5 | 5729511 | 21907713 | South Oil Peaking |
| TX | TH WHARTON ELECTRIC GENERATING STATION | 3469 | GT1 | 4926511 | 31238113 | South Gas Peaking |
| TX | TRINIDAD STEAM ELEC STATION | 3507 | D1 | 4863311 | 29419613 | South Oil Peaking |
| TX | TRINIDAD STEAM ELEC STATION | 3507 | D2 | 4863311 | 29419513 | South Oil Peaking |
| TX | WA PARISH ELECTRIC GENERATING STATION | 3470 | GT1 | 3968411 | 34521513 | South Gas Peaking |
| TX | WF COGENERATION PLANT | 50127 | GTA | 5127311 | 25206313 | South Gas Peaking |
| TX | WF COGENERATION PLANT | 50127 | GTB | 5127311 | 25206213 | South Gas Peaking |
| TX | WF COGENERATION PLANT | 50127 | GTC | 5127311 | 25206113 | South Gas Peaking |
| VA | Calpine Mid-Atlantic Generation LLC - Bayview | 3782 | BAYV | 7665411 | 12168313 | MANE-VU Oil Peaking |
| VA | Calpine Mid-Atlantic Generation LLC - Bayview | 3782 | BYV2 | 7665411 | 12168213 | MANE-VU Oil Peaking |
| VA | Calpine Mid-Atlantic Generation LLC - Bayview | 3782 | BYV3 | 7665411 | 12168713 | MANE-VU Oil Peaking |
| VA | Calpine Mid-Atlantic Generation LLC - Bayview | 3782 | BYV4 | 7665411 | 12168613 | MANE-VU Oil Peaking |
| VA | Calpine Mid-Atlantic Generation LLC - Bayview | 3782 | BYV5 | 7665411 | 12168513 | MANE-VU Oil Peaking |
| VA | Calpine Mid-Atlantic Generation LLC - Bayview | 3782 | BYV6 | 7665411 | 12168413 | MANE-VU Oil Peaking |
| VA | Dominion - Bear Garden CT Station | | | 15432111 | 96378113 | MANE-VU Oil Peaking |
| VA | Dominion - Bear Garden CT Station | | | 15432111 | 96378313 | MANE-VU Oil Peaking |
| VA | Dominion - Chesapeake Energy Center | 3803 | 6 | 5040211 | 28681613 | MANE-VU Oil Peaking |
| VA | Dominion - Chesapeake Energy Center | 3803 | GT1 | 5040211 | 28680513 | MANE-VU Oil Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| VA | Dominion - Chesapeake Energy Center | 3803 | GT2 | 5040211 | 28680613 | MANE-VU Oil Peaking |
| VA | Dominion - Chesapeake Energy Center | 3803 | GT4 | 5040211 | 28680713 | MANE-VU Oil Peaking |
| VA | Dominion - Low Moor CT Station | 3799 | GT1 | 9047011 | 57565413 | MANE-VU Oil Peaking |
| VA | Dominion - Low Moor CT Station | 3799 | GT2 | 9047011 | 57565513 | MANE-VU Oil Peaking |
| VA | Dominion - Low Moor CT Station | 3799 | GT3 | 9047011 | 57565613 | MANE-VU Oil Peaking |
| VA | Dominion - Low Moor CT Station | 3799 | GT4 | 9047011 | 57565713 | MANE-VU Oil Peaking |
| VA | Dominion - Northern Neck CT Station | 3800 | GT1 | 9049611 | 58389513 | MANE-VU Oil Peaking |
| VA | Dominion - Northern Neck CT Station | 3800 | GT2 | 9049611 | 58389613 | MANE-VU Oil Peaking |
| VA | Dominion - Northern Neck CT Station | 3800 | GT3 | 9049611 | 58389713 | MANE-VU Oil Peaking |
| VA | Dominion - Northern Neck CT Station | 3800 | GT4 | 9049611 | 58389813 | MANE-VU Oil Peaking |
| VA | Dominion - Possum Point Power Station | 3804 | GT1 | 7520511 | 12374213 | MANE-VU Oil Peaking |
| VA | Dominion - Possum Point Power Station | 3804 | GT2 | 7520511 | 12374413 | MANE-VU Oil Peaking |
| VA | Dominion - Possum Point Power Station | 3804 | GT3 | 7520511 | 12373613 | MANE-VU Oil Peaking |
| VA | Dominion - Possum Point Power Station | 3804 | GT4 | 7520511 | 12373213 | MANE-VU Oil Peaking |
| VA | Dominion - Possum Point Power Station | 3804 | GT5 | 7520511 | 12373813 | MANE-VU Oil Peaking |
| VA | Dominion - Possum Point Power Station | 3804 | GT6 | 7520511 | 12373713 | MANE-VU Oil Peaking |
| VA | Dominion-Gordonsville Power Station | 54844 | GOR3 | 5040011 | 28682913 | MANE-VU Gas Peaking |
| VA | Dominion-Gordonsville Power Station | 54844 | GOR4 | 5040011 | 28683113 | MANE-VU Gas Peaking |
| VA | INGENCO - Amelia | 56681 | 1 | 6216811 | 16510613 | MANE-VU Gas Peaking |
| VA | INGENCO - Brunswick Plant | | | 10641711 | 58486313 | MANE-VU Gas Peaking |
| VA | INGENCO - Charles City | 56683 | 1 | 9089211 | 58367913 | MANE-VU Gas Peaking |
| VA | INGENCO - Chester Plant | 56684 | 1 | 10642911 | 58488213 | MANE-VU Gas Peaking |
| VA | INGENCO - Rockville Plant | 56692 | 1A | 6760511 | 58482613 | MANE-VU Oil Peaking |
| VA | Manassas City VMEA | 7440 | V3 | 7520711 | 12373013 | MANE-VU Oil Peaking |
| VA | Manassas City VMEA | 7441 | V1 | 7520711 | 12372813 | MANE-VU Oil Peaking |
| VA | Panda Stonewall LLC | | | 17856211 | 125484913 | MANE-VU Gas Peaking |
| VA | Panda Stonewall LLC | | | 17856211 | 125485013 | MANE-VU Gas Peaking |
| VA | Pow Gen (Suffolk) & Suff Energy Partners | 54781 | SU1 | 6894711 | 12959313 | MANE-VU Gas Peaking |
| VA | Surry Power Station and Gravel Neck | 7032 | 1 | 4937411 | 32379813 | MANE-VU Oil Peaking |
| VA | Surry Power Station and Gravel Neck | 7032 | 2 | 4937411 | 32379513 | MANE-VU Oil Peaking |
| VA | Tenaska Virginia Partners, L.P. | | | 9078811 | 58376713 | MANE-VU Oil Peaking |
| VA | Tenaska Virginia Partners, L.P. | | | 9078811 | 58376913 | MANE-VU Oil Peaking |
| VA | Tenaska Virginia Partners, L.P. | | | 9078811 | 58388613 | MANE-VU Oil Peaking |
| WI | WISCONSIN PUBLIC SERVICE CORPORATION - FOX ENERGY CENTER | 56031 | STG | 15038711 | 91926613 | LADCO Gas Peaking |
| WI | WISCONSIN PUBLIC SERVICE CORPORATION- WESTON PLANT | 4078 | 31 | 7078511 | 14849513 | LADCO Gas Peaking |

| State | Facility Name | ORIS | BOILER | facility_id | unit_id | DAILY PROFILE |
|---|---|---|---|---|---|---|
| WV | Dominion Resources, Inc. - MOUNT STORM POWER STATION | 3954 | JF1 | 6257011 | 71962013 | SESARM Gas Peaking |
| WY | Neil Simpson One | | | 8317511 | 72219713 | West North Central Composite Peaking |

Appendix H. *Additional Sector Source Apportionment*

# Emission Sector Analysis

The following summaries examine contribution by source sector.

**Figures H-1** though **H-9** examine each modeled exceedance day at the monitors of concern and the extent that each sector contributes on each day. Each exceedance day is in order by the total future DVF, though contribution from international emissions and boundary conditions are excluded from display.

**Figure H-1.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Greenwich, CT

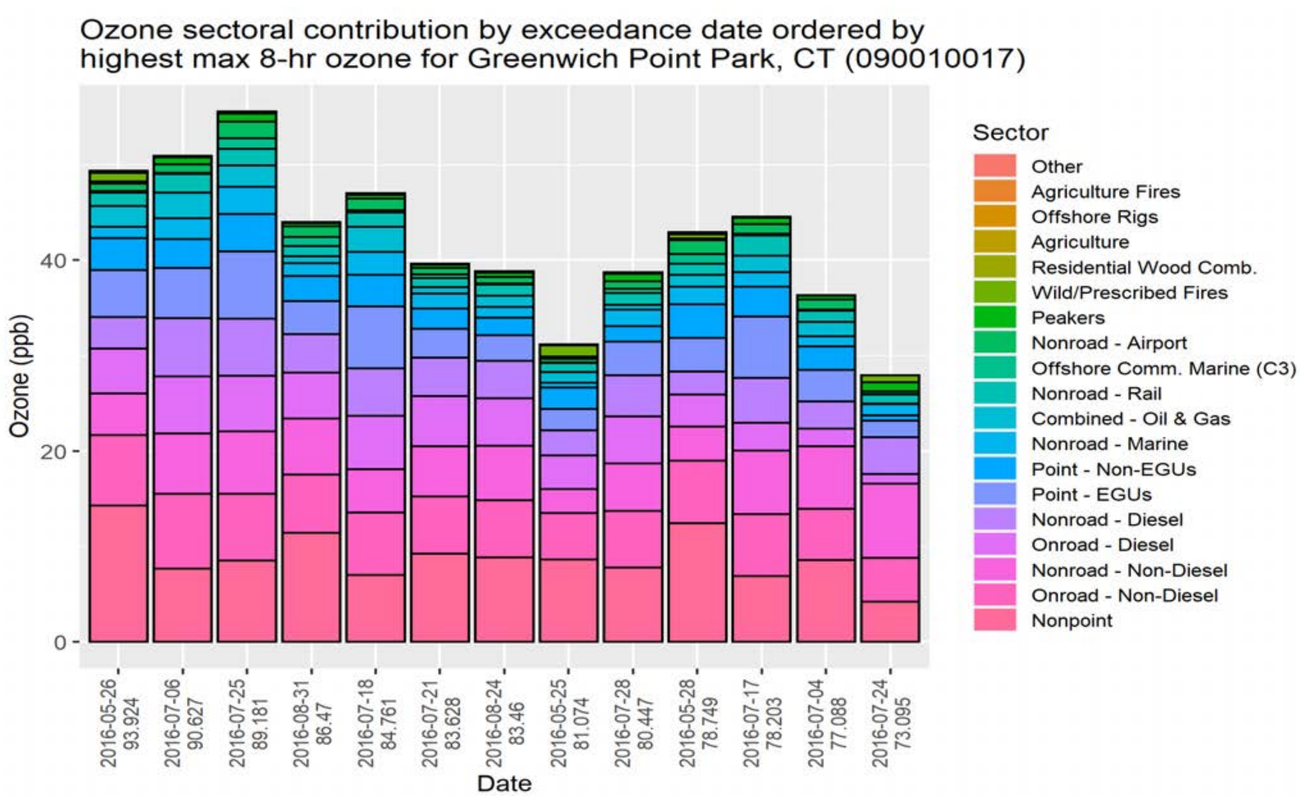


**Figure H-2.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Stratford, CT.

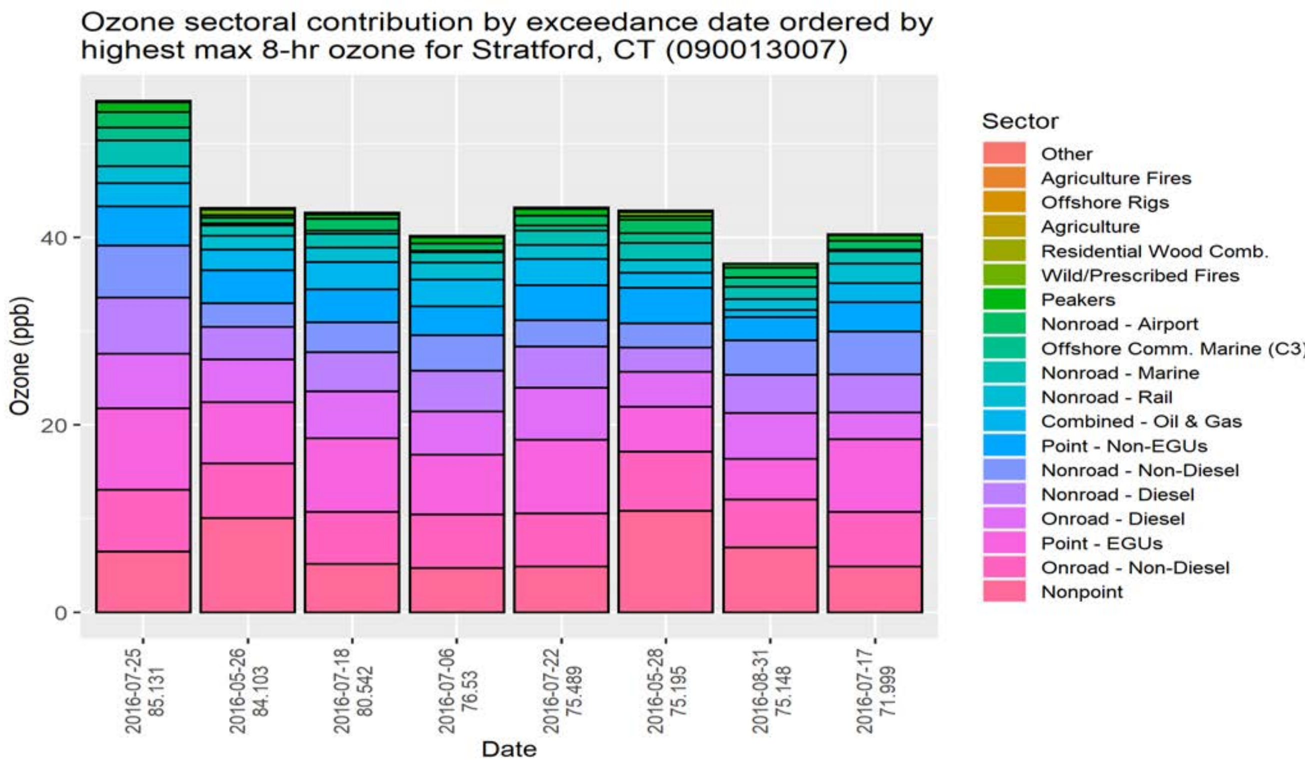



**Figure H-3.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Westport, CT.

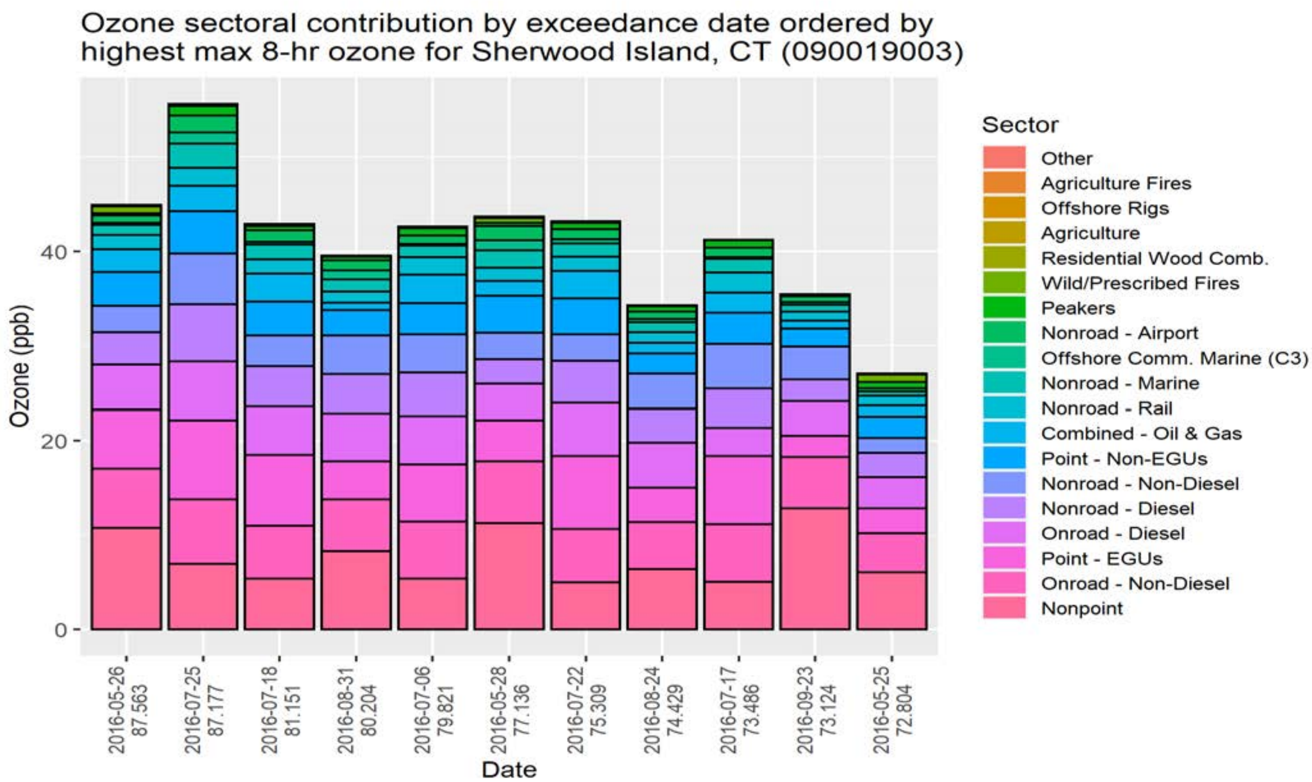



**Figure H-4.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Madison, CT.

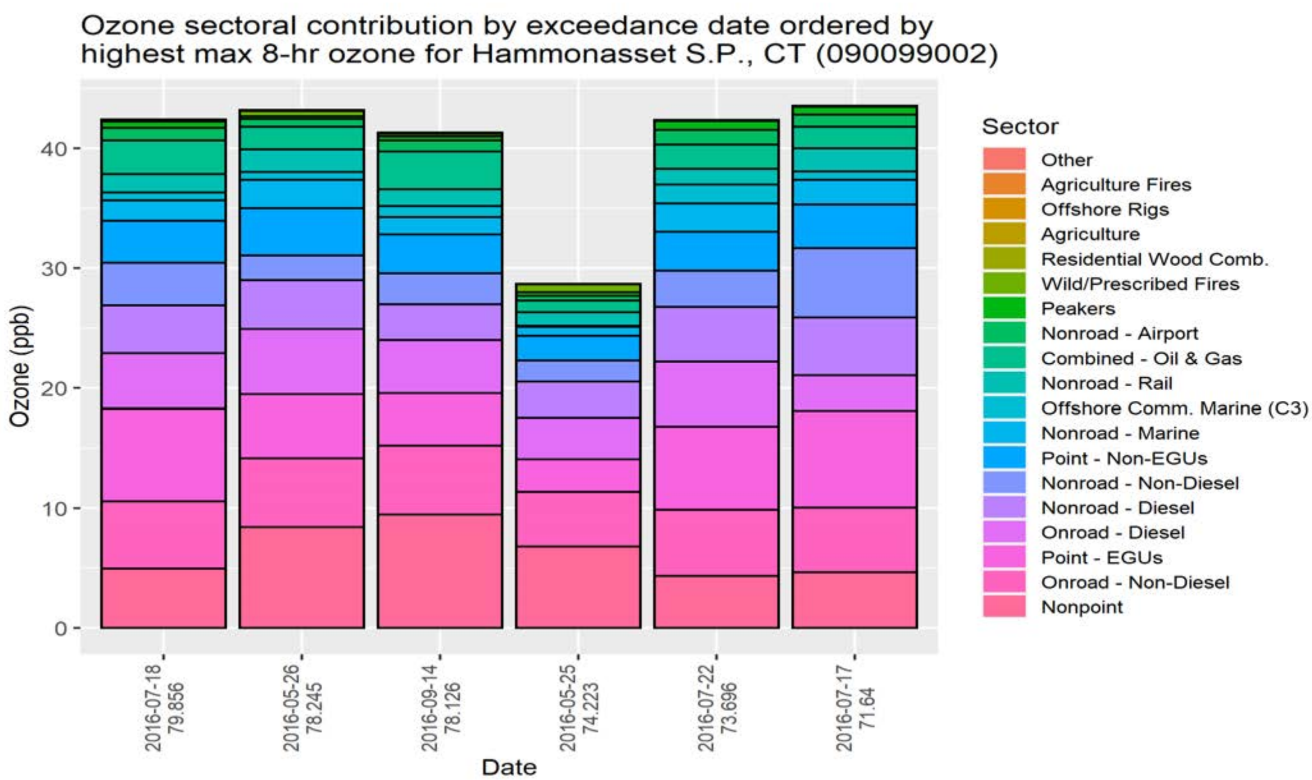


**Figure H-5.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Groton, CT.

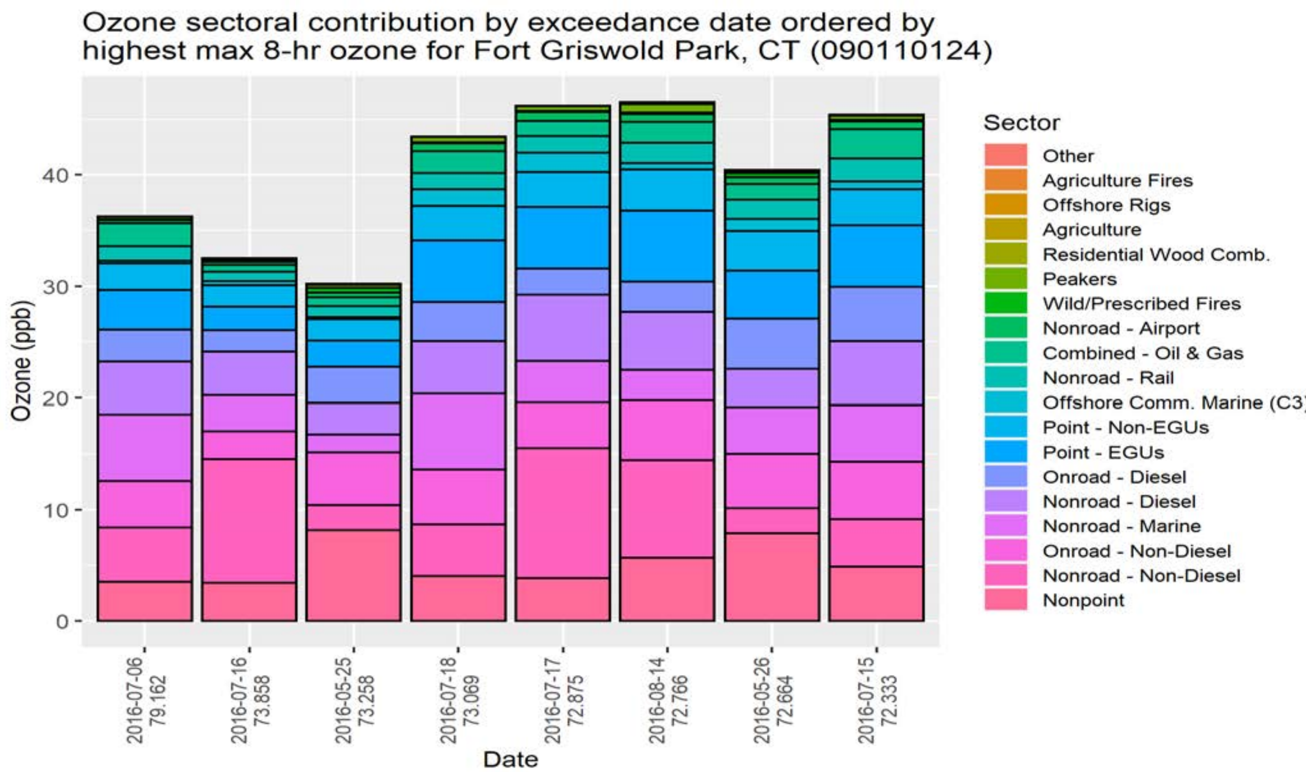



**Figure H-6.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Susan Wagner H.S.

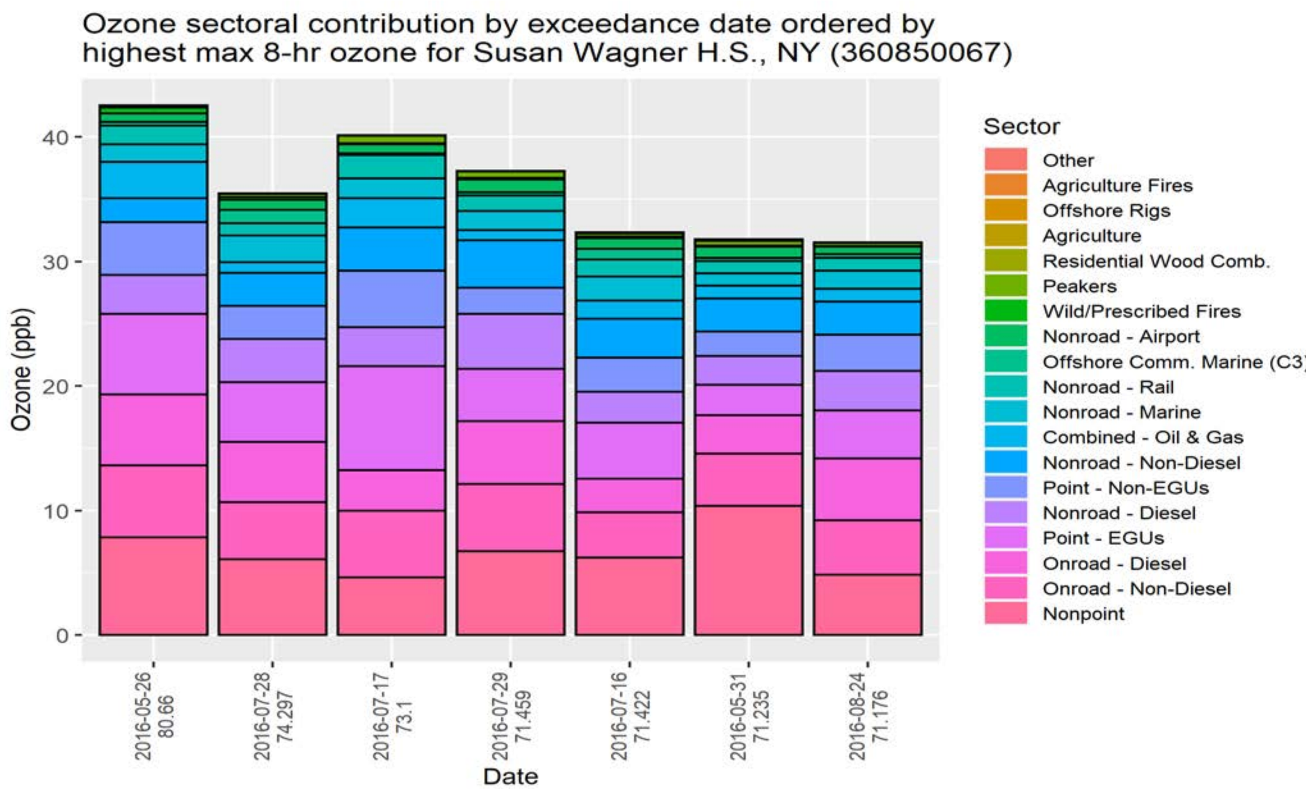



**Figure H-7.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Babylon NY.

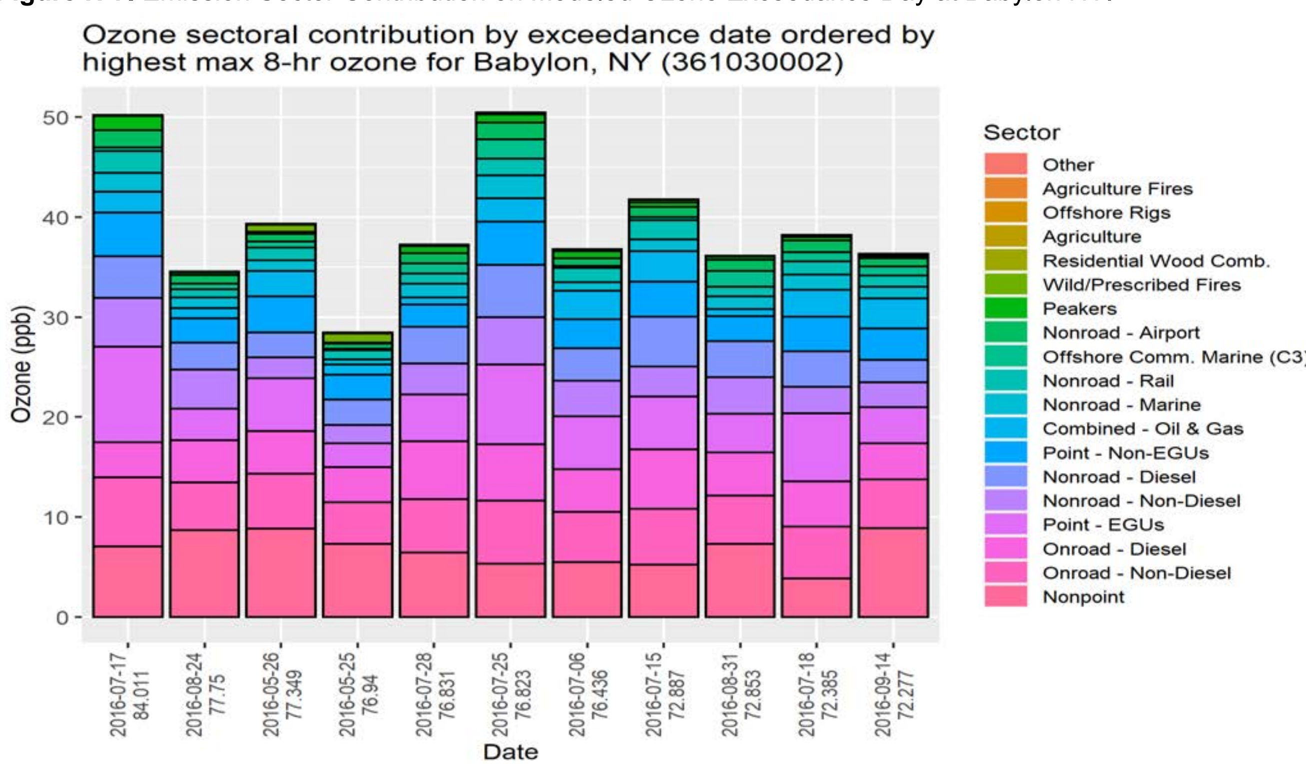


**Figure H-8**. Emission Sector Contribution on Modeled Ozone Exceedance Day at White Plaines, NY.

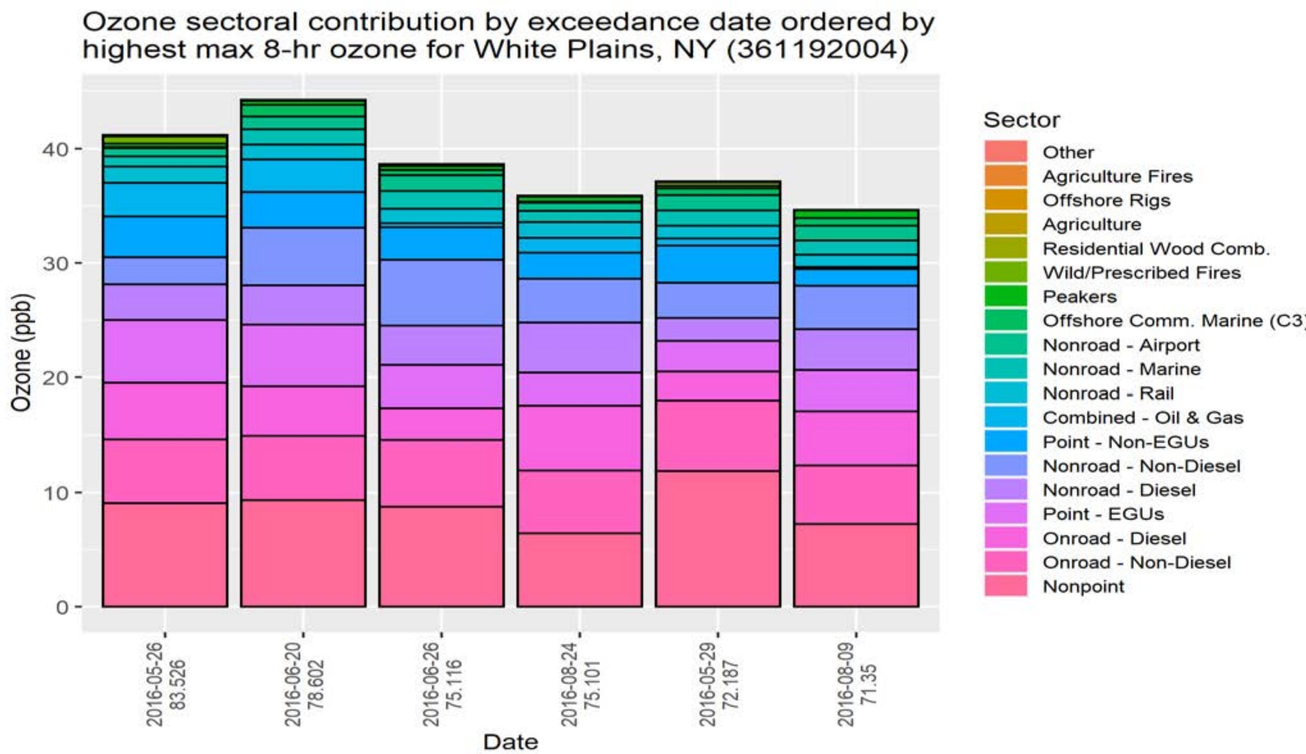
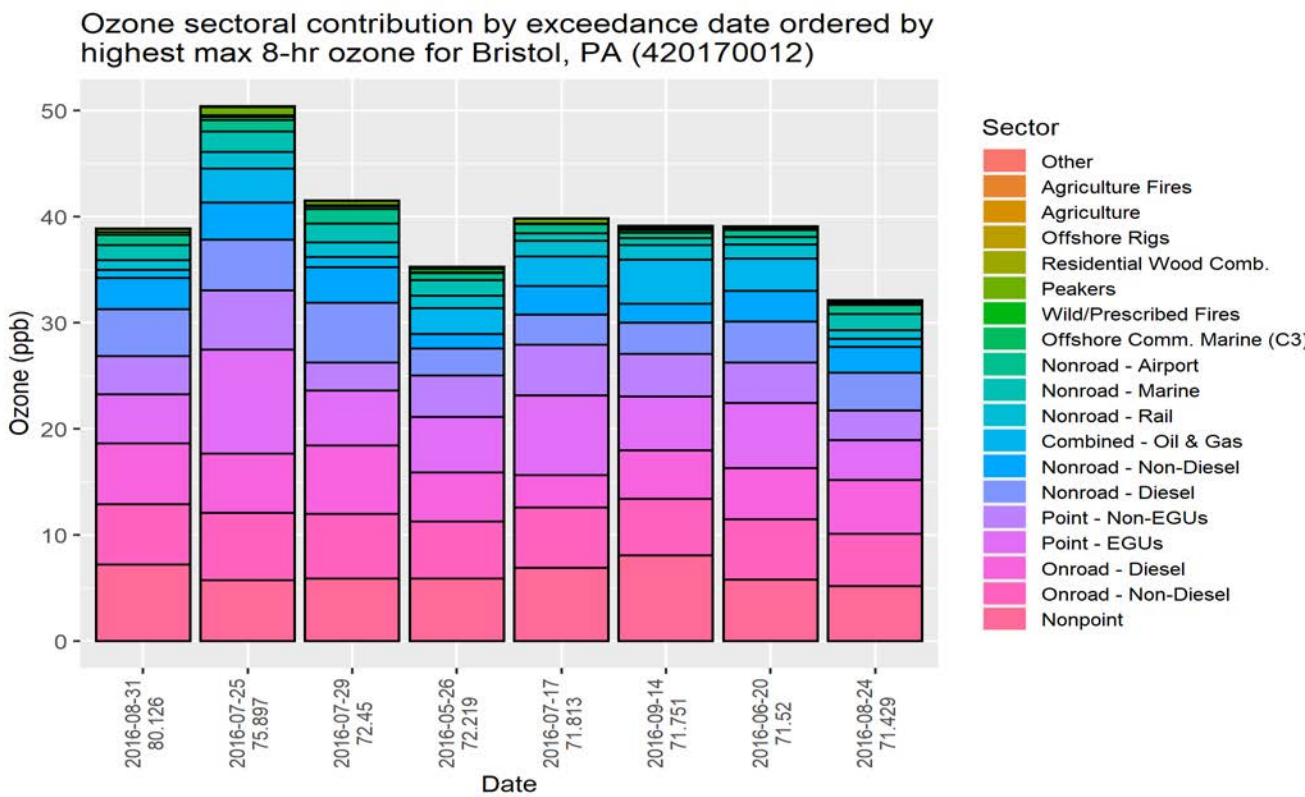



**Figure H-9.** Emission Sector Contribution on Modeled Ozone Exceedance Day at Bristol, PA.




**Figures H-10 though H-18** examine the range of contribution for sectors on all exceedance days at the monitors of concern. Each sector is in order by the total contribution, only the eight most important sectors are displayed, and the contribution from international emissions and boundary conditions are excluded from display.

**Figure H-10**. Emission Sector Contribution on 13 Highest Modeled Ozone Days at Greenwich, CT

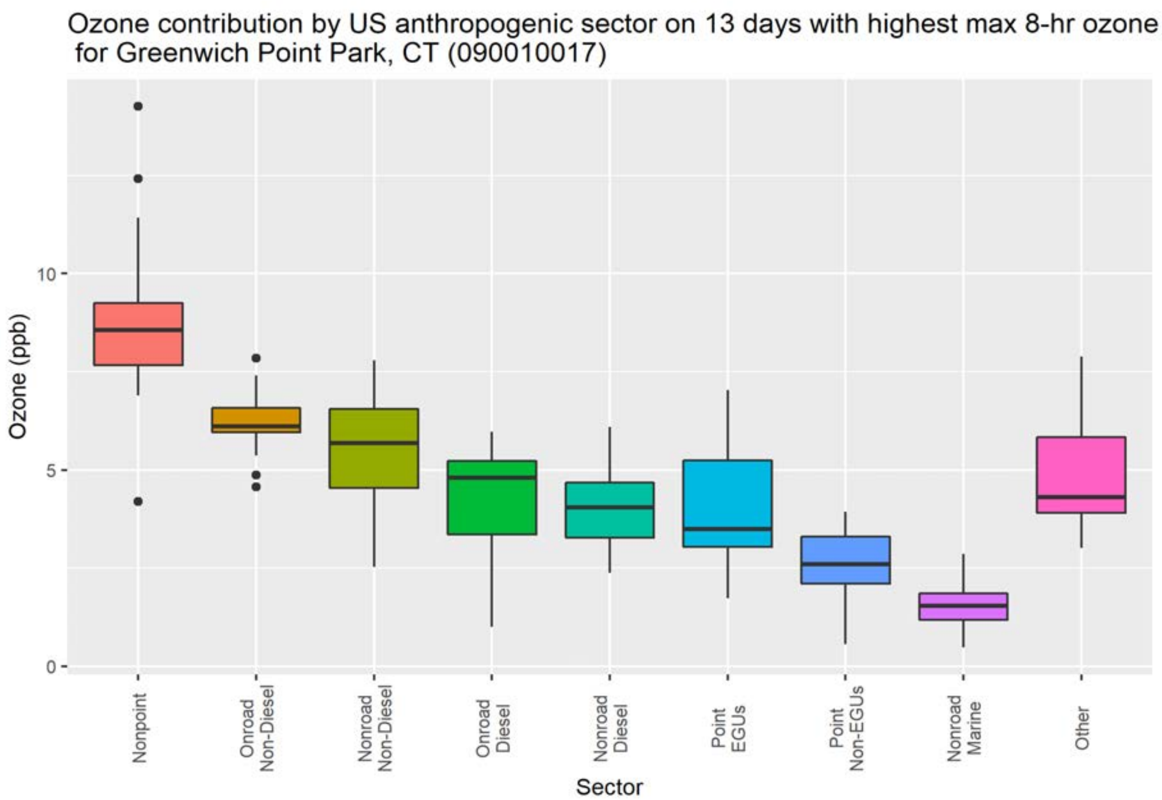



**Figure H-11**. Emission Sector Contribution on 13 Highest Modeled Ozone Days at Stratford, CT

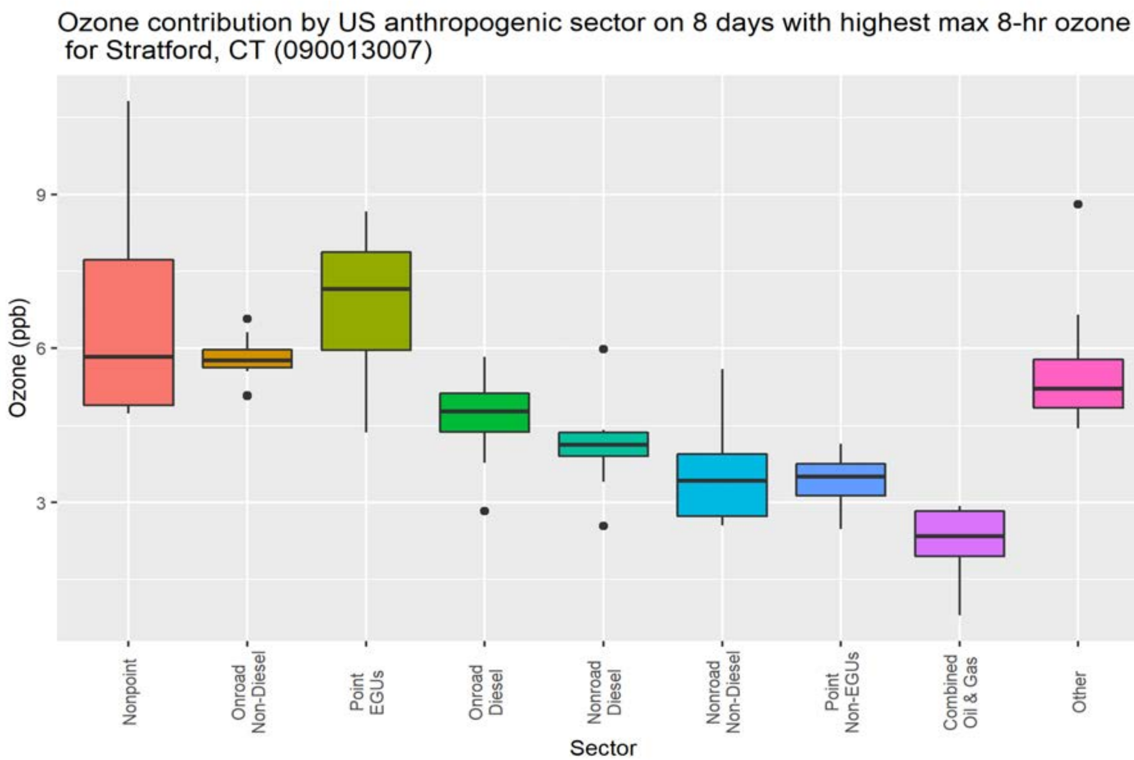



**Figure H-11**. Emission Sector Contribution on 13 Highest Modeled Ozone Days at Westport, CT

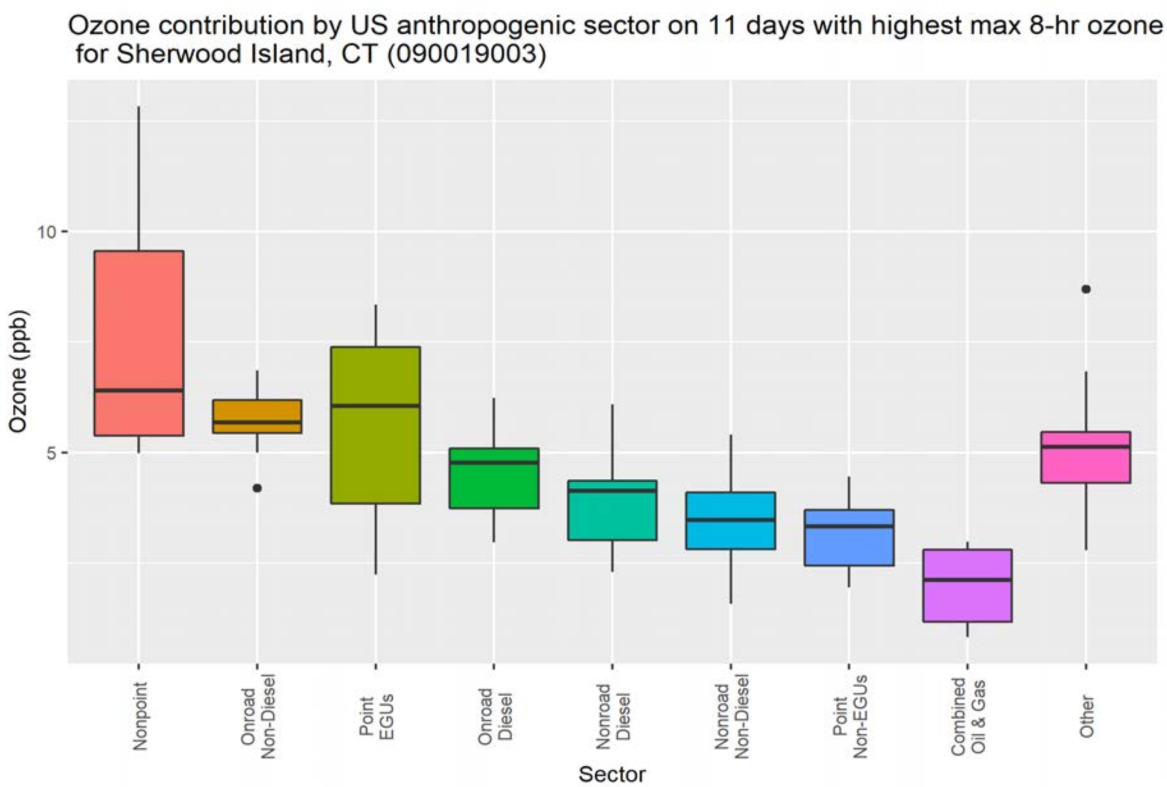


**Figure H-13.** Emission Sector Contribution on 13 Highest Modeled Ozone Days at Madison, CT.

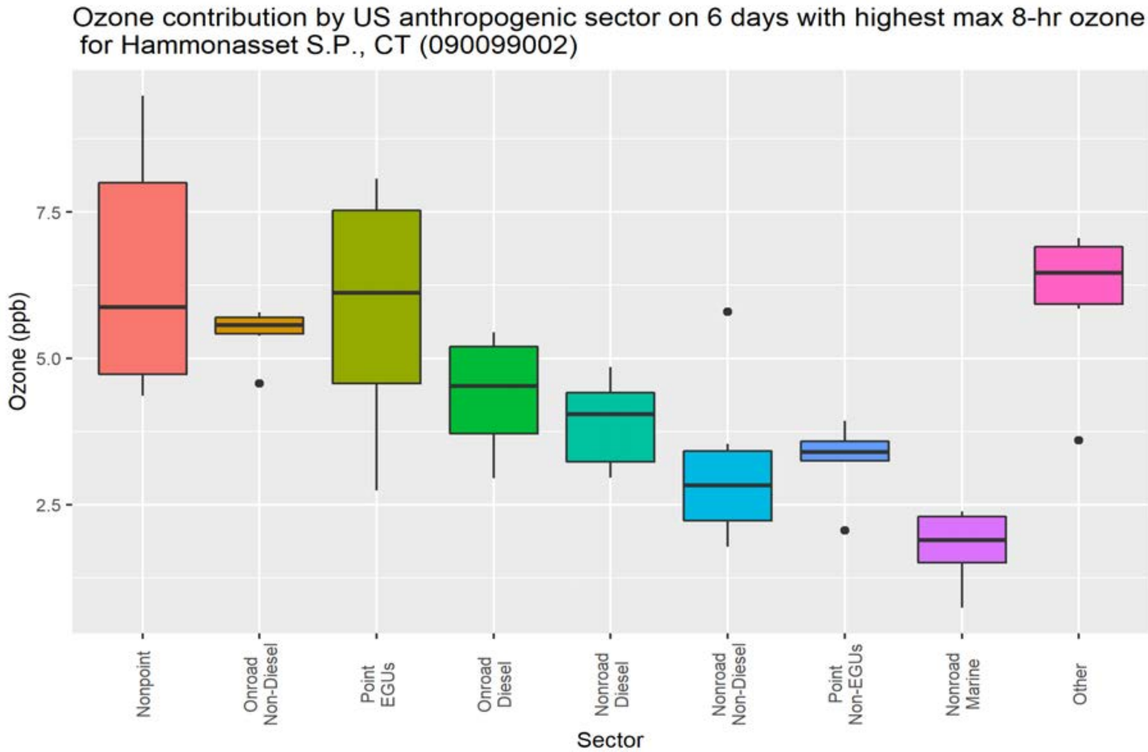



**Figure H-14.** Emission Sector Contribution on 13 Highest Modeled Ozone Days at Groton, CT.

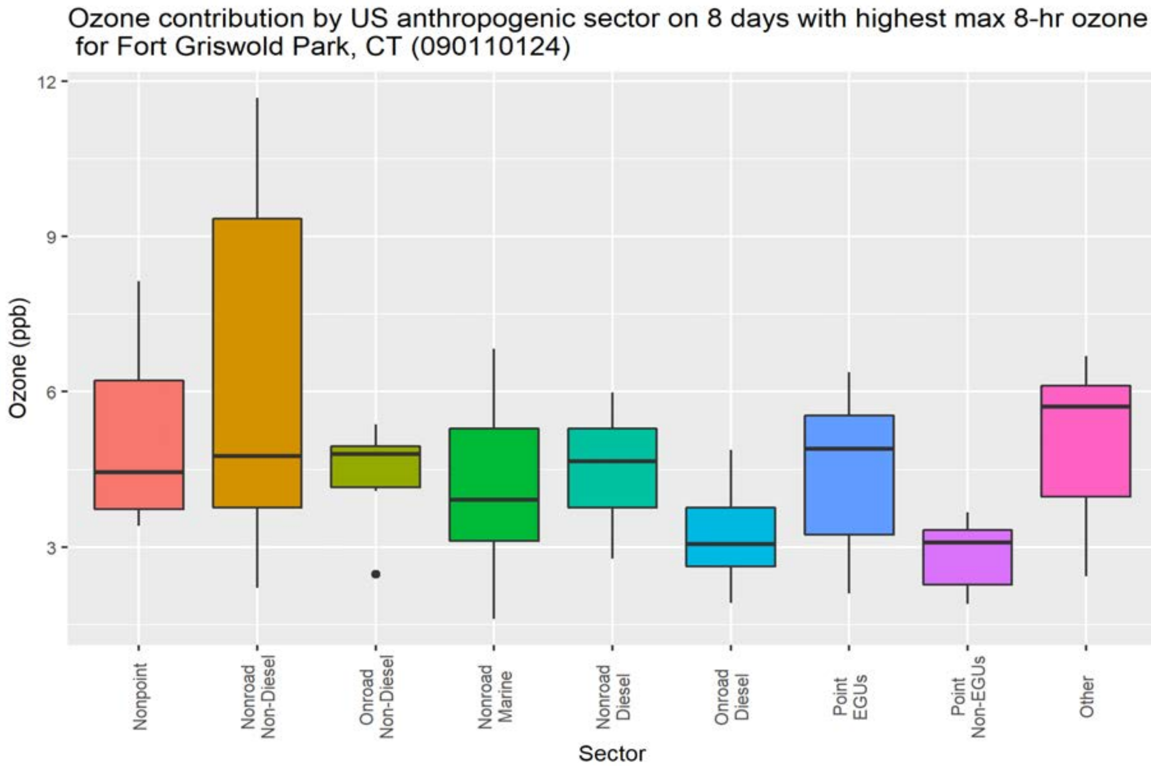



**Figure H-15**. Emission Sector Contribution on 13 Highest Modeled Ozone Days at Susan Wagner H.S.

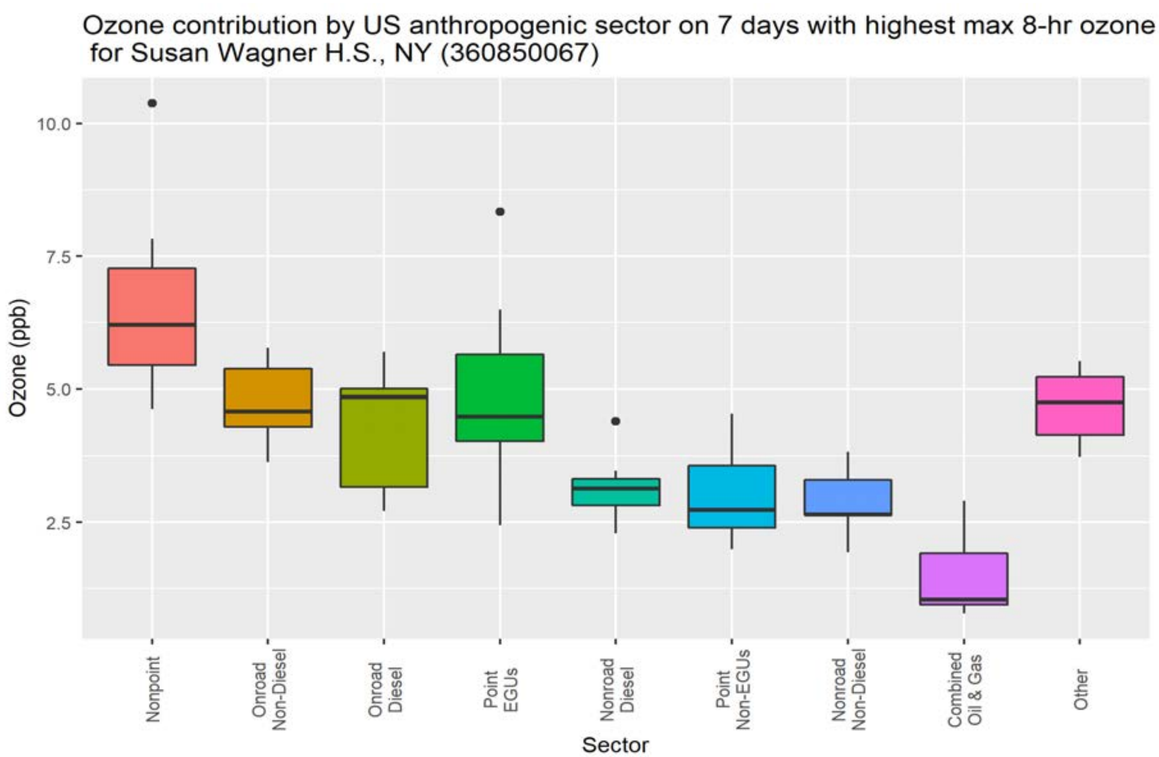


**Figure H-16**. Emission Sector Contribution on 13 Highest Modeled Ozone Days at Babylon, NY.

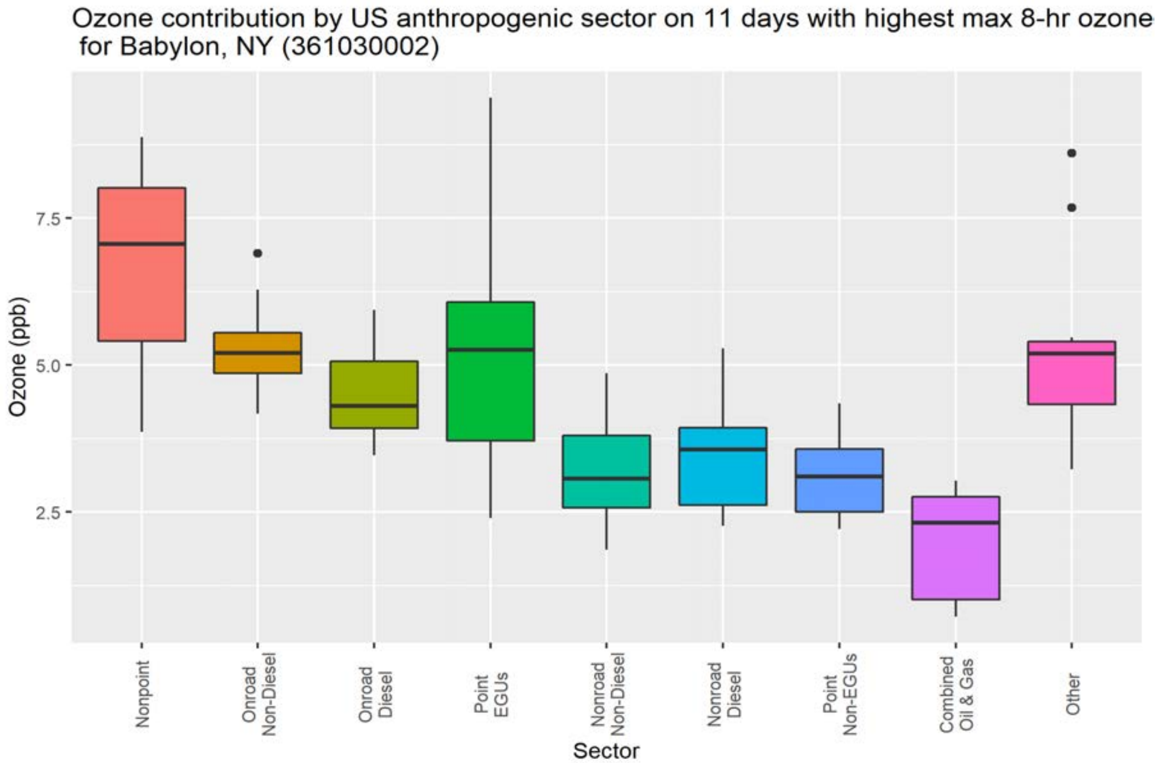



**Figure H-17.** Emission Sector Contribution on 13 Highest Modeled Ozone Days at White Plains, NY.

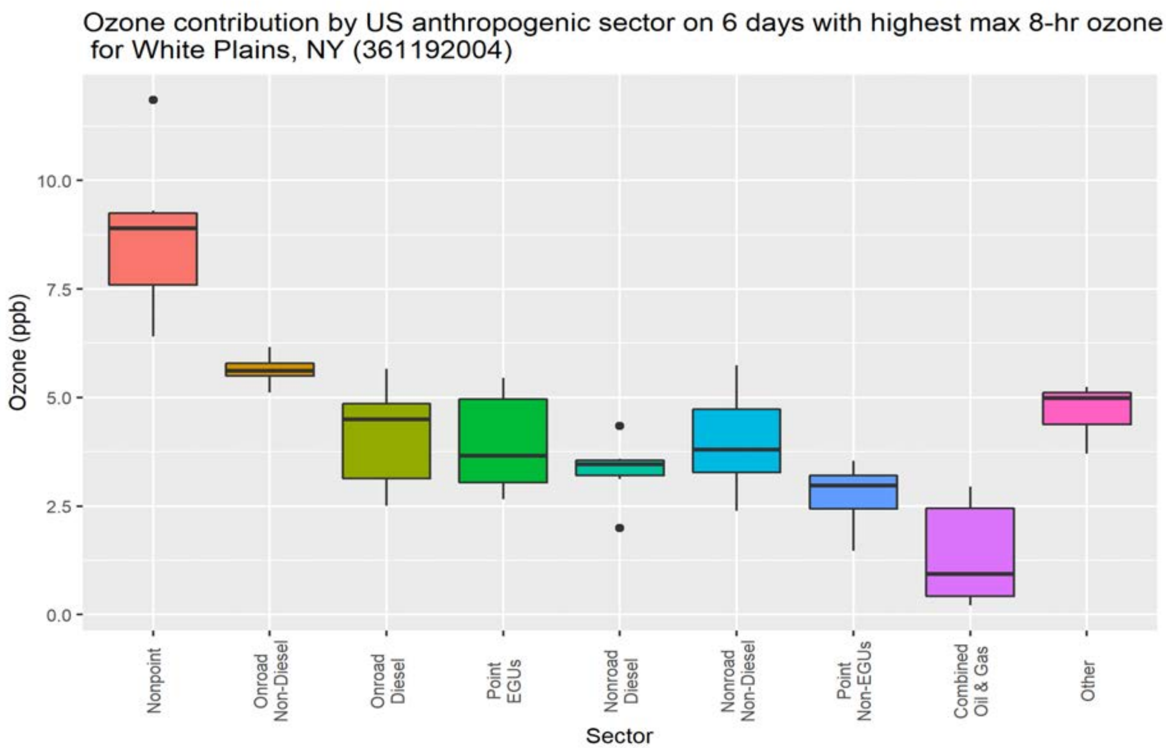
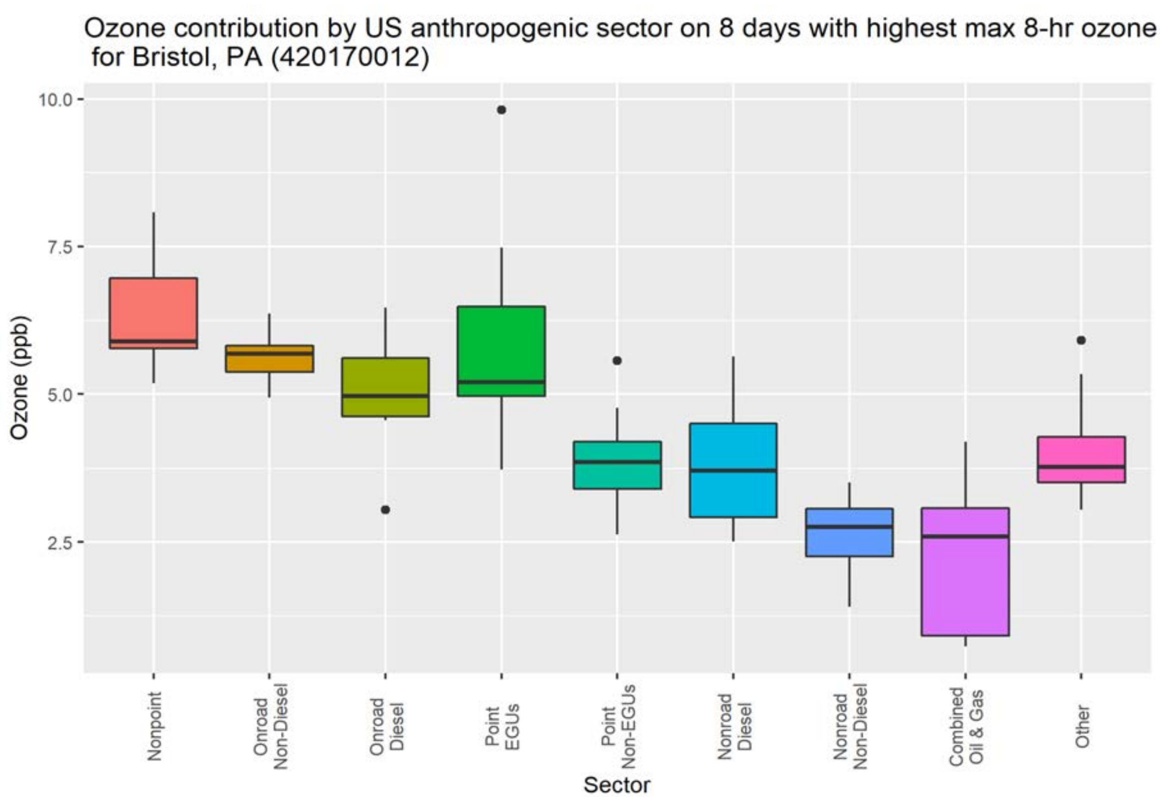



**Figure H-17.** Emission Sector Contribution on 13 Highest Modeled Ozone Days at Bristol, PA.



## State Analysis

The next section bases the analysis on contribution by state level summaries.

**Figures H-19 though H-27** examine the range of contribution for each state on all exceedance days at the monitors of concern. Each state is in order by the total contribution and the contribution from international emissions and boundary conditions are not included. The black bar indicates the 1% threshold for contribution.

**Figure H-19.** State Contribution on 13 Highest Modeled Ozone Days at Greenwich, CT

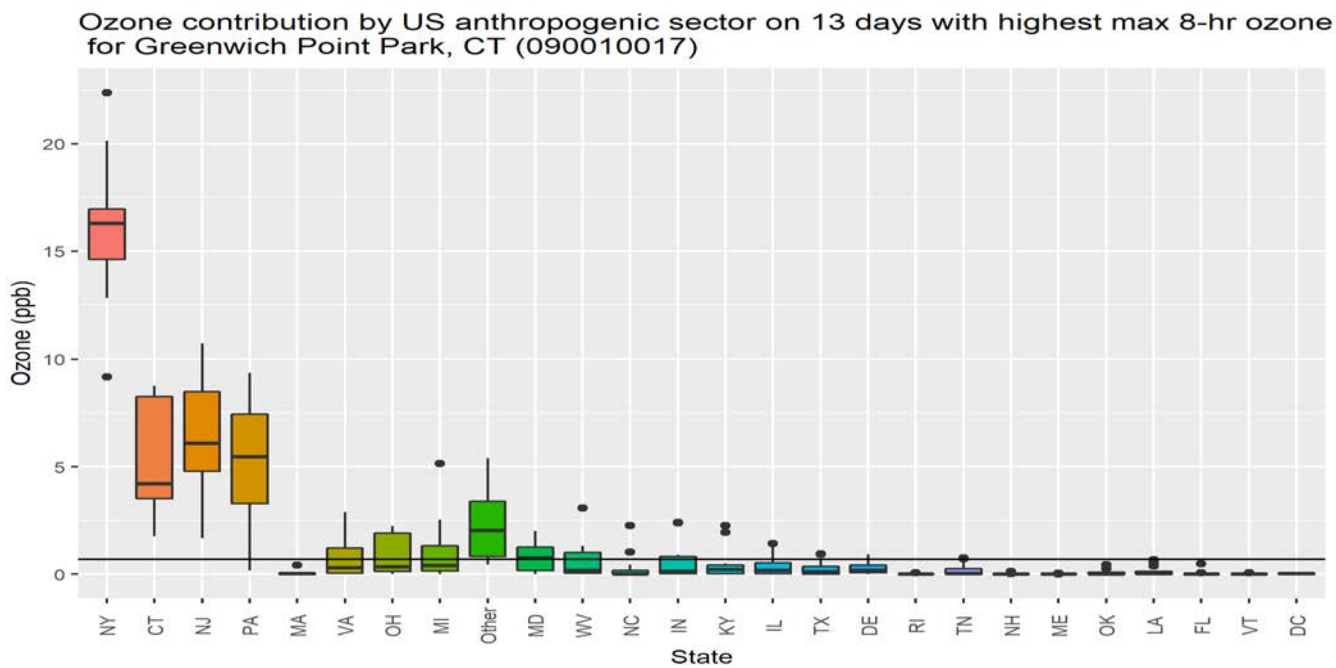


**Figure H-20**. State Contribution on 13 Highest Modeled Ozone Days at Stratford, CT

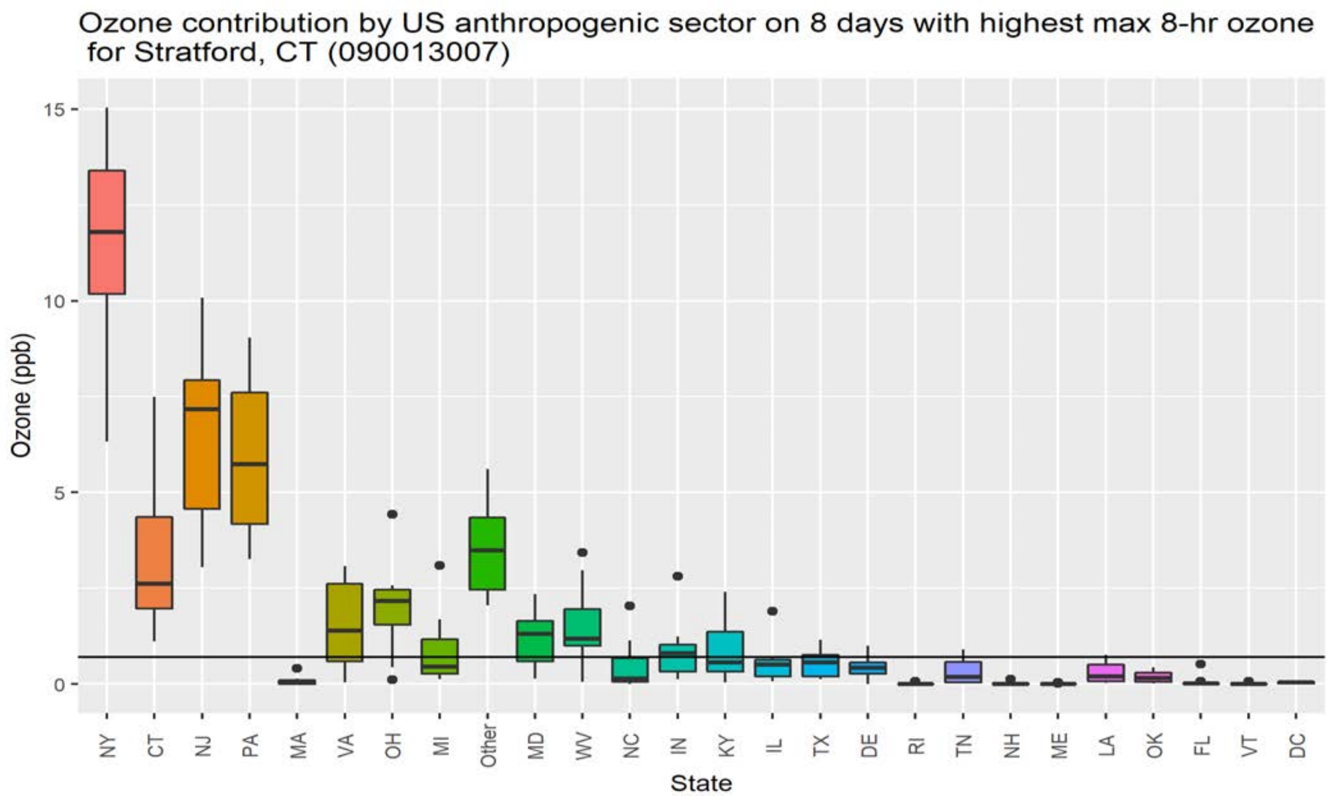



**Figure H-20**. State Contribution on 13 Highest Modeled Ozone Days at Westport, CT

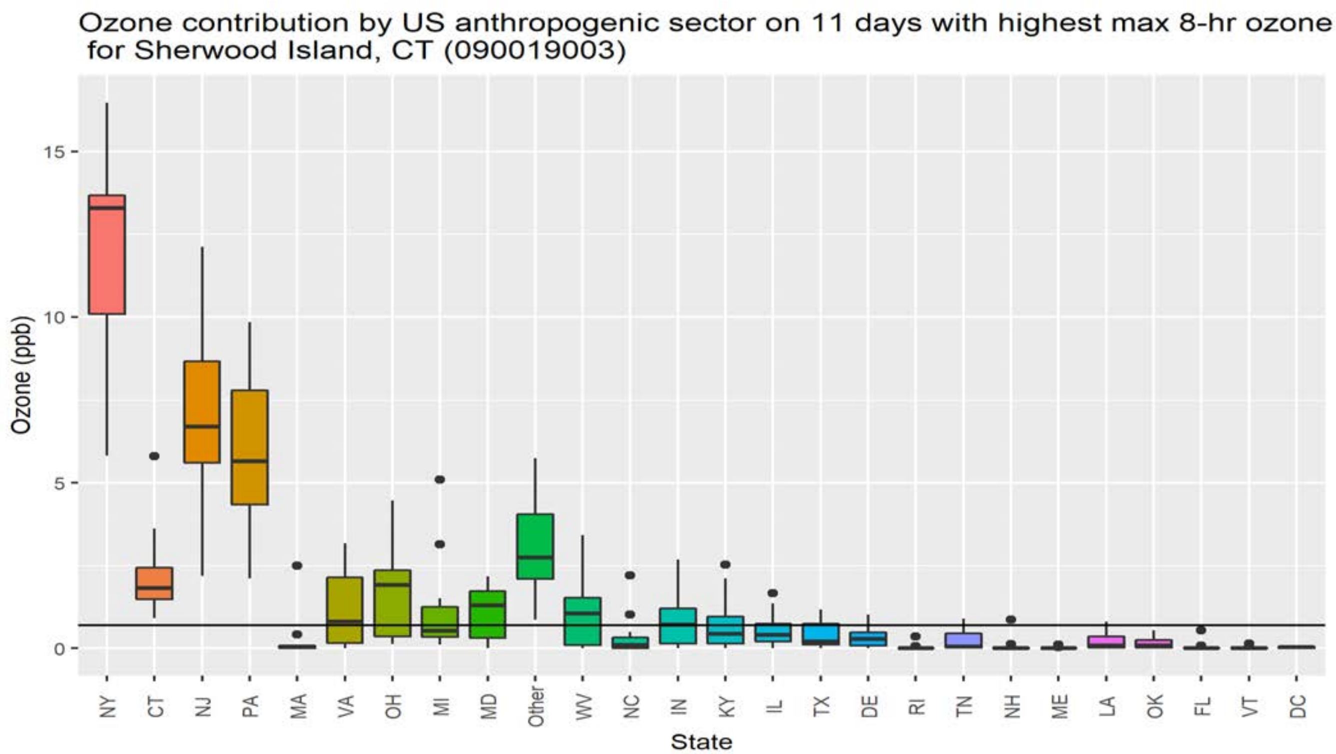



**Figure H-22.** State Contribution on 13 Highest Modeled Ozone Days at Madison, CT

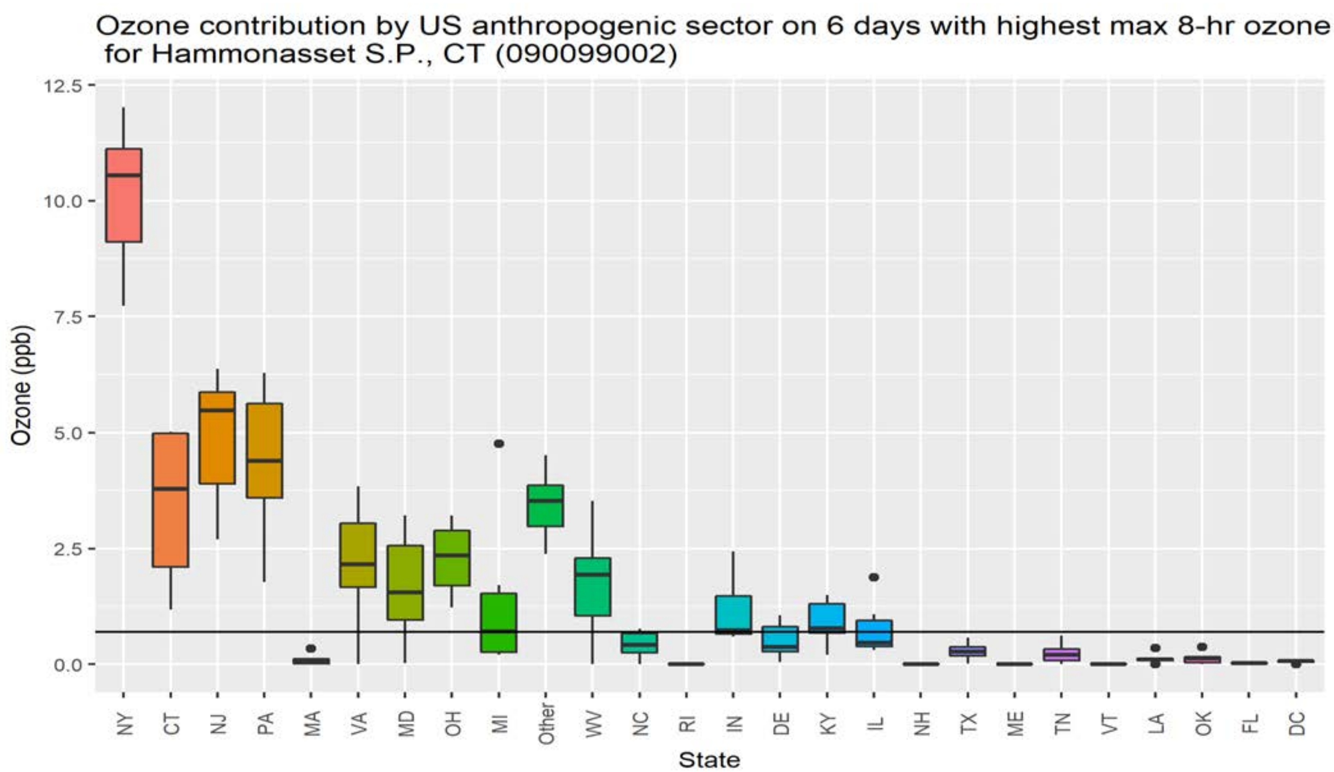



**Figure H-23.** State Contribution on 13 Highest Modeled Ozone Days at Groton, CT

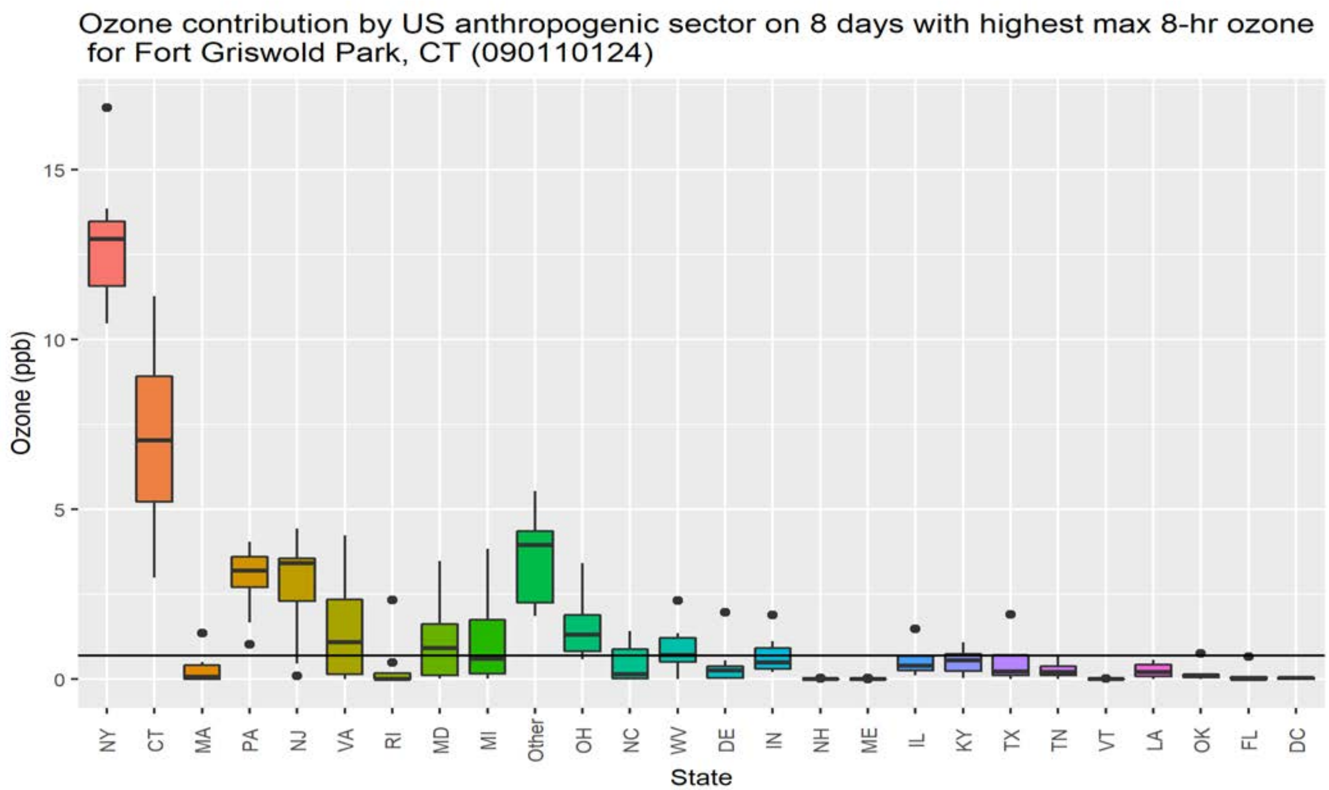

Ozone contribution by US anthropogenic sector on 8 days with highest max 8-hr ozone
for Fort Griswold Park, CT (090110124)
Ozone (ppb)
15
10
5
0
NY
CT
MA
PA
NJ
VA
RI
MD
MI
Other
OH
NC
WV
DE
IN
NH
ME
IL
KY
TX
TN
VT
LA
OK
FL
DC
State

**Figure H-24.** State Contribution on 13 Highest Modeled Ozone Days at Susan Wagner H.S.

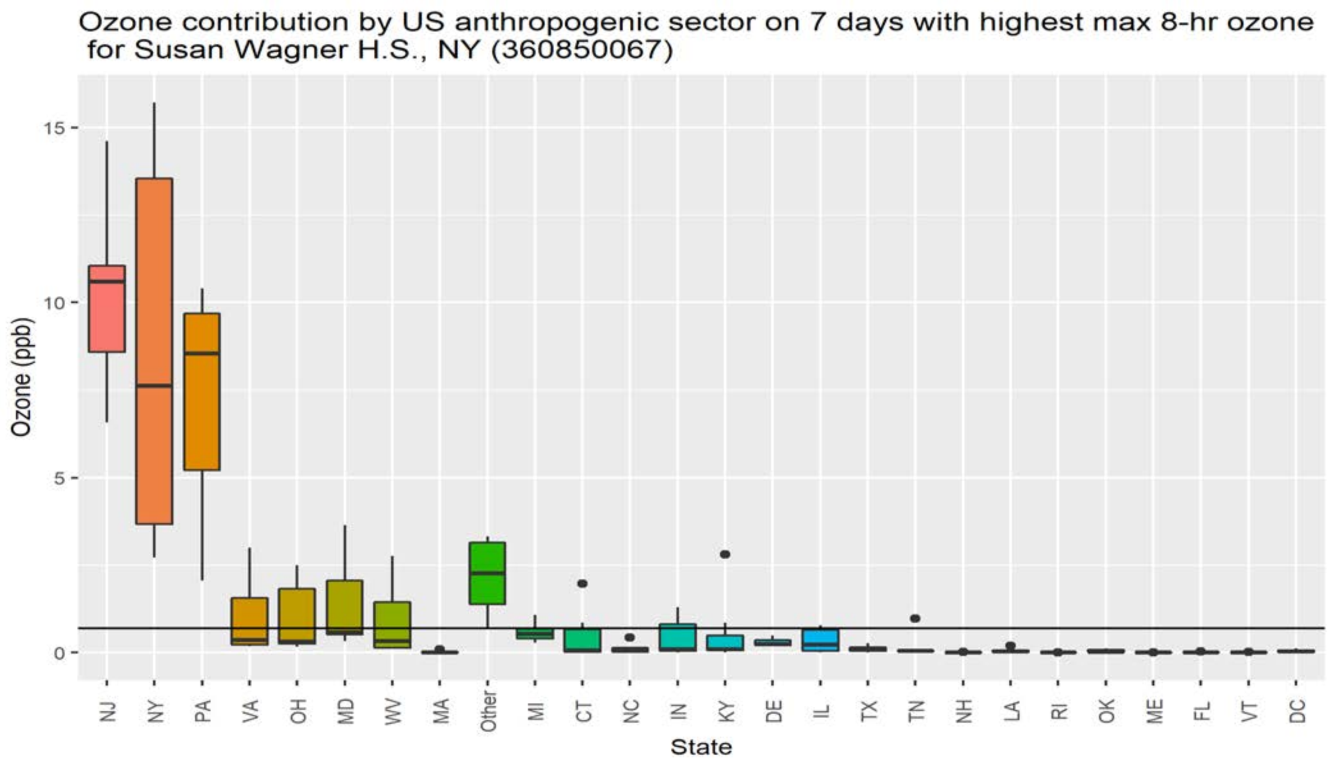
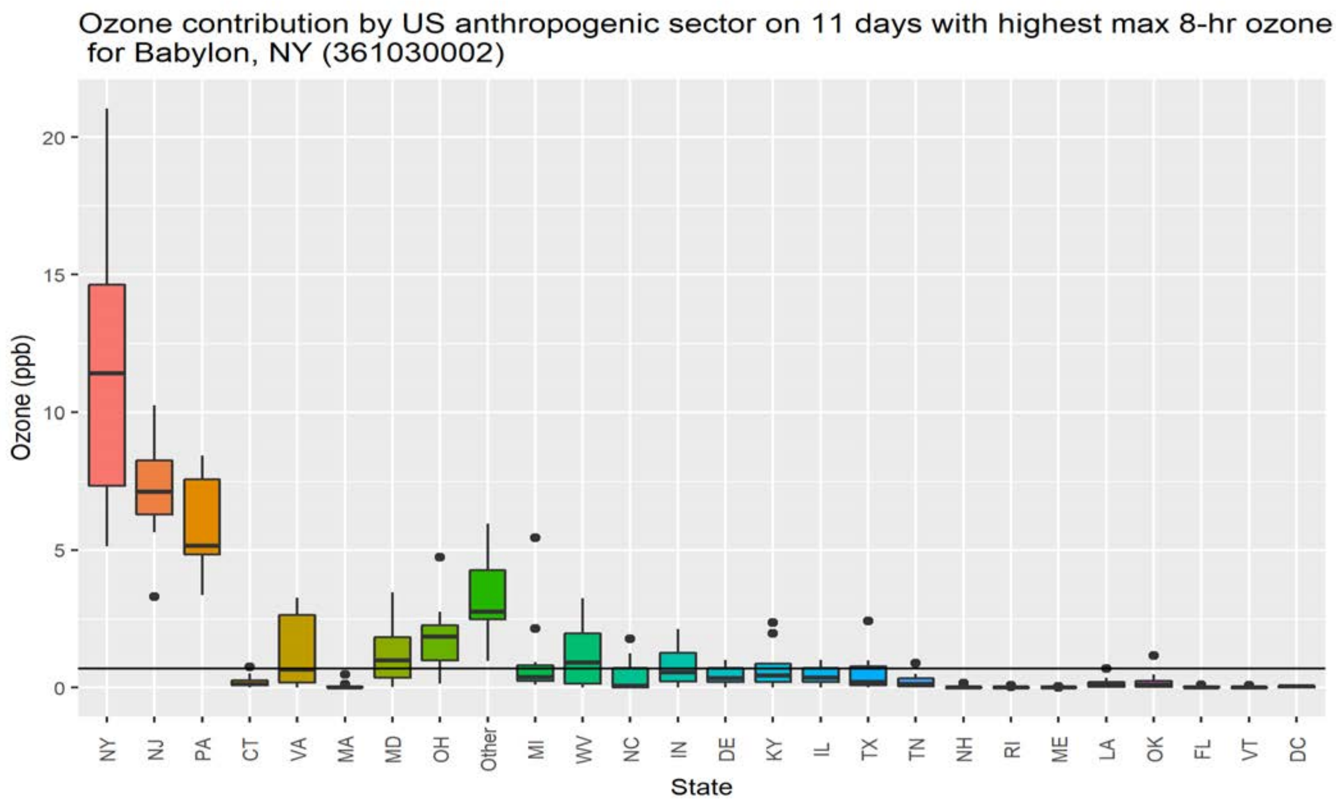
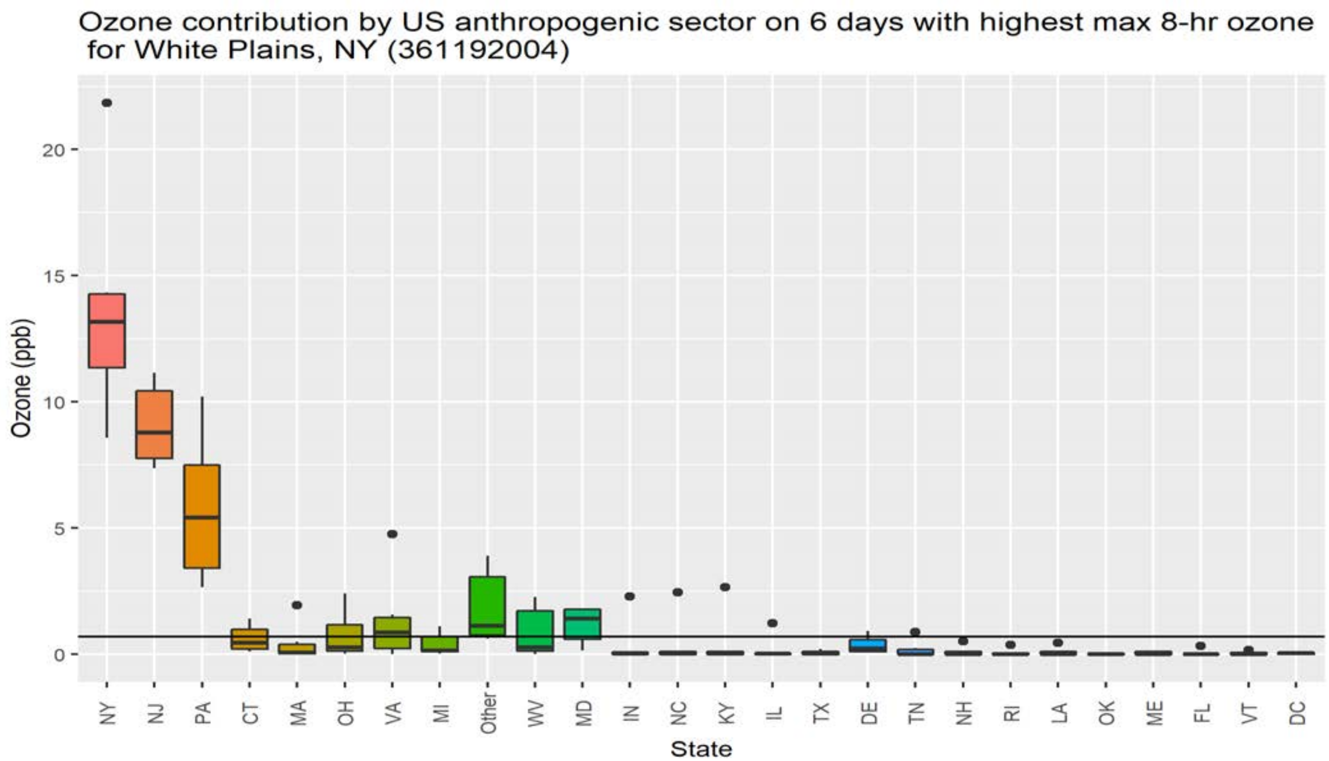


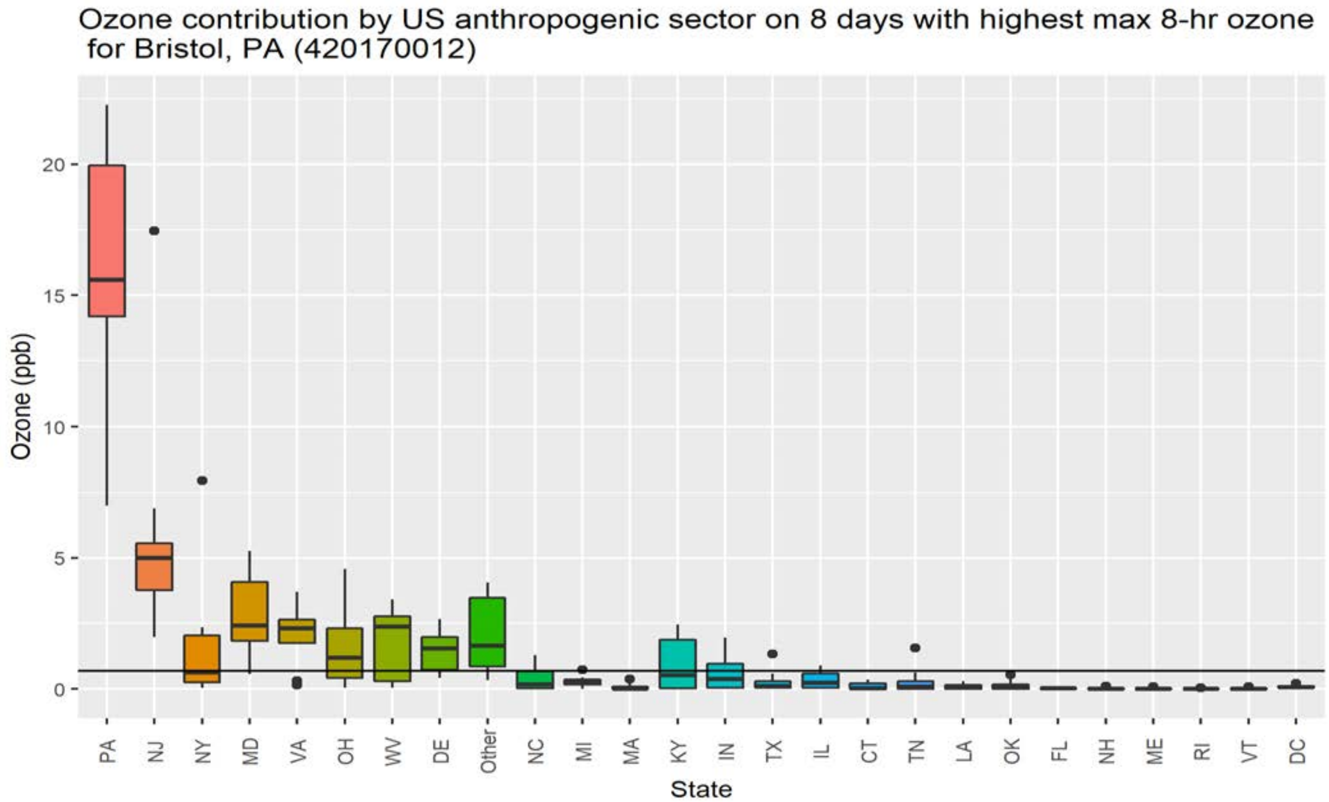

**Figure H-25.** State Contribution on 13 Highest Modeled Ozone Days at Babylon, NY.


Ozone contribution by US anthropogenic sector on 11 days with highest max 8-hr ozone for Babylon, NY (361030002)
Ozone (ppb)
20
15
10
5
0
NY
NJ
PA
CT
VA
MA
MD
OH
Other
MI
WV
NC
IN
DE
KY
IL
TX
TN
NH
RI
ME
LA
OK
FL
VT
DC
State

**Figures H-26**. State Contribution on 13 Highest Modeled Ozone Days at White Plains, NY




**Figures H-27**. State Contribution on 13 Highest Modeled Ozone Days at Bristol, PA




The states listed in **Tables H-1 though H-9** are projected to contribute at least 1% to each of the monitors of concern in 2023 and the top three source categories that make up that contribution.

When it comes to larger point sources, EGUs are often the top contributor and nearly always one of the top three contributors from states that are not adjacent to the state in which the monitor. Every instance of Indiana and Kentucky being a 1% contributor has EGUs as their top category. Most instances of Ohio being a top contributor also have EGU as the top contributor, though two instances have it being the second highest contributor. Unexpectedly EGUs are the third most important contributor from Michigan and Illinois in all cases. With West Virginia, EGUs are often the most important contributor, though for some monitors the Oil & Gas sector is the highest and EGUs second (West Virginia is the only state, in which Oil and Gas is consistently a top three contributor). When it comes to larger states in the OTR (Maryland, New York, Pennsylvania, and Virginia) EGUs often are a top three contributor, though in some instances they are not. In regards, to Non-EGUs they are often a top three contributor from states outside of the OTR (Indiana, Kentucky, Michigan, Ohio, West Virginia) as well as Pennsylvania.

As far as nonpoint stationary sources, they are more often a top three contributor from OTR states, in particular Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Virginia.

Mobile sources are also an important top three contributor. Onroad appears to be a top three contributors more often than nonroad, that non-diesel appears to be a top three contributor more often than diesel, and that mobile in general appears more often in states nearer to the monitor than in further away states.

**Table H-1.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Greenwich Point Park, CT (090010017)

| Rank | CT | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Point - EGUs | Nonpoint | Nonpoint | Nonpoint | Point - EGUs | Nonpoint | Onroad - Non-Diesel | Point - EGUs |
| 2 | Nonroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Nonpoint | Combined - Oil & Gas |
| 3 | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Point - Non-EGUs | Point - EGUs | Point - Non-EGUs |

**Table H-2.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Stratford, CT (090013007)

| Rank | CT | IN | KY | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Point - EGUs | Point - EGUs | Point - EGUs | Point - EGUs | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Point - EGUs | Point - Non-EGUs | Point - Non-EGUs | Onroad - Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Combined - Oil & Gas |
| 3 | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Nonroad - Diesel | Point - EGUs | Point - Non-EGUs | Point - Non-EGUs | Nonpoint | Point - Non-EGUs |

**Table H-3.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Sherwood Island, CT (090019003)

| Rank | CT | IN | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Diesel | Nonpoint | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Combined - Oil & Gas |
| 3 | Nonroad - Non-Diesel | Point - Non-EGUs | Onroad - Non-Diesel | Point - EGUs | Nonroad - Diesel | Onroad - Diesel | Point - Non-EGUs | Onroad - Diesel | Nonpoint | Point - Non-EGUs |

**Table H-4.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Hammonasset S.P., CT (090099002)

| Rank | CT | IL | IN | KY | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonpoint | Nonroad - Diesel | Point - EGUs | Point - EGUs | Point - EGUs | Nonpoint | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Combined - Oil & Gas |
| 2 | Onroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Point - Non-EGUs | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Point - EGUs |
| 3 | Nonroad - Diesel | Point - EGUs | Point - Non-EGUs | Onroad - Non-Diesel | Onroad - Diesel | Point - EGUs | Onroad - Diesel | Onroad - Diesel | Point - Non-EGUs | Point - Non-EGUs | Onroad - Diesel | Point - Non-EGUs |

**Table H-5.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Fort Griswold Park, CT (090110124)

| Rank | CT | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Nonroad - Marine | Nonroad - Non-Diesel | Nonpoint | Nonpoint | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Nonroad - Non-Diesel | Point - EGUs | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonroad - Diesel | Point - EGUs | Nonpoint | Point - EGUs | Combined - Oil & Gas |

| Rank | CT | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|
| 3 | Nonpoint | Onroad - Non-Diesel | Point - EGUs | Nonroad - Marine | Nonroad - Marine | Point - Non-EGUs | Point - Non-EGUs | Nonroad - Non-Diesel | Point - Non-EGUs |

**Table H-6.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Susan Wagner H.S., NY (360850067)

| Rank | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|
| 1 | Point – EGUs | Point - Non-EGUs | Nonpoint | Nonpoint | Point - EGUs | Point - EGUs | Onroad - Non-Diesel | Point - EGUs |
| 2 | Onroad – Diesel | Combined - Oil & Gas | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Nonpoint | Onroad - Diesel | Combined - Oil & Gas |
| 3 | Onroad - Non-Diesel | Point - EGUs | Onroad - Diesel | Nonroad - Non-Diesel | Point - Non-EGUs | Point - Non-EGUs | Nonpoint | Point - Non-EGUs |

**Table H-7.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Babylon, NY (361030002)

| Rank | IN | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Point - EGUs | Point - EGUs | Nonpoint | Nonpoint | Nonpoint | Onroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Combined - Oil & Gas |
| 2 | Point - Non-EGUs | Onroad - Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Point - EGUs | Point - EGUs | Point - EGUs |
| 3 | Onroad - Non-Diesel | Onroad - Non-Diesel | Point – EGUs | Onroad - Diesel | Onroad - Diesel | Point - Non-EGUs | Point - Non-EGUs | Nonpoint | Point - Non-EGUs |

**Table H-8.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at White Plains, NY (361192004)

| Rank | CT | MA | MD | NJ | NY | PA | VA |
|---|---|---|---|---|---|---|---|
| 1 | Onroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Nonpoint | Nonpoint | Nonpoint | Onroad - Non-Diesel |
| 2 | Nonpoint | Nonroad - Non-Diesel | Nonpoint | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Nonpoint |
| 3 | Nonroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Nonroad - Non-Diesel | Nonroad - Non-Diesel | Point - Non-EGUs | Onroad - Diesel |

**Table H-9.** Top 3 Sectors for Each State Which Contributes 1% to Exceedances at Bristol, PA (420170012)

| Rank | DE | IN | KY | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Onroad - Non-Diesel | Point - EGUs | Point - EGUs | Onroad - Diesel | Nonpoint | Onroad - Non-Diesel | Nonpoint | Point - EGUs | Nonpoint | Onroad - Non-Diesel | Point - EGUs |
| 2 | Point - EGUs | Onroad - Non-Diesel | Point - Non-EGUs | Point - EGUs | Onroad - Non-Diesel | Onroad - Diesel | Onroad - Diesel | Onroad - Non-Diesel | Onroad - Non-Diesel | Point - EGUs | Combined - Oil & Gas |

| Rank | DE | IN | KY | MD | MI | NJ | NY | OH | PA | VA | WV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Point - Non-EGUs | Point - Non-EGUs | Onroad - Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Nonroad - Diesel | Onroad - Non-Diesel | Point - Non-EGUs | Onroad - Diesel | Onroad - Diesel | Point - Non-EGUs |

Another way to examine which sectors from which states are projected to contribute to nonattainment in 2023 is to look individually at each exceedance day. **Figures H-28 though H-36** shows which sector is projected to impact nonattainment the most on a day that was projected to exceed the 1% threshold. It should be noted that these charts do include all modeled states even if they did not contribute on any exceedance days and states that did not contribute to enough exceedances to warrant a linkage in the next section.

**Figure H-28.** Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Greenwich

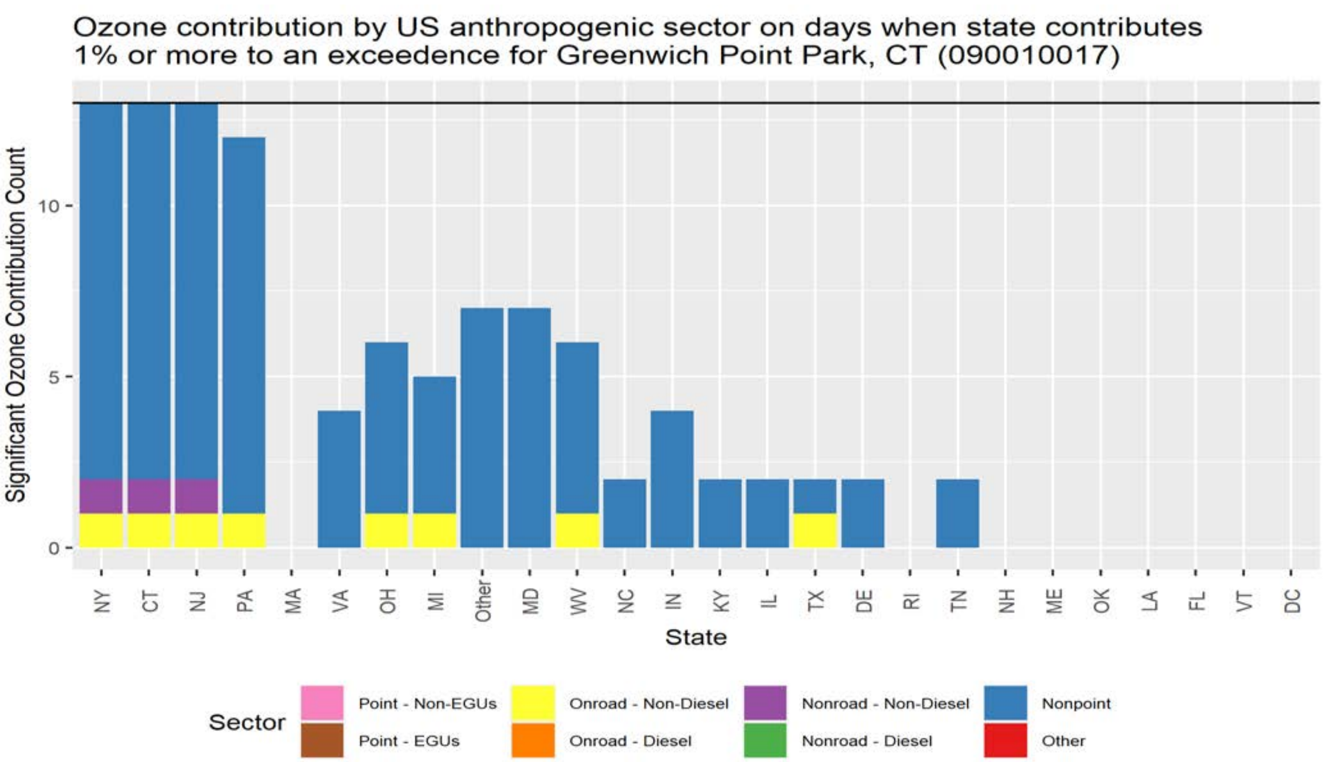


**Figure H-29**. Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Stratford, CT.

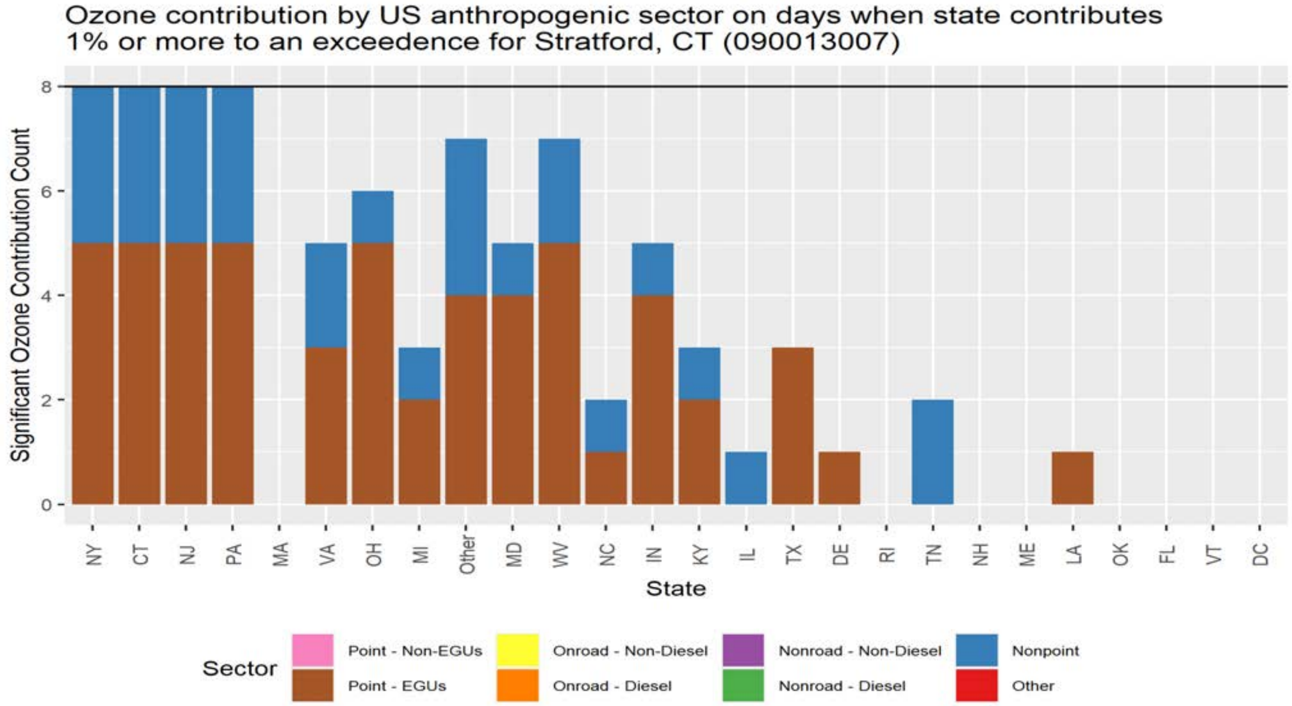



**Figure H-30**. Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Westport, CT.

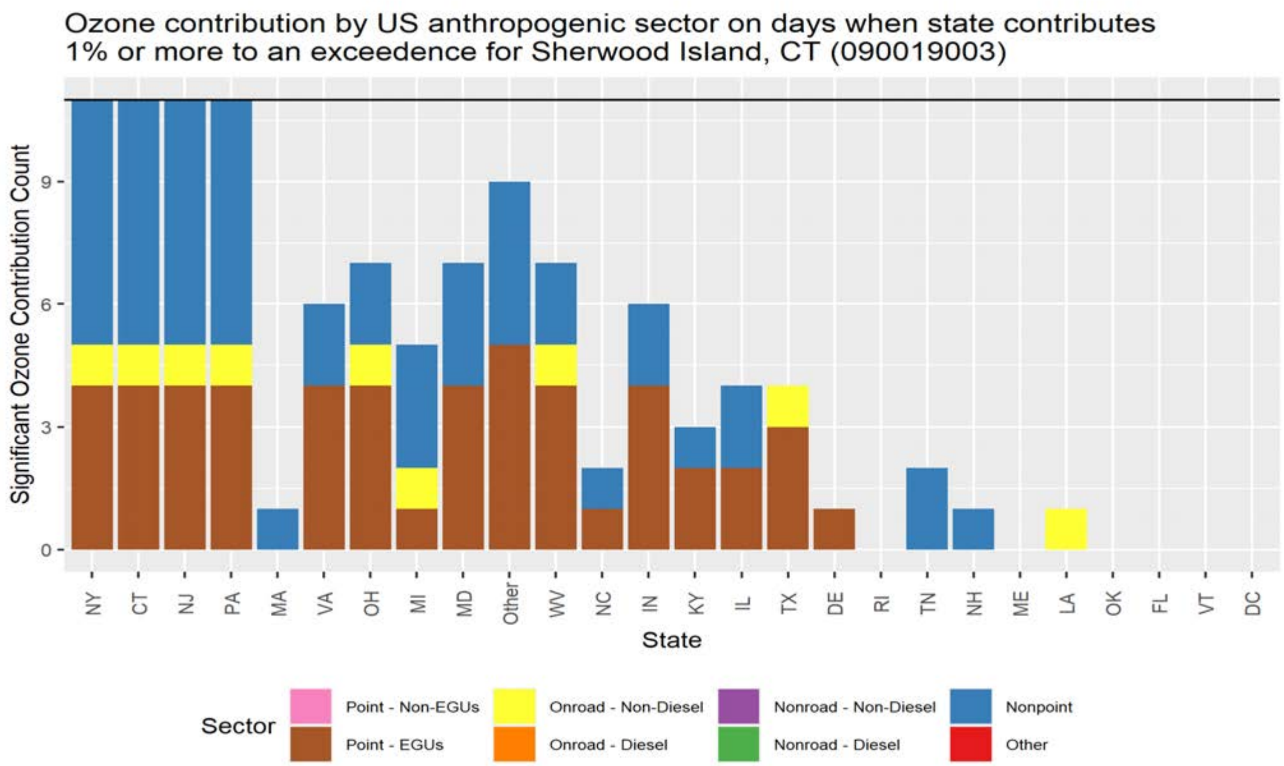



**Figure H-31.** Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Madison, CT

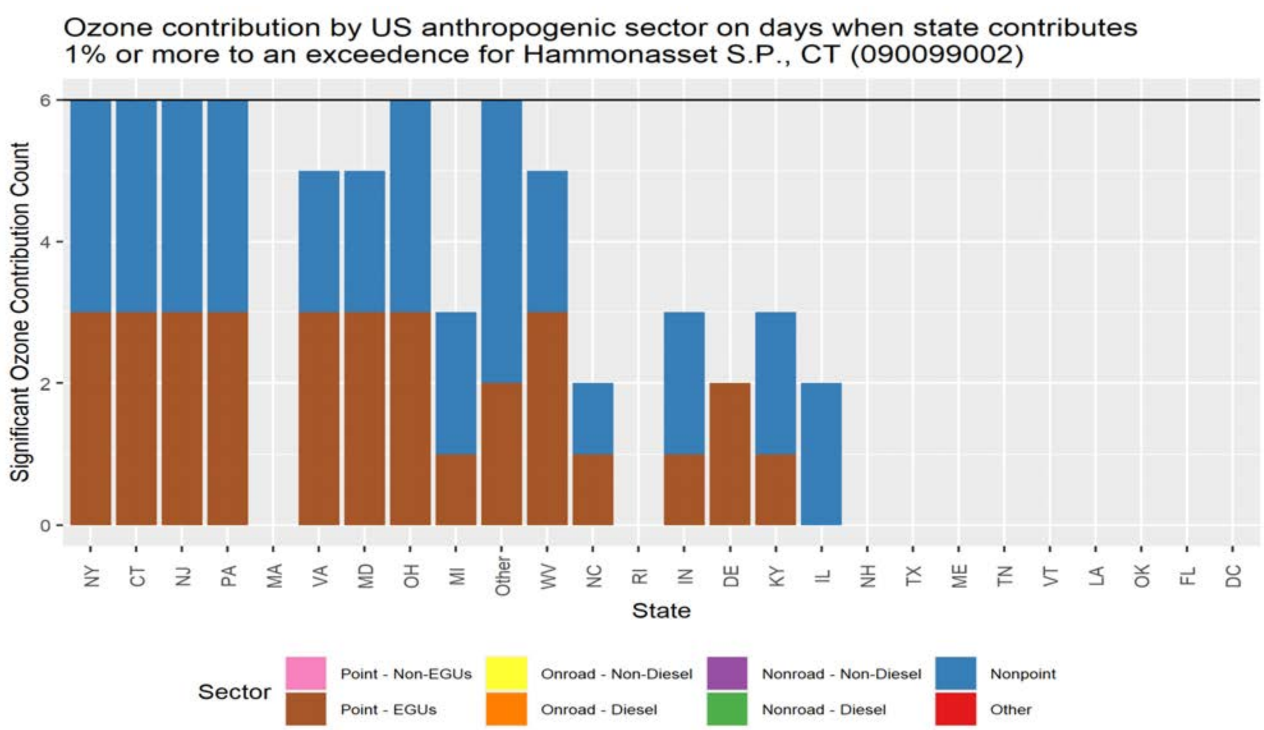



**Figure H-32.** Anthropogenic Emission Sector Contribution for States with >1% contribution of the

Ozone NAAQS at Groton, CT.

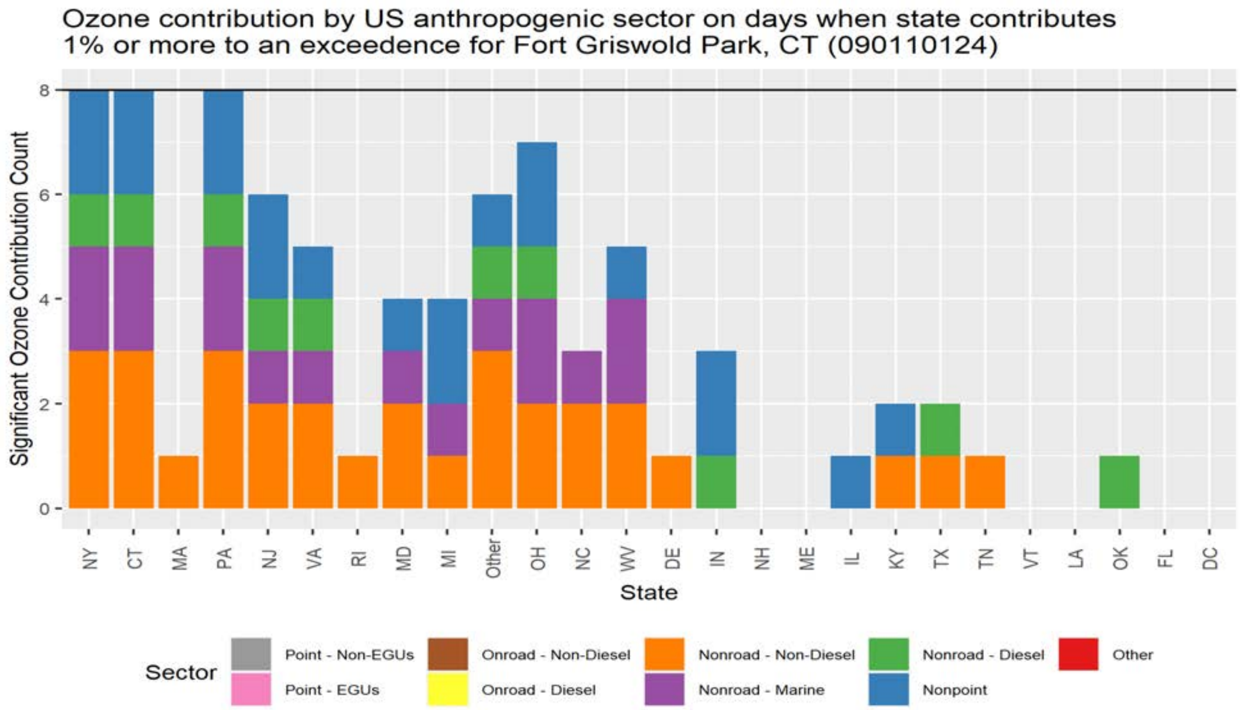



**Figure H-34.** Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Susan Wagner H.S.

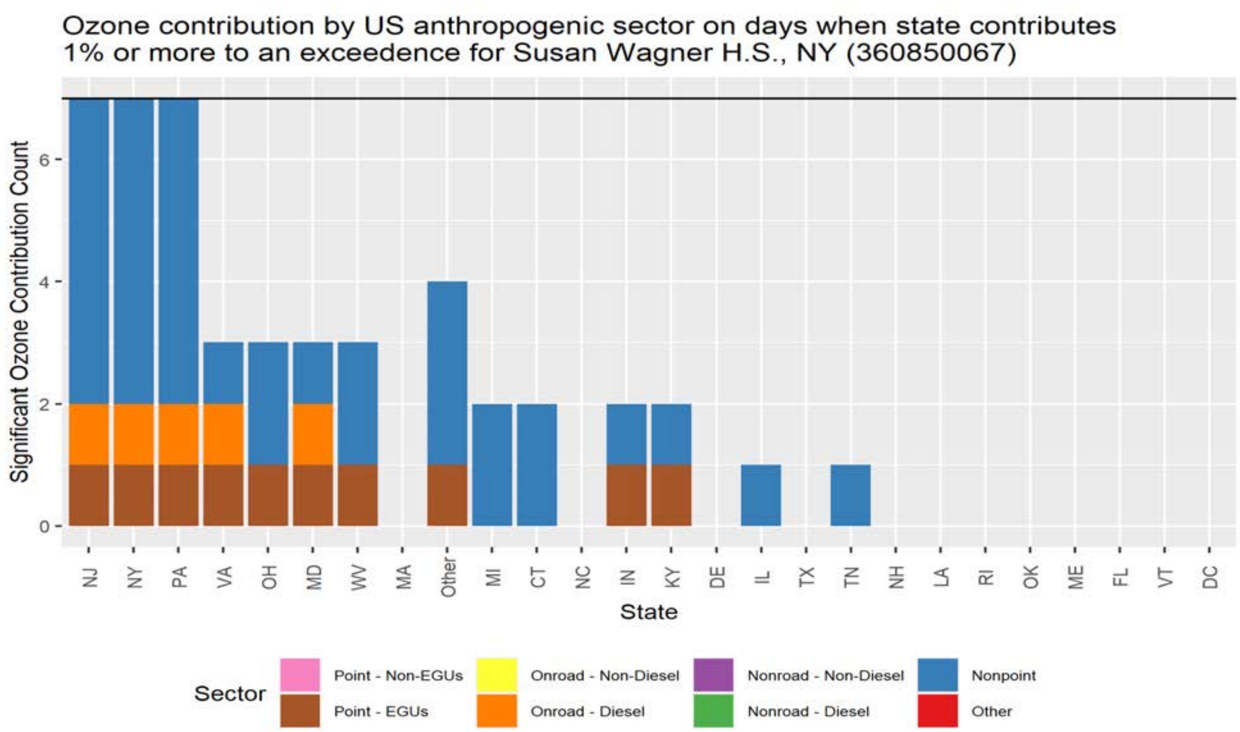


**Figure H-35.** Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Babylon, NY.

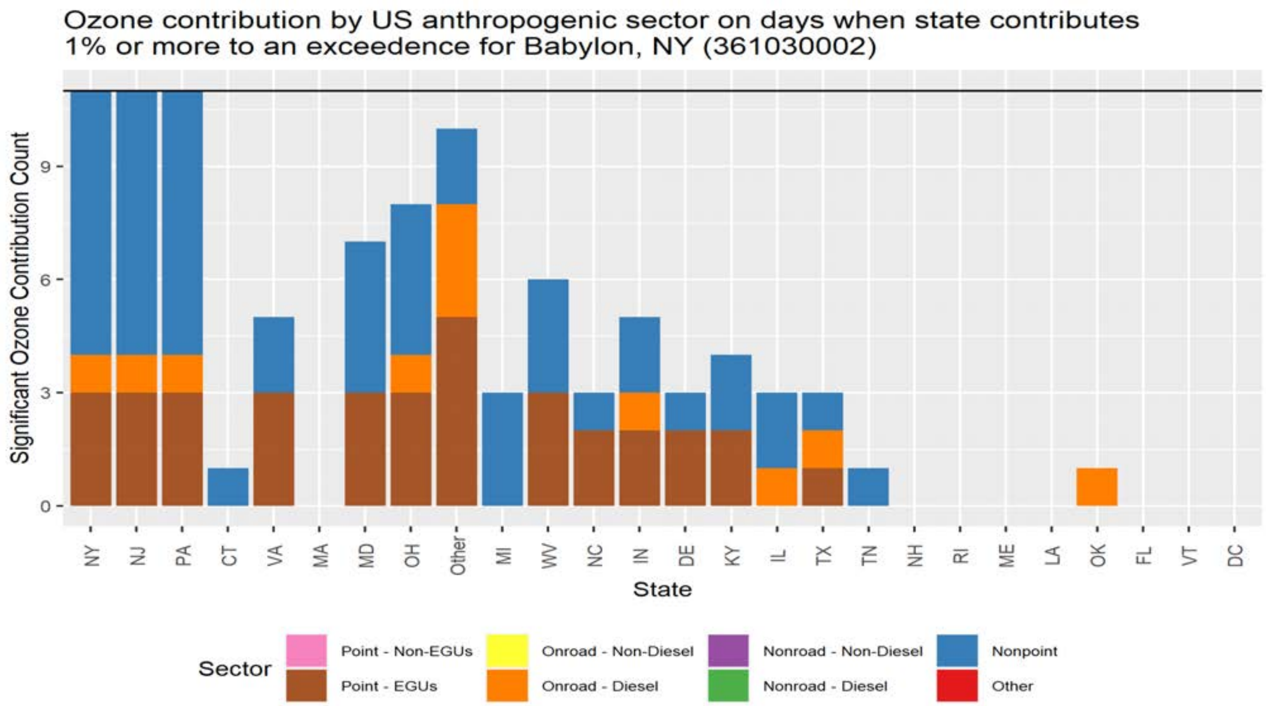



**Figure H-36**. Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at White Plains, NY

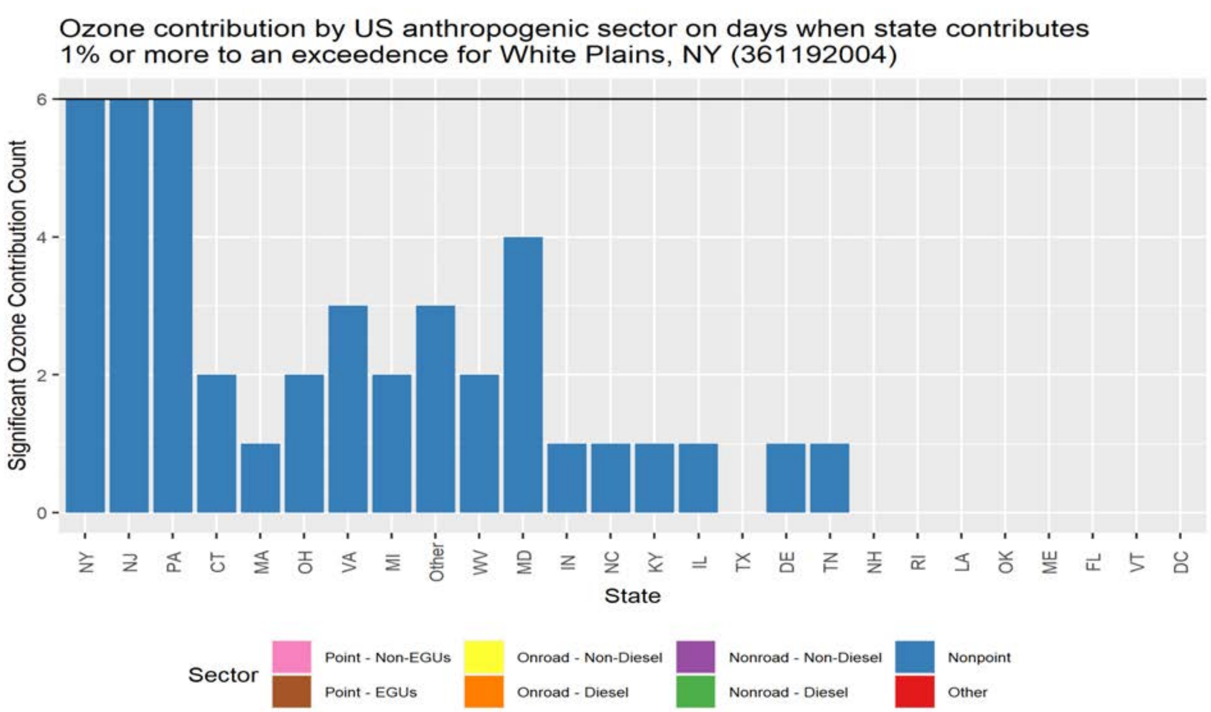
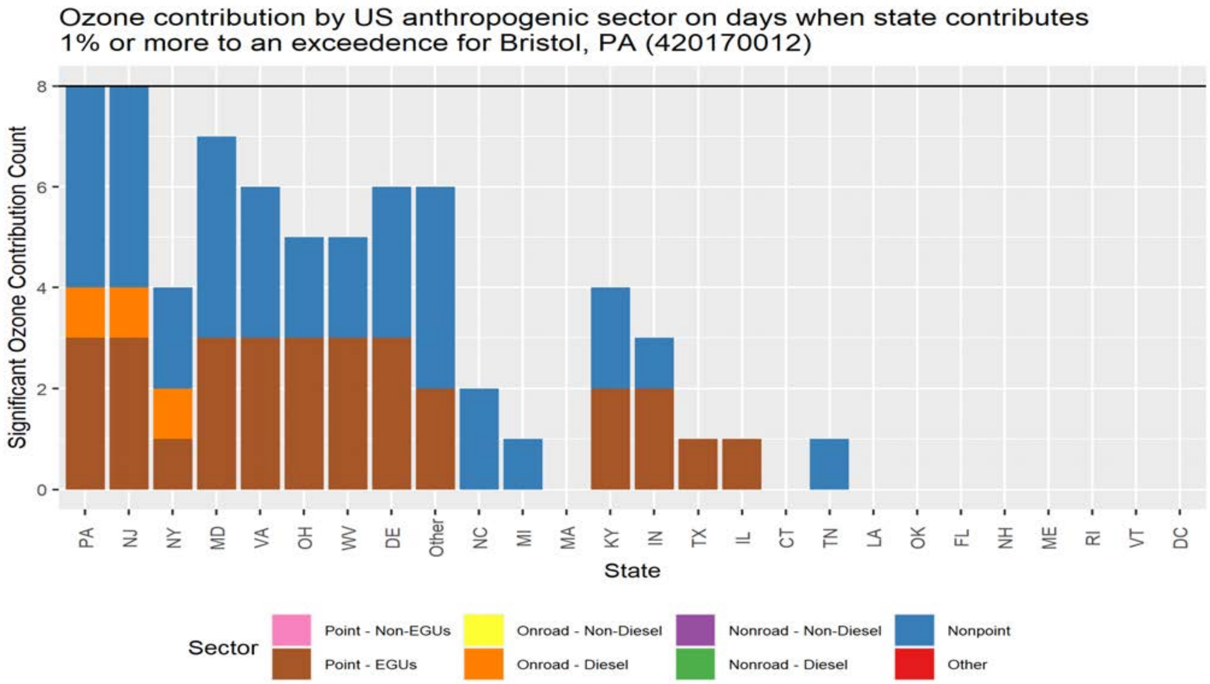


**Figure H-37**. Anthropogenic Emission Sector Contribution for States with >1% contribution of the Ozone NAAQS at Bristol, NY



# Additional Modeling Detail for Select Monitors

| | | CT: Greenwich Point Park (090010017) | | | | CT: Stratford (090013007) | | | | CT: Sherwood Island (090019003) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Sector | Sub Sector | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| EGUs | EGUs | 4.2 | 5.2 % | 5.2 | 5.7 % | 6.8 | 8.7 % | 7.4 | 9 % | 5.3 | 6.8 % | 6.5 | 7.8 % |
| EGUs | Peakers | 0.5 | 0.6 % | 0.5 | 0.6 % | 0.6 | 0.7 % | 0.6 | 0.7 % | 0.5 | 0.7 % | 0.5 | 0.6 % |
| Non-EGUs | Non-EGUs | 2.7 | 3.3 % | 3.2 | 3.6 % | 3.4 | 4.4 % | 3.6 | 4.4 % | 3.1 | 4 % | 3.6 | 4.2 % |
| Nonpoint | Nonpoint | 8.7 | 10.7 % | 10.5 | 11.6 % | 6.7 | 8.6 % | 6.6 | 8.1 % | 7.4 | 9.5 % | 7.8 | 9.3 % |
| Nonpoint | RWC | 0 | 0 % | 0 | 0.1 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Onroad | Diesel | 4.2 | 5.2 % | 5.3 | 5.9 % | 4.6 | 5.9 % | 5 | 6.1 % | 4.6 | 5.9 % | 5.3 | 6.3 % |
| Onroad | Non-Diesel | 6.1 | 7.5 % | 7.1 | 7.9 % | 5.8 | 7.5 % | 5.9 | 7.3 % | 5.7 | 7.3 % | 6 | 7.2 % |
| Nonroad | Airport | 0.9 | 1.1 % | 1.1 | 1.3 % | 1.1 | 1.4 % | 1.1 | 1.3 % | 1 | 1.3 % | 1.2 | 1.4 % |
| Nonroad | Diesel | 4 | 4.9 % | 4.9 | 5.4 % | 4.1 | 5.3 % | 4.5 | 5.5 % | 3.8 | 4.9 % | 4.5 | 5.3 % |
| Nonroad | Marine | 1.5 | 1.8 % | 1.9 | 2.1 % | 1.6 | 2 % | 1.6 | 2 % | 1.3 | 1.7 % | 1.6 | 1.9 % |
| Nonroad | Marine Offshore C3 | 0.4 | 0.5 % | 0.6 | 0.7 % | 0.6 | 0.8 % | 0.5 | 0.6 % | 0.5 | 0.6 % | 0.7 | 0.8 % |
| Nonroad | Non-Diesel | 5.1 | 6.3 % | 5.8 | 6.4 % | 3.6 | 4.6 % | 3.8 | 4.6 % | 3.5 | 4.5 % | 3.9 | 4.6 % |
| Nonroad | Rail | 1.3 | 1.6 % | 1.5 | 1.7 % | 1.6 | 2 % | 1.7 | 2 % | 1.4 | 1.8 % | 1.5 | 1.8 % |
| Oil & Gas | Combined - Oil & Gas | 1.6 | 2 % | 2 | 2.2 % | 2.2 | 2.8 % | 2.6 | 3.2 % | 1.9 | 2.4 % | 2.2 | 2.6 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 1.9 | 2.4 % | 2.8 | 3.1 % | 1.8 | 2.3 % | 2.8 | 3.5 % | 2 | 2.6 % | 1 | 1.1 % |
| International | Mexico | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| Biogenic | Biogenic | 13.9 | 17.1 % | 16.5 | 18.3 % | 10.6 | 13.6 % | 11.7 | 14.3 % | 10.3 | 13.2 % | 12.9 | 15.4 % |
| BC/IC | Boundary | 24 | 29.5 % | 20.7 | 23 % | 22.5 | 28.9 % | 21.8 | 26.8 % | 25.1 | 32.3 % | 24.3 | 28.9 % |
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.3 | 0.3 % | 0.3 | 0.3 % | 0.3 | 0.4 % |

| | | CT: Hammonasset S.P. (090099002) | | | | CT: Fort Griswold Park (090110124) | | | | DE: Bellevue S.P. (100031013) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Sector | Sub Sector | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| EGUs | EGUs | 5.9 | 7.7 % | 5 | 6.5 % | 4.4 | 6 % | 3.4 | 4.5 % | 10.1 | 13.9 % | 7 | 10 % |
| EGUs | Peakers | 0.5 | 0.6 % | 0.4 | 0.5 % | 0.4 | 0.5 % | 0.3 | 0.4 % | 1.2 | 1.6 % | 0.7 | 1 % |
| Non-EGUs | Non-EGUs | 3.3 | 4.3 % | 3.2 | 4.1 % | 2.9 | 3.9 % | 2.3 | 3.1 % | 4.8 | 6.6 % | 3.9 | 5.6 % |
| Nonpoint | Nonpoint | 6.4 | 8.5 % | 7.4 | 9.5 % | 5.2 | 7 % | 4.8 | 6.4 % | 3.1 | 4.3 % | 4.1 | 5.7 % |
| Nonpoint | RWC | 0 | 0 % | 0 | 0.1 % | 0 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % |
| Onroad | Diesel | 4.4 | 5.8 % | 4.5 | 5.8 % | 3.3 | 4.4 % | 2.9 | 3.9 % | 6 | 8.2 % | 4.6 | 6.6 % |
| Onroad | Non-Diesel | 5.4 | 7.2 % | 5.4 | 7 % | 4.5 | 6.1 % | 4.1 | 5.4 % | 6.2 | 8.6 % | 5.2 | 7.3 % |
| Nonroad | Airport | 0.9 | 1.1 % | 0.7 | 1 % | 0.6 | 0.8 % | 0.4 | 0.6 % | 0.9 | 1.2 % | 0.7 | 1 % |
| Nonroad | Diesel | 3.9 | 5.1 % | 3.5 | 4.5 % | 4.5 | 6.1 % | 4 | 5.3 % | 4.2 | 5.7 % | 3.4 | 4.8 % |
| Nonroad | Marine | 1.8 | 2.4 % | 1.6 | 2 % | 4.2 | 5.6 % | 4.4 | 5.9 % | 1.7 | 2.3 % | 1.4 | 2 % |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nonroad | Marine Offshore C3 | 0.8 | 1 % | 0.6 | 0.7 % | 0.8 | 1.1 % | 0.6 | 0.8 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| Nonroad | Non-Diesel | 3.1 | 4.1 % | 2.5 | 3.2 % | 6.2 | 8.4 % | 5.7 | 7.7 % | 2.6 | 3.5 % | 2.3 | 3.3 % |
| Nonroad | Rail | 1.5 | 2 % | 1.5 | 1.9 % | 1.5 | 2 % | 1.2 | 1.5 % | 1.7 | 2.4 % | 1.3 | 1.9 % |
| Oil & Gas | Combined - Oil & Gas | 2.1 | 2.8 % | 2.2 | 2.8 % | 1.6 | 2.2 % | 1.3 | 1.8 % | 3.6 | 5 % | 2.2 | 3.1 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 1.5 | 2 % | 1.9 | 2.5 % | 2.4 | 3.2 % | 4.2 | 5.7 % | 0.4 | 0.5 % | 1.2 | 1.7 % |
| International | Mexico | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| Biogenic | Biogenic | 9.6 | 12.6 % | 10.3 | 13.3 % | 13.4 | 18.1 % | 12.5 | 16.7 % | 8.4 | 11.6 % | 8.9 | 12.6 % |
| BC/IC | Boundary | 24.5 | 32.3 % | 26.4 | 34 % | 17.8 | 24.1 % | 22.4 | 30 % | 17.4 | 23.9 % | 23.3 | 33 % |
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.3 | 0.4 % | 0.4 | 0.5 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.2 | 0.2 % |

| | | DC: McMillan Reservoir (110010043) | | | | ME: Cadillac Mountain (230090102) | | | | MD: Fair Hill (240150003) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| **Sector** | **Sub Sector** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| EGUs | EGUs | 5.2 | 7.3 % | 4.6 | 6.4 % | NA | NA % | 4.2 | 7.7 % | 8 | 11.3 % | 6.4 | 9.3 % |
| EGUs | Peakers | 0.3 | 0.4 % | 0.2 | 0.3 % | NA | NA % | 0.5 | 0.9 % | 1.1 | 1.6 % | 0.8 | 1.1 % |
| Non-EGUs | Non-EGUs | 2.7 | 3.7 % | 2.6 | 3.6 % | NA | NA % | 2.9 | 5.4 % | 3.7 | 5.3 % | 3.6 | 5.2 % |
| Nonpoint | Nonpoint | 5 | 7 % | 5.8 | 8 % | NA | NA % | 3.8 | 7 % | 2.6 | 3.6 % | 5 | 7.2 % |
| Nonpoint | RWC | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Onroad | Diesel | 5.3 | 7.3 % | 5.8 | 8.1 % | NA | NA % | 4.2 | 7.7 % | 6.3 | 8.9 % | 4.9 | 7.2 % |
| Onroad | Non-Diesel | 6.9 | 9.5 % | 7.1 | 9.8 % | NA | NA % | 3.8 | 7 % | 5.9 | 8.3 % | 5.3 | 7.7 % |
| Nonroad | Airport | 1.8 | 2.6 % | 1.9 | 2.6 % | NA | NA % | 0.8 | 1.5 % | 0.9 | 1.3 % | 0.8 | 1.1 % |
| Nonroad | Diesel | 4.5 | 6.2 % | 4.9 | 6.7 % | NA | NA % | 3.1 | 5.8 % | 3.9 | 5.5 % | 3.3 | 4.9 % |
| Nonroad | Marine | 1.1 | 1.5 % | 1.4 | 1.9 % | NA | NA % | 2.4 | 4.4 % | 1.5 | 2.1 % | 1.4 | 2 % |
| Nonroad | Marine Offshore C3 | 0.3 | 0.4 % | 0.4 | 0.6 % | NA | NA % | 1.4 | 2.6 % | 0.1 | 0.2 % | 0.1 | 0.2 % |
| Nonroad | Non-Diesel | 2.7 | 3.8 % | 3 | 4.2 % | NA | NA % | 2.3 | 4.2 % | 2 | 2.8 % | 2.5 | 3.6 % |
| Nonroad | Rail | 1.4 | 1.9 % | 1.3 | 1.8 % | NA | NA % | 1.2 | 2.1 % | 1.6 | 2.2 % | 1.3 | 1.9 % |
| Oil & Gas | Combined - Oil & Gas | 2.4 | 3.3 % | 2 | 2.7 % | NA | NA % | 1 | 1.9 % | 2.9 | 4.2 % | 2.1 | 3 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 0.9 | 1.3 % | 1.2 | 1.7 % | NA | NA % | 1.2 | 2.2 % | 0.4 | 0.6 % | 1.2 | 1.7 % |
| International | Mexico | 0 | 0.1 % | 0 | 0 % | NA | NA % | 0 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| Biogenic | Biogenic | 7.6 | 10.6 % | 7.8 | 10.7 % | NA | NA % | 5.4 | 9.9 % | 6.7 | 9.5 % | 9.2 | 13.3 % |
| BC/IC | Boundary | 23.5 | 32.8 % | 22.2 | 30.6 % | NA | NA % | 16 | 29.5 % | 22.6 | 32.1 % | 20.8 | 30.3 % |
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.1 | 0.2 % | 0.1 | 0.1 % | NA | NA % | 0.1 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.2 % |

| | | MD: Edgewood (240251001) | | | | MD: Beltsville (240339991) | | | | MD: P.G. Equestrian Ctr (240338003) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Sector | Sub Sector | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| EGUs | EGUs | 6.3 | 8.6 % | 7.8 | 10.4 % | 5.2 | 7.2 % | 5.2 | 7.2 % | 6.7 | 9.4 % | 5.8 | 8.1 % |
| EGUs | Peakers | 0.9 | 1.2 % | 1.1 | 1.5 % | 0.7 | 0.9 % | 0.7 | 0.9 % | 0.5 | 0.7 % | 0.4 | 0.6 % |
| Non-EGUs | Non-EGUs | 4 | 5.5 % | 4.4 | 5.8 % | 3.1 | 4.3 % | 3.1 | 4.3 % | 4.1 | 5.7 % | 3.5 | 5 % |
| Nonpoint | Nonpoint | 5.3 | 7.2 % | 4.3 | 5.7 % | 5.1 | 7 % | 5.1 | 7 % | 4.5 | 6.3 % | 5.8 | 8.2 % |
| Nonpoint | RWC | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Onroad | Diesel | 6.1 | 8.3 % | 6.6 | 8.8 % | 6.9 | 9.5 % | 6.9 | 9.5 % | 6.8 | 9.5 % | 6.5 | 9.2 % |
| Onroad | Non-Diesel | 6.3 | 8.6 % | 6.8 | 9.1 % | 6.8 | 9.4 % | 6.8 | 9.4 % | 6.9 | 9.7 % | 6.9 | 9.8 % |
| Nonroad | Airport | 1.3 | 1.7 % | 1.4 | 1.8 % | 1.4 | 2 % | 1.4 | 2 % | 1.4 | 2 % | 1.4 | 2 % |
| Nonroad | Diesel | 3.4 | 4.6 % | 3.7 | 4.9 % | 4.8 | 6.6 % | 4.8 | 6.6 % | 4.5 | 6.3 % | 4.2 | 5.9 % |
| Nonroad | Marine | 2.1 | 2.9 % | 2 | 2.7 % | 0.9 | 1.3 % | 0.9 | 1.3 % | 0.9 | 1.3 % | 1.2 | 1.7 % |
| Nonroad | Marine Offshore C3 | 0.1 | 0.2 % | 0.1 | 0.1 % | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.1 | 0.1 % | 0.2 | 0.3 % |
| Nonroad | Non-Diesel | 2.2 | 3 % | 2.3 | 3.1 % | 2.6 | 3.6 % | 2.6 | 3.6 % | 2.4 | 3.4 % | 2.5 | 3.5 % |
| Nonroad | Rail | 1.6 | 2.1 % | 1.7 | 2.3 % | 1.4 | 2 % | 1.4 | 2 % | 1.8 | 2.5 % | 1.6 | 2.3 % |
| Oil & Gas | Combined - Oil & Gas | 2.6 | 3.5 % | 3.4 | 4.5 % | 1.7 | 2.4 % | 1.7 | 2.4 % | 3.3 | 4.7 % | 2.6 | 3.7 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 0.6 | 0.9 % | 0.3 | 0.4 % | 1.3 | 1.7 % | 1.3 | 1.7 % | 0.4 | 0.5 % | 0.5 | 0.7 % |
| International | Mexico | 0.1 | 0.1 % | 0.1 | 0.2 % | 0 | 0.1 % | 0 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| Biogenic | Biogenic | 9.3 | 12.7 % | 9.3 | 12.4 % | 6.6 | 9.1 % | 6.6 | 9.1 % | 8.5 | 12 % | 8.7 | 12.4 % |
| BC/IC | Boundary | 21.1 | 28.6 % | 19.2 | 25.6 % | 23.5 | 32.5 % | 23.5 | 32.5 % | 18 | 25.3 % | 18.5 | 26.2 % |
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.2 | 0.3 % | 0.2 | 0.2 % |

| | | MA: Martha's Vineyard (250070001) | | | | NH: Mt. Washington Summit (330074001) | | | | NJ: Ancora St. Hospital (340071001) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Sector | Sub Sector | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| EGUs | EGUs | 2.4 | 3.2 % | 3.2 | 4.5 % | NA | NA % | 2.1 | 4.2 % | 3.8 | 5.2 % | 4.9 | 7 % |
| EGUs | Peakers | 0.2 | 0.2 % | 0.2 | 0.3 % | NA | NA % | 0.2 | 0.4 % | 0.2 | 0.3 % | 0.4 | 0.5 % |
| Non-EGUs | Non-EGUs | 3 | 3.9 % | 2.8 | 3.9 % | NA | NA % | 1.9 | 3.7 % | 4 | 5.6 % | 3.9 | 5.6 % |
| Nonpoint | Nonpoint | 7.4 | 9.7 % | 5.5 | 7.6 % | NA | NA % | 2.9 | 5.7 % | 10.4 | 14.4 % | 7.1 | 10.1 % |
| Nonpoint | RWC | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0 | 0.1 % | 0 | 0.1 % | 0 | 0 % |
| Onroad | Diesel | 2.9 | 3.8 % | 3.2 | 4.5 % | NA | NA % | 1.9 | 3.8 % | 4.3 | 5.9 % | 5 | 7.2 % |
| Onroad | Non-Diesel | 3.9 | 5.1 % | 4 | 5.6 % | NA | NA % | 2.8 | 5.4 % | 5.4 | 7.5 % | 5.3 | 7.6 % |
| Nonroad | Airport | 0.6 | 0.8 % | 0.7 | 1 % | NA | NA % | 0.3 | 0.7 % | 0.9 | 1.2 % | 1.1 | 1.6 % |
| Nonroad | Diesel | 5.3 | 7 % | 5.3 | 7.4 % | NA | NA % | 2 | 3.9 % | 3.1 | 4.3 % | 4.2 | 6 % |
| Nonroad | Marine | 2.9 | 3.8 % | 3 | 4.1 % | NA | NA % | 0.5 | 0.9 % | 1.4 | 1.9 % | 1.3 | 1.8 % |
| Nonroad | Marine Offshore C3 | 0.8 | 1 % | 1.4 | 2 % | NA | NA % | 0.1 | 0.2 % | 0.4 | 0.5 % | 0.2 | 0.3 % |
| Nonroad | Non-Diesel | 8.8 | 11.5 % | 7.8 | 10.7 % | NA | NA % | 1.5 | 2.9 % | 2.3 | 3.2 % | 2.7 | 3.9 % |
| Nonroad | Rail | 1 | 1.2 % | 1.1 | 1.6 % | NA | NA % | 0.8 | 1.6 % | 0.9 | 1.3 % | 1.2 | 1.7 % |
| Oil & Gas | Combined - Oil & Gas | 0.7 | 0.9 % | 1 | 1.4 % | NA | NA % | 1.2 | 2.3 % | 0.6 | 0.8 % | 1.3 | 1.9 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 2.8 | 3.7 % | 2.3 | 3.1 % | NA | NA % | 2.1 | 4.2 % | 1.2 | 1.7 % | 1.4 | 2 % |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| International | Mexico | 0 | 0 % | 0 | 0 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % |
| Biogenic | Biogenic | 10.7 | 14.1 % | 9.7 | 13.5 % | NA | NA % | 3.7 | 7.2 % | 10.3 | 14.2 % | 9.7 | 13.9 % |
| BC/IC | Boundary | 22.6 | 29.6 % | 20.5 | 28.4 % | NA | NA % | 27 | 52.5 % | 22.8 | 31.6 % | 20 | 28.6 % |
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.3 | 0.4 % | 0.2 | 0.3 % | NA | NA % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0.1 | 0.1 % |

| | | NJ: Collier's Mill (340290006) | | | | NJ: Clarksboro (340150002) | | | | NY: Susan Wagner H.S. (360850067) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| **Sector** | **Sub Sector** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| EGUs | EGUs | 5 | 7 % | 4.3 | 5.9 % | 7.8 | 11 % | 7.8 | 11 % | 4.9 | 6.7 % | 6 | 8 % |
| EGUs | Peakers | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.8 | 1.1 % | 0.8 | 1.1 % | 0.4 | 0.5 % | 0.4 | 0.5 % |
| Non-EGUs | Non-EGUs | 3.4 | 4.8 % | 3.1 | 4.3 % | 4.6 | 6.5 % | 4.6 | 6.5 % | 3 | 4.1 % | 3.4 | 4.5 % |
| Nonpoint | Nonpoint | 7.2 | 10 % | 8.1 | 11.2 % | 4.3 | 6 % | 4.3 | 6 % | 6.6 | 9 % | 6.3 | 8.4 % |
| Nonpoint | RWC | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Onroad | Diesel | 4.5 | 6.2 % | 4.7 | 6.5 % | 5.3 | 7.5 % | 5.3 | 7.5 % | 4.2 | 5.8 % | 4.7 | 6.3 % |
| Onroad | Non-Diesel | 5.3 | 7.3 % | 5.3 | 7.4 % | 5.5 | 7.8 % | 5.5 | 7.8 % | 4.7 | 6.5 % | 5.3 | 7 % |
| Nonroad | Airport | 1.2 | 1.6 % | 1.1 | 1.5 % | 1 | 1.5 % | 1 | 1.5 % | 0.9 | 1.2 % | 0.8 | 1.1 % |
| Nonroad | Diesel | 3.5 | 4.9 % | 3.6 | 4.9 % | 4.3 | 6 % | 4.3 | 6 % | 3.3 | 4.5 % | 3.5 | 4.7 % |
| Nonroad | Marine | 1.1 | 1.6 % | 1.1 | 1.5 % | 1.7 | 2.4 % | 1.7 | 2.4 % | 1.6 | 2.2 % | 1.7 | 2.2 % |
| Nonroad | Marine Offshore C3 | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.1 | 0.2 % | 0.1 | 0.2 % | 0.4 | 0.6 % | 0.4 | 0.6 % |
| Nonroad | Non-Diesel | 2.4 | 3.3 % | 2.3 | 3.2 % | 2.6 | 3.6 % | 2.6 | 3.6 % | 3 | 4.1 % | 3 | 4 % |
| Nonroad | Rail | 1.2 | 1.6 % | 1.1 | 1.6 % | 1.5 | 2.1 % | 1.5 | 2.1 % | 1.3 | 1.8 % | 1.4 | 1.9 % |
| Oil & Gas | Combined - Oil & Gas | 1.6 | 2.3 % | 1.6 | 2.2 % | 2.5 | 3.6 % | 2.5 | 3.6 % | 1.5 | 2.1 % | 1.7 | 2.3 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 1.4 | 1.9 % | 1.8 | 2.5 % | 0.9 | 1.3 % | 0.9 | 1.3 % | 2 | 2.7 % | 1.7 | 2.2 % |
| International | Mexico | 0 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % |
| Biogenic | Biogenic | 7.9 | 11 % | 8.4 | 11.6 % | 9.3 | 13.2 % | 9.3 | 13.2 % | 10.3 | 14.1 % | 9.2 | 12.3 % |
| BC/IC | Boundary | 25.5 | 35.4 % | 25.2 | 34.7 % | 18.4 | 26 % | 18.4 | 26 % | 24.6 | 33.7 % | 25.1 | 33.5 % |
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.1 | 0.2 % | 0.2 | 0.3 % | 0.1 | 0.2 % | 0.1 | 0.2 % | 0.2 | 0.3 % | 0.2 | 0.3 % |

| | | NY: Holtsville (361030009) | | | | NY: Babylon (361030002) | | | | NY: White Plains (361192004) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| **Sector** | **Sub Sector** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| EGUs | EGUs | 5.1 | 6.7 % | 5.8 | 7.6 % | 5.1 | 6.7 % | 5.1 | 6.4 % | 3.7 | 5 % | 4.4 | 5.6 % |
| EGUs | Peakers | 0.4 | 0.6 % | 0.5 | 0.6 % | 0.5 | 0.6 % | 0.5 | 0.6 % | 0.5 | 0.6 % | 0.4 | 0.5 % |
| Non-EGUs | Non-EGUs | 3.1 | 4.1 % | 3.5 | 4.6 % | 3.1 | 4.1 % | 3.2 | 4.1 % | 2.5 | 3.4 % | 2.9 | 3.8 % |
| Nonpoint | Nonpoint | 6.9 | 9.2 % | 7.1 | 9.2 % | 6.8 | 9 % | 8 | 10.1 % | 8.5 | 11.4 % | 8.4 | 10.7 % |
| Nonpoint | RWC | 0 | 0 % | 0 | 0.1 % | 0 | 0 % | 0 | 0.1 % | 0 | 0 % | 0 | 0 % |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onroad | Diesel | 4.5 | 6 % | 4.4 | 5.8 % | 4.5 | 5.9 % | 3.9 | 4.9 % | 3.5 | 4.7 % | 4.4 | 5.6 % |
| Onroad | Non-Diesel | 5.3 | 7 % | 5.5 | 7.2 % | 5.2 | 6.9 % | 5.3 | 6.8 % | 5.4 | 7.2 % | 5.6 | 7.2 % |
| Nonroad | Airport | 0.9 | 1.2 % | 0.9 | 1.2 % | 1 | 1.3 % | 0.9 | 1.2 % | 1 | 1.4 % | 1 | 1.2 % |
| Nonroad | Diesel | 3.4 | 4.6 % | 3.5 | 4.6 % | 3.5 | 4.6 % | 3 | 3.8 % | 3.1 | 4.2 % | 3.6 | 4.6 % |
| Nonroad | Marine | 1.4 | 1.9 % | 1.3 | 1.7 % | 1.3 | 1.7 % | 1.1 | 1.4 % | 1.2 | 1.6 % | 1.2 | 1.5 % |
| Nonroad | Marine Offshore C3 | 0.8 | 1.1 % | 0.7 | 0.9 % | 0.8 | 1 % | 0.4 | 0.5 % | 0.5 | 0.7 % | 0.4 | 0.5 % |
| Nonroad | Non-Diesel | 3.1 | 4.1 % | 3 | 3.9 % | 3.2 | 4.3 % | 3.2 | 4 % | 4.2 | 5.6 % | 4.2 | 5.4 % |
| Nonroad | Rail | 1.4 | 1.8 % | 1.5 | 2 % | 1.3 | 1.7 % | 1.3 | 1.6 % | 1.2 | 1.6 % | 1.3 | 1.7 % |
| Oil & Gas | Combined - Oil & Gas | 1.7 | 2.2 % | 2.1 | 2.7 % | 1.9 | 2.5 % | 1.7 | 2.1 % | 1.1 | 1.5 % | 1.9 | 2.4 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 1.9 | 2.5 % | 1.8 | 2.3 % | 2.1 | 2.8 % | 2.1 | 2.6 % | 1.4 | 1.9 % | 1.3 | 1.7 % |
| International | Mexico | 0.1 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Biogenic | Biogenic | 10.6 | 14.1 % | 11.6 | 15.1 % | 10.6 | 14.1 % | 10.5 | 13.3 % | 9.3 | 12.5 % | 9.5 | 12.1 % |
| BC/IC | Boundary | 24.2 | 32.2 % | 22.8 | 29.7 % | 24.4 | 32.2 % | 28.3 | 35.8 % | 27.1 | 36.3 % | 27.3 | 35 % |
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.3 | 0.4 % | 0.5 | 0.6 % | 0.3 | 0.4 % | 0.5 | 0.6 % | 0.2 | 0.2 % | 0.2 | 0.3 % |

| | | **PA: NEA (421010024)** | | | | **PA: Harrison Twp (420031008)** | | | | **PA: Bristol (420170012)** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Exceedance Avg** | | **4th High Avg** | | **Exceedance Avg** | | **4th High Avg** | | **Exceedance Avg** | | **4th High Avg** | |
| **Sector** | **Sub Sector** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| EGUs | EGUs | 5.8 | 7.9 % | 5.8 | 7.9 % | NA | NA % | 5.4 | 8.1 % | 5.6 | 7.7 % | 6.2 | 8.3 % |
| EGUs | Peakers | 0.3 | 0.5 % | 0.3 | 0.5 % | NA | NA % | 0.2 | 0.3 % | 0.3 | 0.5 % | 0.4 | 0.5 % |
| Non-EGUs | Non-EGUs | 3.9 | 5.3 % | 3.9 | 5.3 % | NA | NA % | 3.9 | 5.8 % | 3.8 | 5.2 % | 3.9 | 5.2 % |
| Nonpoint | Nonpoint | 6 | 8.1 % | 6 | 8.1 % | NA | NA % | 4.1 | 6.1 % | 6.6 | 9 % | 6.2 | 8.2 % |
| Nonpoint | RWC | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Onroad | Diesel | 5.1 | 6.9 % | 5.1 | 6.9 % | NA | NA % | 3.4 | 5.2 % | 4.8 | 6.7 % | 5.6 | 7.5 % |
| Onroad | Non-Diesel | 5.3 | 7.2 % | 5.3 | 7.2 % | NA | NA % | 3.7 | 5.6 % | 5.5 | 7.5 % | 5.9 | 7.8 % |
| Nonroad | Airport | 0.9 | 1.2 % | 0.9 | 1.2 % | NA | NA % | 0.3 | 0.5 % | 0.8 | 1.1 % | 1 | 1.4 % |
| Nonroad | Diesel | 3.6 | 4.9 % | 3.6 | 4.9 % | NA | NA % | 2.5 | 3.7 % | 3.7 | 5.1 % | 4.3 | 5.8 % |
| Nonroad | Marine | 1.4 | 1.9 % | 1.4 | 1.9 % | NA | NA % | 0.4 | 0.6 % | 1.1 | 1.6 % | 1.7 | 2.2 % |
| Nonroad | Marine Offshore C3 | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0 | 0.1 % | 0.2 | 0.2 % | 0.2 | 0.3 % |
| Nonroad | Non-Diesel | 2.5 | 3.3 % | 2.5 | 3.3 % | NA | NA % | 1.2 | 1.9 % | 2.4 | 3.3 % | 2.8 | 3.7 % |
| Nonroad | Rail | 1.1 | 1.5 % | 1.1 | 1.5 % | NA | NA % | 1.6 | 2.4 % | 1.2 | 1.7 % | 1.3 | 1.7 % |
| Oil & Gas | Combined - Oil & Gas | 1.8 | 2.5 % | 1.8 | 2.5 % | NA | NA % | 5.8 | 8.6 % | 2.1 | 2.9 % | 1.8 | 2.4 % |
| Oil & Gas | Offshore Rigs | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | 0.8 | 1 % | 0.8 | 1 % | NA | NA % | 1.1 | 1.7 % | 1.1 | 1.5 % | 0.9 | 1.2 % |
| International | Mexico | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| Biogenic | Biogenic | 9.5 | 12.9 % | 9.5 | 12.9 % | NA | NA % | 7.3 | 10.9 % | 8.6 | 11.8 % | 9.8 | 13 % |
| BC/IC | Boundary | 25.2 | 34.3 % | 25.2 | 34.3 % | NA | NA % | 25.4 | 38.1 % | 24.6 | 33.8 % | 22.9 | 30.4 % |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BC/IC | Initial | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | 0.2 | 0.3 % | 0.2 | 0.3 % | NA | NA % | 0.1 | 0.2 % | 0.2 | 0.2 % | 0.2 | 0.2 % |

| | | RI: AJ (440030002) | | | | VT: Underhill (500070007) | | | | VA: Aurora Hills (510130020) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| **Sector** | **Sub Sector** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| EGUs | EGUs | NA | NA % | 5.8 | 8.7 % | NA | NA % | 2.3 | 4.4 % | 4.9 | 6.7 % | 5.5 | 7.7 % |
| EGUs | Peakers | NA | NA % | 0.4 | 0.5 % | NA | NA % | 0.2 | 0.4 % | 0.4 | 0.5 % | 0.5 | 0.7 % |
| Non-EGUs | Non-EGUs | NA | NA % | 3.4 | 5.1 % | NA | NA % | 2.2 | 4.3 % | 2.7 | 3.8 % | 2.7 | 3.8 % |
| Nonpoint | Nonpoint | NA | NA % | 5 | 7.5 % | NA | NA % | 3 | 5.9 % | 6.1 | 8.4 % | 5.5 | 7.7 % |
| Nonpoint | RWC | NA | NA % | 0 | 0 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % |
| Onroad | Diesel | NA | NA % | 3.8 | 5.7 % | NA | NA % | 2.5 | 4.9 % | 6 | 8.3 % | 5.3 | 7.4 % |
| Onroad | Non-Diesel | NA | NA % | 4.6 | 6.8 % | NA | NA % | 2.9 | 5.7 % | 7 | 9.7 % | 6.9 | 9.6 % |
| Nonroad | Airport | NA | NA % | 0.7 | 1 % | NA | NA % | 0.4 | 0.7 % | 1.5 | 2 % | 1.3 | 1.8 % |
| Nonroad | Diesel | NA | NA % | 3.2 | 4.8 % | NA | NA % | 2.3 | 4.4 % | 5.2 | 7.2 % | 4.7 | 6.6 % |
| Nonroad | Marine | NA | NA % | 2.1 | 3.1 % | NA | NA % | 0.5 | 1 % | 2.2 | 3 % | 1.8 | 2.5 % |
| Nonroad | Marine Offshore C3 | NA | NA % | 1.1 | 1.6 % | NA | NA % | 0.1 | 0.3 % | 0.4 | 0.6 % | 0.3 | 0.4 % |
| Nonroad | Non-Diesel | NA | NA % | 2.8 | 4.1 % | NA | NA % | 1.3 | 2.5 % | 3.1 | 4.3 % | 2.9 | 4 % |
| Nonroad | Rail | NA | NA % | 1.5 | 2.2 % | NA | NA % | 1 | 1.9 % | 1.4 | 1.9 % | 1.4 | 2 % |
| Oil & Gas | Combined - Oil & Gas | NA | NA % | 2.2 | 3.3 % | NA | NA % | 1.3 | 2.6 % | 1.5 | 2 % | 1.9 | 2.6 % |
| Oil & Gas | Offshore Rigs | NA | NA % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| International | Canada | NA | NA % | 0.7 | 1.1 % | NA | NA % | 1.6 | 3.1 % | 1.3 | 1.8 % | 1 | 1.4 % |
| International | Mexico | NA | NA % | 0.1 | 0.1 % | NA | NA % | 0 | 0.1 % | 0 | 0 % | 0 | 0 % |
| Biogenic | Biogenic | NA | NA % | 7.3 | 10.8 % | NA | NA % | 4.2 | 8.2 % | 7.7 | 10.6 % | 7.4 | 10.3 % |
| BC/IC | Boundary | NA | NA % | 22.3 | 33.2 % | NA | NA % | 25.2 | 49.1 % | 21 | 29 % | 22.4 | 31.2 % |
| BC/IC | Initial | NA | NA % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Other | Other | NA | NA % | 0.2 | 0.3 % | NA | NA % | 0.2 | 0.4 % | 0.1 | 0.1 % | 0.1 | 0.1 % |

# Additional Contributing State Apportionment Modeling Results for Select Monitors

| | | CT: Greenwich Point Park (090010017) | | | | CT: Stratford (090013007) | | | | CT: Sherwood Island (090019003) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| **Region** | **State** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| OTC+VA | CT | 4.6 | 5.7 % | 5.9 | 6.6 % | 3.4 | 4.4 % | 4 | 4.9 % | 2.2 | 2.9 % | 2.5 | 3 % |
| OTC+VA | DC | 0 | 0 % | 0 | 0 % | 0 | 0.1 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | DE | 0.3 | 0.3 % | 0.4 | 0.5 % | 0.4 | 0.6 % | 0.4 | 0.5 % | 0.3 | 0.4 % | 0.6 | 0.7 % |
| OTC+VA | MA | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % | 0.3 | 0.3 % | 0.1 | 0.1 % |
| OTC+VA | MD | 0.8 | 1 % | 0.9 | 1 % | 1.2 | 1.6 % | 1.1 | 1.3 % | 1 | 1.3 % | 1.2 | 1.4 % |
| OTC+VA | ME | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NH | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0.1 | 0.1 % | 0 | 0 % |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTC+VA | NJ | 6.3 | 7.7 % | 7.4 | 8.2 % | 6.5 | 8.3 % | 6.1 | 7.5 % | 7 | 9 % | 8.4 | 10.1 % |
| OTC+VA | NY | 14.8 | 18.2 % | 17.4 | 19.3 % | 11.5 | 14.8 % | 12.3 | 15.1 % | 11.9 | 15.3 % | 11.9 | 14.1 % |
| OTC+VA | PA | 5.4 | 6.6 % | 6.2 | 6.9 % | 5.9 | 7.5 % | 5.1 | 6.2 % | 6.3 | 8.1 % | 7.1 | 8.4 % |
| OTC+VA | RI | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | VA | 0.9 | 1.1 % | 1 | 1.1 % | 1.5 | 2 % | 1.4 | 1.8 % | 1.1 | 1.4 % | 1.4 | 1.6 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| LADCO | IL | 0.4 | 0.5 % | 0.6 | 0.7 % | 0.6 | 0.7 % | 0.8 | 1 % | 0.5 | 0.7 % | 0.7 | 0.9 % |
| LADCO | IN | 0.6 | 0.8 % | 0.9 | 1 % | 0.9 | 1.2 % | 1.2 | 1.5 % | 0.8 | 1.1 % | 1.2 | 1.4 % |
| LADCO | MI | 1 | 1.2 % | 1.2 | 1.3 % | 0.9 | 1.2 % | 1.4 | 1.7 % | 1.1 | 1.5 % | 0.6 | 0.7 % |
| LADCO | OH | 1.3 | 1.6 % | 1.6 | 1.8 % | 2 | 2.6 % | 2.3 | 2.9 % | 1.5 | 2 % | 1.8 | 2.1 % |
| SESARM | FL | 0 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % | 0 | 0 % |
| SESARM | KY | 0.5 | 0.7 % | 0.7 | 0.8 % | 0.9 | 1.2 % | 1.3 | 1.6 % | 0.7 | 0.9 % | 1.3 | 1.5 % |
| SESARM | NC | 0.3 | 0.4 % | 0.3 | 0.3 % | 0.5 | 0.7 % | 0.5 | 0.6 % | 0.3 | 0.4 % | 0.4 | 0.5 % |
| SESARM | TN | 0.2 | 0.2 % | 0.3 | 0.3 % | 0.3 | 0.4 % | 0.4 | 0.5 % | 0.2 | 0.3 % | 0.4 | 0.4 % |
| SESARM | WV | 0.9 | 1.1 % | 0.8 | 0.9 % | 1.6 | 2 % | 1.6 | 2 % | 1.1 | 1.4 % | 1.4 | 1.7 % |
| CENSARA | LA | 0.1 | 0.2 % | 0.3 | 0.3 % | 0.3 | 0.4 % | 0.4 | 0.4 % | 0.2 | 0.3 % | 0.2 | 0.2 % |
| CENSARA | OK | 0.1 | 0.2 % | 0.2 | 0.2 % | 0.2 | 0.2 % | 0.2 | 0.3 % | 0.1 | 0.2 % | 0.2 | 0.3 % |
| CENSARA | TX | 0.3 | 0.4 % | 0.6 | 0.6 % | 0.6 | 0.7 % | 0.7 | 0.9 % | 0.4 | 0.5 % | 0.6 | 0.7 % |
| Multi-State | AL/AR/GA/MS/SC | 0.4 | 0.5 % | 0.5 | 0.5 % | 0.8 | 1 % | 0.7 | 0.8 % | 0.5 | 0.7 % | 0.5 | 0.6 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.2 | 0.2 % | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.4 | 0.4 % | 0.3 | 0.3 % | 0.4 | 0.5 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.5 | 0.6 % | 0.7 | 0.8 % | 0.8 | 1 % | 1 | 1.2 % | 0.7 | 0.8 % | 0.9 | 1.1 % |
| International | Canada | 1.9 | 2.4 % | 2.8 | 3.1 % | 1.8 | 2.3 % | 2.8 | 3.5 % | 2 | 2.6 % | 1 | 1.1 % |
| International | Mexcio | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| Not State Tagged | | 39.2 | 48.1 % | 38.9 | 43.2 % | 34.8 | 44.6 % | 35.3 | 43.3 % | 36.8 | 47.3 % | 39 | 46.4 % |

| | | CT: Hammonasset S.P. (090099002) | | | | CT: Fort Griswold Park (090110124) | | | | DE: Bellevue S.P. (100031013) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Region | State | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| OTC+VA | CT | 3.4 | 4.5 % | 3.6 | 4.7 % | 7.1 | 9.7 % | 7.2 | 9.7 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | DC | 0.1 | 0.1 % | 0 | 0.1 % | 0 | 0 % | 0 | 0 % | 0.5 | 0.7 % | 0.3 | 0.4 % |
| OTC+VA | DE | 0.5 | 0.7 % | 0.3 | 0.3 % | 0.4 | 0.6 % | 0.2 | 0.2 % | 4.3 | 5.9 % | 3.4 | 4.9 % |
| OTC+VA | MA | 0.1 | 0.1 % | 0.1 | 0.2 % | 0.3 | 0.4 % | 0.5 | 0.6 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | MD | 1.7 | 2.2 % | 1 | 1.3 % | 1.2 | 1.6 % | 0.6 | 0.8 % | 12.5 | 17.2 % | 7.6 | 10.8 % |
| OTC+VA | ME | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NH | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NJ | 4.9 | 6.4 % | 4.4 | 5.7 % | 2.7 | 3.7 % | 1.9 | 2.6 % | 0.2 | 0.3 % | 2.2 | 3.2 % |
| OTC+VA | NY | 10.1 | 13.3 % | 10.2 | 13.2 % | 12.9 | 17.5 % | 12.7 | 17 % | 0.1 | 0.2 % | 0.7 | 1 % |
| OTC+VA | PA | 4.4 | 5.8 % | 3.5 | 4.5 % | 2.9 | 4 % | 2.2 | 3 % | 3.2 | 4.4 % | 5.7 | 8.1 % |
| OTC+VA | RI | 0 | 0 % | 0 | 0 % | 0.4 | 0.5 % | 0.6 | 0.8 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | VA | 2.2 | 2.9 % | 1.8 | 2.3 % | 1.5 | 2.1 % | 1.1 | 1.5 % | 4.8 | 6.6 % | 2.5 | 3.6 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| LADCO | IL | 0.8 | 1 % | 0.9 | 1.2 % | 0.5 | 0.7 % | 0.4 | 0.5 % | 0.5 | 0.7 % | 0.5 | 0.6 % |
| LADCO | IN | 1.1 | 1.5 % | 1.4 | 1.7 % | 0.7 | 0.9 % | 0.5 | 0.7 % | 1.4 | 1.9 % | 1.3 | 1.8 % |
| LADCO | MI | 1.4 | 1.8 % | 1.8 | 2.3 % | 1.2 | 1.6 % | 1.9 | 2.5 % | 0.7 | 0.9 % | 1.1 | 1.6 % |
| LADCO | OH | 2.3 | 3 % | 2.2 | 2.9 % | 1.5 | 2 % | 1.3 | 1.7 % | 5.4 | 7.4 % | 4.3 | 6 % |
| SESARM | FL | 0 | 0 % | 0 | 0 % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| SESARM | KY | 0.9 | 1.2 % | 1 | 1.3 % | 0.5 | 0.7 % | 0.3 | 0.4 % | 2.1 | 2.9 % | 1.4 | 2 % |
| SESARM | NC | 0.4 | 0.6 % | 0.4 | 0.5 % | 0.5 | 0.6 % | 0.3 | 0.4 % | 0.8 | 1 % | 0.4 | 0.5 % |
| SESARM | TN | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.1 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| SESARM | WV | 1.8 | 2.3 % | 1.7 | 2.2 % | 0.9 | 1.2 % | 0.8 | 1 % | 4.9 | 6.7 % | 2.6 | 3.6 % |
| CENSARA | LA | 0.1 | 0.2 % | 0.1 | 0.2 % | 0.2 | 0.3 % | 0.1 | 0.2 % | 0.3 | 0.4 % | 0.1 | 0.2 % |
| CENSARA | OK | 0.1 | 0.2 % | 0.1 | 0.2 % | 0.2 | 0.2 % | 0.1 | 0.1 % | 0.4 | 0.5 % | 0.2 | 0.3 % |
| CENSARA | TX | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.5 | 0.7 % | 0.3 | 0.3 % | 0.9 | 1.3 % | 0.5 | 0.7 % |
| Multi-State | AL/AR/GA/MS/SC | 0.4 | 0.6 % | 0.5 | 0.6 % | 0.8 | 1.1 % | 0.3 | 0.4 % | 0.4 | 0.6 % | 0.2 | 0.3 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.3 | 0.3 % | 0.3 | 0.3 % | 0.2 | 0.3 % | 0.2 | 0.2 % | 0.4 | 0.5 % | 0.2 | 0.3 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.9 | 1.2 % | 1 | 1.3 % | 0.8 | 1 % | 0.7 | 0.9 % | 0.9 | 1.3 % | 0.7 | 1 % |
| International | Canada | 1.5 | 2 % | 1.9 | 2.5 % | 2.4 | 3.2 % | 4.2 | 5.7 % | 0.4 | 0.5 % | 1.2 | 1.7 % |
| International | Mexcio | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| Not State Tagged | | 36 | 47.4 % | 38.5 | 49.6 % | 33 | 44.7 % | 36.3 | 48.5 % | 27.4 | 37.6 % | 33.3 | 47.2 % |

| | | DC: McMillan Reservoir (110010043) | | | | ME: Cadillac Mountain (230090102) | | | | MD: Fair Hill (2400150003) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Region | State | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| OTC+VA | CT | 0.2 | 0.3 % | 0.4 | 0.5 % | NA | NA % | 0.8 | 1.5 % | 0 | 0 % | 0.6 | 0.8 % |
| OTC+VA | DC | 3.8 | 5.3 % | 3.7 | 5.1 % | NA | NA % | 0.1 | 0.1 % | 0.6 | 0.8 % | 0.3 | 0.4 % |
| OTC+VA | DE | 0.4 | 0.6 % | 0.6 | 0.9 % | NA | NA % | 0.5 | 0.9 % | 0.1 | 0.1 % | 2 | 3 % |
| OTC+VA | MA | 0.3 | 0.4 % | 0.4 | 0.6 % | NA | NA % | 6.7 | 12.3 % | 0 | 0 % | 1.1 | 1.5 % |
| OTC+VA | MD | 8.4 | 11.7 % | 10.1 | 13.9 % | NA | NA % | 1.6 | 2.9 % | 15 | 21.2 % | 8.7 | 12.7 % |
| OTC+VA | ME | 0 | 0 % | 0 | 0.1 % | NA | NA % | 2 | 3.7 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NH | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 1.4 | 2.7 % | 0 | 0 % | 0.1 | 0.2 % |
| OTC+VA | NJ | 1 | 1.4 % | 1.5 | 2.1 % | NA | NA % | 2.5 | 4.7 % | 0.1 | 0.1 % | 2.6 | 3.8 % |
| OTC+VA | NY | 1.1 | 1.6 % | 1.7 | 2.3 % | NA | NA % | 3.7 | 6.8 % | 0.1 | 0.2 % | 1.7 | 2.5 % |
| OTC+VA | PA | 2.4 | 3.3 % | 3.3 | 4.6 % | NA | NA % | 4.6 | 8.4 % | 1.9 | 2.7 % | 6.2 | 9 % |
| OTC+VA | RI | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0.7 | 1.3 % | 0 | 0 % | 0.2 | 0.3 % |
| OTC+VA | VA | 11.9 | 16.6 % | 11.7 | 16.2 % | NA | NA % | 1.1 | 2 % | 5.5 | 7.8 % | 2.5 | 3.7 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0.1 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % |
| LADCO | IL | 0.2 | 0.3 % | 0.1 | 0.2 % | NA | NA % | 0.2 | 0.4 % | 0.3 | 0.5 % | 0.3 | 0.5 % |
| LADCO | IN | 0.4 | 0.6 % | 0.3 | 0.3 % | NA | NA % | 0.2 | 0.3 % | 0.8 | 1.2 % | 0.7 | 1 % |
| LADCO | MI | 0.4 | 0.6 % | 0.3 | 0.4 % | NA | NA % | 0.6 | 1.1 % | 1.1 | 1.6 % | 0.5 | 0.8 % |
| LADCO | OH | 1.5 | 2 % | 0.6 | 0.9 % | NA | NA % | 0.6 | 1.2 % | 5.1 | 7.2 % | 2.7 | 3.9 % |
| SESARM | FL | 0 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % |
| SESARM | KY | 0.6 | 0.9 % | 0.4 | 0.6 % | NA | NA % | 0.2 | 0.3 % | 1 | 1.4 % | 1.1 | 1.7 % |
| SESARM | NC | 0.6 | 0.8 % | 0.5 | 0.7 % | NA | NA % | 0.4 | 0.6 % | 0.8 | 1.2 % | 0.3 | 0.5 % |
| SESARM | TN | 0.2 | 0.3 % | 0.3 | 0.4 % | NA | NA % | 0.1 | 0.2 % | 0 | 0 % | 0.1 | 0.1 % |
| SESARM | WV | 3.5 | 4.9 % | 2.7 | 3.8 % | NA | NA % | 0.4 | 0.8 % | 4.5 | 6.4 % | 2.7 | 3.9 % |
| CENSARA | LA | 0.1 | 0.2 % | 0.1 | 0.2 % | NA | NA % | 0.1 | 0.2 % | 0.2 | 0.3 % | 0.2 | 0.2 % |
| CENSARA | OK | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0.1 | 0.2 % | 0.3 | 0.4 % | 0.2 | 0.3 % |
| CENSARA | TX | 0.2 | 0.3 % | 0.2 | 0.2 % | NA | NA % | 0.3 | 0.6 % | 0.6 | 0.8 % | 0.5 | 0.7 % |
| Multi-State | AL/AR/GA/MS/SC | 0.4 | 0.6 % | 0.5 | 0.7 % | NA | NA % | 0.3 | 0.5 % | 0.2 | 0.3 % | 0.2 | 0.3 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.2 | 0.3 % | 0.1 | 0.2 % | NA | NA % | 0.1 | 0.2 % | 0.3 | 0.4 % | 0.3 | 0.4 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.4 | 0.6 % | 0.3 | 0.4 % | NA | NA % | 0.4 | 0.7 % | 0.7 | 1 % | 0.6 | 0.9 % |
| International | Canada | 0.9 | 1.3 % | 1.2 | 1.7 % | NA | NA % | 1.2 | 2.2 % | 0.4 | 0.6 % | 1.2 | 1.7 % |
| International | Mexcio | 0 | 0.1 % | 0 | 0 % | NA | NA % | 0 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| Not State Tagged | | 32.1 | 44.7 % | 30.9 | 42.7 % | NA | NA % | 23.3 | 42.9 % | 30.6 | 43.4 % | 30.9 | 45 % |

| | | MD: Edgewood (240251001) | | | | MD: Beltsville (240339991) | | | | MD: P.G. Equestrian Ctr. (240338003) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| **Region** | **State** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| OTC+VA | CT | 0.2 | 0.3 % | 0 | 0 % | 0.3 | 0.4 % | 0.3 | 0.4 % | 0 | 0 % | 0.2 | 0.3 % |
| OTC+VA | DC | 0.6 | 0.8 % | 0.7 | 1 % | 1.3 | 1.8 % | 1.3 | 1.8 % | 2.1 | 2.9 % | 2.3 | 3.3 % |
| OTC+VA | DE | 0.2 | 0.3 % | 0 | 0 % | 0.7 | 0.9 % | 0.7 | 0.9 % | 0.2 | 0.3 % | 0.4 | 0.6 % |
| OTC+VA | MA | 0.3 | 0.4 % | 0 | 0 % | 0.3 | 0.5 % | 0.3 | 0.5 % | 0 | 0 % | 0.3 | 0.5 % |
| OTC+VA | MD | 17.1 | 23.3 % | 17.7 | 23.6 % | 15.4 | 21.2 % | 15.4 | 21.2 % | 13.6 | 19.1 % | 14.4 | 20.4 % |
| OTC+VA | ME | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NH | 0 | 0.1 % | 0 | 0 % | 0 | 0.1 % | 0 | 0.1 % | 0 | 0 % | 0 | 0.1 % |
| OTC+VA | NJ | 0.6 | 0.8 % | 0.1 | 0.1 % | 1.4 | 2 % | 1.4 | 2 % | 0.2 | 0.3 % | 0.8 | 1.2 % |
| OTC+VA | NY | 0.6 | 0.8 % | 0.1 | 0.2 % | 1.5 | 2.1 % | 1.5 | 2.1 % | 0.2 | 0.3 % | 0.8 | 1.1 % |
| OTC+VA | PA | 2 | 2.7 % | 1.6 | 2.2 % | 7.7 | 10.7 % | 7.7 | 10.7 % | 7.8 | 11 % | 6.4 | 9 % |
| OTC+VA | RI | 0.1 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % |
| OTC+VA | VA | 4.3 | 5.9 % | 6 | 8 % | 5.4 | 7.4 % | 5.4 | 7.4 % | 4.7 | 6.6 % | 5.1 | 7.1 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| LADCO | IL | 0.4 | 0.5 % | 0.4 | 0.6 % | 0.2 | 0.2 % | 0.2 | 0.2 % | 0.2 | 0.3 % | 0.2 | 0.3 % |
| LADCO | IN | 0.9 | 1.2 % | 0.9 | 1.2 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.7 | 1 % | 0.6 | 0.8 % |
| LADCO | MI | 0.7 | 0.9 % | 0.5 | 0.7 % | 0.7 | 1 % | 0.7 | 1 % | 0.3 | 0.4 % | 0.3 | 0.4 % |
| LADCO | OH | 3.7 | 5 % | 3.5 | 4.7 % | 1.6 | 2.2 % | 1.6 | 2.2 % | 4.2 | 5.9 % | 3.2 | 4.5 % |
| SESARM | FL | 0 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| SESARM | KY | 1.5 | 2.1 % | 1.8 | 2.4 % | 0.3 | 0.4 % | 0.3 | 0.4 % | 1.5 | 2.2 % | 1.1 | 1.6 % |
| SESARM | NC | 1.3 | 1.8 % | 1.9 | 2.6 % | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.2 | 0.3 % |
| SESARM | TN | 0.7 | 0.9 % | 1 | 1.4 % | 0 | 0.1 % | 0 | 0.1 % | 0.7 | 1 % | 0.6 | 0.8 % |
| SESARM | WV | 2.9 | 3.9 % | 4 | 5.3 % | 1.7 | 2.3 % | 1.7 | 2.3 % | 2.8 | 3.9 % | 2.1 | 3 % |
| CENSARA | LA | 0.2 | 0.2 % | 0.2 | 0.3 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.4 | 0.6 % | 0.3 | 0.5 % |
| CENSARA | OK | 0.2 | 0.2 % | 0.2 | 0.3 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.2 | 0.3 % | 0.2 | 0.3 % |
| CENSARA | TX | 0.4 | 0.5 % | 0.5 | 0.7 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.7 | 1 % | 0.6 | 0.8 % |
| Multi-State | AL/AR/GA/MS/SC | 1.2 | 1.7 % | 1.8 | 2.5 % | 0.1 | 0.2 % | 0.1 | 0.2 % | 0.9 | 1.2 % | 0.7 | 0.9 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.2 | 0.3 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.7 | 0.9 % | 0.7 | 1 % | 0.4 | 0.5 % | 0.4 | 0.5 % | 0.4 | 0.6 % | 0.4 | 0.5 % |
| International | Canada | 0.6 | 0.9 % | 0.3 | 0.4 % | 1.3 | 1.7 % | 1.3 | 1.7 % | 0.4 | 0.5 % | 0.5 | 0.7 % |
| International | Mexcio | 0.1 | 0.1 % | 0.1 | 0.2 % | 0 | 0.1 % | 0 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| Not State | | 31.9 | 43.3 % | 30.1 | 40.2 % | 30.9 | 42.7 % | 30.9 | 42.7 % | 28 | 39.3 % | 28.6 | 40.4 % |

| | | MA: Martha's Vineyard (250070001) | | | | NH: Mt Washington Summit (330074001) | | | | NJ: Ancora St. Hospital (340071001) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Region | State | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| OTC+VA | CT | 1.2 | 1.6 % | 2.5 | 3.5 % | NA | NA % | 1.3 | 2.5 % | 1.1 | 1.5 % | 0.4 | 0.5 % |
| OTC+VA | DC | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0.1 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | DE | 0.2 | 0.2 % | 0.2 | 0.3 % | NA | NA % | 0.3 | 0.5 % | 2.7 | 3.7 % | 1.2 | 1.7 % |
| OTC+VA | MA | 15.6 | 20.5 % | 9.4 | 13 % | NA | NA % | 1.5 | 2.9 % | 2.3 | 3.2 % | 0.6 | 0.8 % |
| OTC+VA | MD | 0.2 | 0.3 % | 0.5 | 0.6 % | NA | NA % | 0.7 | 1.4 % | 2 | 2.8 % | 0.8 | 1.1 % |
| OTC+VA | ME | 0 | 0.1 % | 0 | 0 % | NA | NA % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0 | 0 % |
| OTC+VA | NH | 0 | 0.1 % | 0 | 0 % | NA | NA % | 0.6 | 1.2 % | 0.5 | 0.6 % | 0.1 | 0.2 % |
| OTC+VA | NJ | 4.4 | 5.8 % | 4.1 | 5.7 % | NA | NA % | 1.2 | 2.4 % | 8.2 | 11.4 % | 9.7 | 13.9 % |
| OTC+VA | NY | 7.7 | 10.1 % | 9.6 | 13.2 % | NA | NA % | 2.7 | 5.2 % | 2.6 | 3.7 % | 3.2 | 4.6 % |
| OTC+VA | PA | 2.4 | 3.1 % | 2.1 | 3 % | NA | NA % | 2.6 | 5.1 % | 15.3 | 21.2 % | 16.9 | 24.1 % |
| OTC+VA | RI | 1.6 | 2.1 % | 1.7 | 2.3 % | NA | NA % | 0.2 | 0.4 % | 0.3 | 0.5 % | 0.1 | 0.1 % |
| OTC+VA | VA | 0.1 | 0.1 % | 0.8 | 1.1 % | NA | NA % | 0.4 | 0.8 % | 0.1 | 0.1 % | 0.1 | 0.2 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0 % | NA | NA % | 0.5 | 0.9 % | 0.1 | 0.1 % | 0 | 0 % |
| LADCO | IL | 0.4 | 0.5 % | 0.5 | 0.7 % | NA | NA % | 0.8 | 1.5 % | 0.2 | 0.3 % | 0.5 | 0.7 % |
| LADCO | IN | 0.6 | 0.8 % | 0.6 | 0.8 % | NA | NA % | 0.3 | 0.5 % | 0.1 | 0.2 % | 0.4 | 0.5 % |
| LADCO | MI | 1.9 | 2.5 % | 1.3 | 1.9 % | NA | NA % | 1.2 | 2.3 % | 0.3 | 0.5 % | 0.8 | 1.1 % |
| LADCO | OH | 0.8 | 1.1 % | 0.9 | 1.2 % | NA | NA % | 1.3 | 2.5 % | 0.1 | 0.2 % | 0.8 | 1.1 % |
| SESARM | FL | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % |
| SESARM | KY | 0.1 | 0.1 % | 0.3 | 0.4 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0.2 | 0.3 % |
| SESARM | NC | 0 | 0 % | 0.5 | 0.7 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % |
| SESARM | TN | 0 | 0 % | 0.2 | 0.2 % | NA | NA % | 0 | 0.1 % | 0 | 0 % | 0.1 | 0.2 % |
| SESARM | WV | 0.1 | 0.1 % | 0.4 | 0.6 % | NA | NA % | 0.6 | 1.2 % | 0.1 | 0.1 % | 0.2 | 0.3 % |
| CENSARA | LA | 0 | 0 % | 0 | 0.1 % | NA | NA % | 0 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % |
| CENSARA | OK | 0.1 | 0.1 % | 0.1 | 0.2 % | NA | NA % | 0 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.2 % |
| CENSARA | TX | 0.1 | 0.1 % | 0.2 | 0.3 % | NA | NA % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0.4 | 0.5 % |
| Multi-State | AL/AR/GA/MS/SC | 0.1 | 0.1 % | 0.3 | 0.5 % | NA | NA % | 0.1 | 0.3 % | 0 | 0 % | 0.3 | 0.5 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.1 | 0.2 % | 0.2 | 0.3 % | NA | NA % | 0.1 | 0.1 % | 0.3 | 0.5 % | 0.2 | 0.3 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.7 | 1 % | 0.8 | 1.2 % | NA | NA % | 0.8 | 1.6 % | 0.4 | 0.5 % | 0.7 | 1 % |
| International | Canada | 2.8 | 3.7 % | 2.3 | 3.1 % | NA | NA % | 2.1 | 4.2 % | 1.2 | 1.7 % | 1.4 | 2 % |
| International | Mexcio | 0 | 0 % | 0 | 0 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % |
| Not State Tagged | | 35 | 45.8 % | 32.5 | 44.9 % | NA | NA % | 31.5 | 61.3 % | 33.8 | 46.8 % | 30.6 | 43.8 % |

| | | NJ: Collier's Mill (340290006) | | | | NJ: Clarksboro (340150002) | | | | NY: Susan Wagner H.S. (360850067) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| **Region** | **State** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** | **Total** | **%** |
| OTC+VA | CT | 0.4 | 0.6 % | 0.5 | 0.7 % | 0 | 0 % | 0 | 0 % | 0.5 | 0.6 % | 0.5 | 0.7 % |
| OTC+VA | DC | 0 | 0.1 % | 0 | 0 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0 | 0.1 % | 0 | 0 % |
| OTC+VA | DE | 0.9 | 1.2 % | 0.5 | 0.6 % | 2.3 | 3.2 % | 2.3 | 3.2 % | 0.3 | 0.3 % | 0.3 | 0.4 % |
| OTC+VA | MA | 0.5 | 0.7 % | 0.7 | 0.9 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | MD | 1.3 | 1.8 % | 0.6 | 0.9 % | 5.3 | 7.5 % | 5.3 | 7.5 % | 1.2 | 1.7 % | 1.2 | 1.7 % |
| OTC+VA | ME | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NH | 0.1 | 0.2 % | 0.2 | 0.2 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NJ | 7.7 | 10.7 % | 8 | 11 % | 5.1 | 7.2 % | 5.1 | 7.2 % | 10.6 | 14.5 % | 11.8 | 15.7 % |
| OTC+VA | NY | 3.3 | 4.5 % | 4.1 | 5.7 % | 1.8 | 2.5 % | 1.8 | 2.5 % | 9.1 | 12.4 % | 7.5 | 10.1 % |
| OTC+VA | PA | 13.9 | 19.4 % | 13.1 | 18.1 % | 11.3 | 16 % | 11.3 | 16 % | 6.6 | 9 % | 8.5 | 11.3 % |
| OTC+VA | RI | 0.1 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | VA | 1.1 | 1.5 % | 0.8 | 1 % | 2.4 | 3.3 % | 2.4 | 3.3 % | 0.9 | 1.2 % | 1.3 | 1.7 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| LADCO | IL | 0.4 | 0.5 % | 0.4 | 0.5 % | 0.6 | 0.9 % | 0.6 | 0.9 % | 0.4 | 0.6 % | 0.3 | 0.5 % |
| LADCO | IN | 0.7 | 0.9 % | 0.7 | 1 % | 1 | 1.4 % | 1 | 1.4 % | 0.5 | 0.7 % | 0.6 | 0.8 % |
| LADCO | MI | 1 | 1.4 % | 1.4 | 1.9 % | 0.8 | 1.1 % | 0.8 | 1.1 % | 0.7 | 1 % | 0.5 | 0.7 % |
| LADCO | OH | 1.5 | 2 % | 1.8 | 2.5 % | 3.3 | 4.7 % | 3.3 | 4.7 % | 1 | 1.4 % | 1.2 | 1.6 % |
| SESARM | FL | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| SESARM | KY | 0.6 | 0.8 % | 0.6 | 0.8 % | 1 | 1.5 % | 1 | 1.5 % | 0.5 | 0.7 % | 1 | 1.3 % |
| SESARM | NC | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.5 | 0.7 % | 0.5 | 0.7 % | 0.1 | 0.1 % | 0.2 | 0.2 % |
| SESARM | TN | 0.1 | 0.2 % | 0.2 | 0.2 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.2 | 0.2 % | 0.3 | 0.4 % |
| SESARM | WV | 1.1 | 1.5 % | 0.9 | 1.3 % | 2.2 | 3.1 % | 2.2 | 3.1 % | 0.8 | 1.1 % | 1.3 | 1.7 % |
| CENSARA | LA | 0 | 0.1 % | 0 | 0.1 % | 0.2 | 0.2 % | 0.2 | 0.2 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| CENSARA | OK | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.4 | 0.5 % | 0.4 | 0.5 % | 0.1 | 0.1 % | 0 | 0 % |
| CENSARA | TX | 0.2 | 0.2 % | 0.2 | 0.2 % | 0.7 | 1 % | 0.7 | 1 % | 0.2 | 0.3 % | 0.1 | 0.1 % |
| Multi-State | AL/AR/GA/MS/SC | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.3 | 0.5 % | 0.3 | 0.5 % | 0.2 | 0.3 % | 0.2 | 0.3 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.5 | 0.7 % | 0.5 | 0.7 % | 0.2 | 0.3 % | 0.1 | 0.2 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.5 | 0.7 % | 0.5 | 0.7 % | 0.9 | 1.3 % | 0.9 | 1.3 % | 0.8 | 1.1 % | 0.5 | 0.7 % |
| International | Canada | 1.4 | 1.9 % | 1.8 | 2.5 % | 0.9 | 1.3 % | 0.9 | 1.3 % | 2 | 2.7 % | 1.7 | 2.2 % |
| International | Mexcio | 0 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0 | 0 % |
| Not State Tagged | | 34.4 | 47.8 % | 34.6 | 47.7 % | 29.1 | 41 % | 29.1 | 41 % | 36.1 | 49.4 % | 35.5 | 47.4 % |

| | | NY: Holtsville (361030009) | | | | NY: Babylon (361030002) | | | | NY: White Plains (361192004) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | | Exceedance Avg | | 4th High Avg | |
| Region | State | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| OTC+VA | CT | 0.4 | 0.6 % | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.1 | 0.1 % | 0.8 | 1.1 % | 0.6 | 0.7 % |
| OTC+VA | DC | 0 | 0.1 % | 0 | 0.1 % | 0 | 0 % | 0.1 | 0.1 % | 0 | 0.1 % | 0 | 0 % |
| OTC+VA | DE | 0.4 | 0.5 % | 0.4 | 0.6 % | 0.4 | 0.6 % | 0.3 | 0.4 % | 0.4 | 0.5 % | 0.4 | 0.6 % |
| OTC+VA | MA | 0 | 0 % | 0 | 0 % | 0.1 | 0.1 % | 0 | 0 % | 0.7 | 1 % | 0.6 | 0.8 % |
| OTC+VA | MD | 1.6 | 2.1 % | 1.7 | 2.2 % | 1.2 | 1.5 % | 1.8 | 2.3 % | 1.1 | 1.5 % | 1.3 | 1.6 % |
| OTC+VA | ME | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| OTC+VA | NH | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0.1 | 0.2 % | 0.2 | 0.2 % |
| OTC+VA | NJ | 6.3 | 8.4 % | 6.1 | 8 % | 7.3 | 9.7 % | 7.3 | 9.2 % | 7.8 | 10.4 % | 9.7 | 12.5 % |
| OTC+VA | NY | 12.3 | 16.4 % | 11.1 | 14.5 % | 11.6 | 15.3 % | 10.7 | 13.6 % | 14.9 | 20 % | 12.3 | 15.8 % |
| OTC+VA | PA | 5.1 | 6.7 % | 4.9 | 6.4 % | 6.2 | 8.2 % | 6.1 | 7.7 % | 4.9 | 6.5 % | 7.3 | 9.3 % |
| OTC+VA | RI | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0.1 | 0.2 % | 0.1 | 0.1 % |
| OTC+VA | VA | 1.2 | 1.6 % | 1.5 | 1.9 % | 1.2 | 1.6 % | 1.4 | 1.7 % | 1.1 | 1.4 % | 0.8 | 1.1 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0.1 % | 0.1 | 0.1 % |
| LADCO | IL | 0.6 | 0.7 % | 0.8 | 1 % | 0.4 | 0.6 % | 0.6 | 0.8 % | 0.2 | 0.2 % | 0.3 | 0.4 % |
| LADCO | IN | 1 | 1.3 % | 1.4 | 1.9 % | 0.7 | 1 % | 1.2 | 1.5 % | 0.3 | 0.4 % | 0.6 | 0.7 % |
| LADCO | MI | 1.3 | 1.7 % | 1.7 | 2.2 % | 0.9 | 1.3 % | 1.8 | 2.3 % | 0.3 | 0.4 % | 0.5 | 0.7 % |
| LADCO | OH | 1.9 | 2.5 % | 2.6 | 3.4 % | 1.7 | 2.2 % | 1.6 | 2 % | 0.6 | 0.8 % | 1.1 | 1.4 % |
| SESARM | FL | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0 % | 0 | 0.1 % | 0 | 0 % |
| SESARM | KY | 0.7 | 0.9 % | 0.9 | 1.2 % | 0.7 | 0.9 % | 0.9 | 1.1 % | 0.4 | 0.5 % | 0.7 | 0.9 % |
| SESARM | NC | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.4 | 0.5 % | 0.2 | 0.2 % | 0.3 | 0.4 % | 0 | 0.1 % |
| SESARM | TN | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.1 | 0.2 % | 0.2 | 0.3 % |
| SESARM | WV | 0.8 | 1 % | 1.1 | 1.4 % | 1 | 1.4 % | 1 | 1.3 % | 0.6 | 0.9 % | 1.2 | 1.5 % |
| CENSARA | LA | 0.1 | 0.2 % | 0.2 | 0.3 % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| CENSARA | OK | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.2 | 0.3 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| CENSARA | TX | 0.5 | 0.7 % | 0.7 | 0.9 % | 0.5 | 0.7 % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| Multi-State | AL/AR/GA/MS/SC | 0.4 | 0.5 % | 0.5 | 0.7 % | 0.4 | 0.5 % | 0.3 | 0.3 % | 0.4 | 0.5 % | 0.2 | 0.2 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.3 | 0.4 % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.8 | 1.1 % | 1.1 | 1.4 % | 0.7 | 0.9 % | 0.7 | 0.9 % | 0.2 | 0.3 % | 0.3 | 0.4 % |
| International | Canada | 1.9 | 2.5 % | 1.8 | 2.3 % | 2.1 | 2.8 % | 2.1 | 2.6 % | 1.4 | 1.9 % | 1.3 | 1.7 % |
| International | Mexcio | 0.1 | 0.1 % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| Not State Tagged | | 36.7 | 48.9 % | 36.5 | 47.6 % | 36.7 | 48.6 % | 40.3 | 51 % | 37.3 | 50.1 % | 37.8 | 48.4 % |

| | | PA: NEA (421010024) | | | | PA: Harrison Twsp. (420031008) | | | | PA: Bristol (420170012) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg. | | Exceedance Ave. | | 4th High Avg. | | Exceedance Avg. | | 4th High Avg. | |
| Region | State | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| OTC+VA | CT | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0 | 0.1 % | 0.2 | 0.2 % | 0.2 | 0.2 % |
| OTC+VA | DC | 0.1 | 0.2 % | 0.1 | 0.2 % | NA | NA % | 0 | 0 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| OTC+VA | DE | 2.1 | 2.9 % | 2.1 | 2.9 % | NA | NA % | 0.1 | 0.1 % | 1.3 | 1.8 % | 1.7 | 2.3 % |
| OTC+VA | MA | 0 | 0.1 % | 0 | 0.1 % | NA | NA % | 0 | 0 % | 0.3 | 0.4 % | 0.1 | 0.1 % |
| OTC+VA | MD | 4.3 | 5.8 % | 4.3 | 5.8 % | NA | NA % | 0.6 | 0.9 % | 2.8 | 3.8 % | 2.9 | 3.9 % |
| OTC+VA | ME | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NH | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0.1 | 0.1 % | 0 | 0 % |
| OTC+VA | NJ | 2.9 | 4 % | 2.9 | 4 % | NA | NA % | 0.4 | 0.6 % | 5.1 | 7 % | 8.6 | 11.4 % |
| OTC+VA | NY | 0.9 | 1.2 % | 0.9 | 1.2 % | NA | NA % | 0.7 | 1 % | 1.6 | 2.1 % | 2.7 | 3.6 % |
| OTC+VA | PA | 15.9 | 21.6 % | 15.9 | 21.6 % | NA | NA % | 13.7 | 20.5 % | 15.3 | 21.1 % | 13.8 | 18.4 % |
| OTC+VA | RI | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0.1 % | 0 | 0 % |
| OTC+VA | VA | 2.1 | 2.9 % | 2.1 | 2.9 % | NA | NA % | 0.8 | 1.2 % | 1.9 | 2.6 % | 1.6 | 2.2 % |
| OTC+VA | VT | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| LADCO | IL | 0.4 | 0.6 % | 0.4 | 0.6 % | NA | NA % | 0.7 | 1 % | 0.4 | 0.6 % | 0.4 | 0.6 % |
| LADCO | IN | 0.7 | 1 % | 0.7 | 1 % | NA | NA % | 1.1 | 1.6 % | 0.8 | 1.1 % | 0.8 | 1 % |
| LADCO | MI | 0.4 | 0.5 % | 0.4 | 0.5 % | NA | NA % | 1.1 | 1.7 % | 0.7 | 1 % | 0.4 | 0.5 % |
| LADCO | OH | 1.6 | 2.1 % | 1.6 | 2.1 % | NA | NA % | 3.9 | 5.8 % | 2.1 | 2.9 % | 1.6 | 2.2 % |
| SESARM | FL | 0 | 0 % | 0 | 0 % | NA | NA % | 0 | 0 % | 0 | 0 % | 0 | 0 % |
| SESARM | KY | 1.2 | 1.6 % | 1.2 | 1.6 % | NA | NA % | 1.7 | 2.5 % | 0.9 | 1.2 % | 1.2 | 1.6 % |
| SESARM | NC | 0.5 | 0.6 % | 0.5 | 0.6 % | NA | NA % | 0 | 0 % | 0.3 | 0.5 % | 0.5 | 0.6 % |
| SESARM | TN | 0.5 | 0.6 % | 0.5 | 0.6 % | NA | NA % | 0.4 | 0.5 % | 0.2 | 0.3 % | 0.5 | 0.6 % |
| SESARM | WV | 1.3 | 1.8 % | 1.3 | 1.8 % | NA | NA % | 4.3 | 6.4 % | 1.7 | 2.3 % | 1.2 | 1.7 % |
| CENSARA | LA | 0.2 | 0.2 % | 0.2 | 0.2 % | NA | NA % | 0.1 | 0.2 % | 0.1 | 0.1 % | 0.2 | 0.2 % |
| CENSARA | OK | 0.2 | 0.2 % | 0.2 | 0.2 % | NA | NA % | 0.2 | 0.3 % | 0.1 | 0.2 % | 0.2 | 0.2 % |
| CENSARA | TX | 0.4 | 0.5 % | 0.4 | 0.5 % | NA | NA % | 0.3 | 0.5 % | 0.3 | 0.4 % | 0.4 | 0.5 % |
| Multi-State | AL/AR/GA/MS/SC | 0.5 | 0.7 % | 0.5 | 0.7 % | NA | NA % | 0.2 | 0.3 % | 0.3 | 0.4 % | 0.5 | 0.7 % |
| Multi-State | CO/MT/ND/NE/NM/WY | 0.2 | 0.3 % | 0.2 | 0.3 % | NA | NA % | 0.3 | 0.4 % | 0.2 | 0.3 % | 0.2 | 0.3 % |
| Multi-State | IA/MO/MN/NE/SD/WI | 0.6 | 0.8 % | 0.6 | 0.8 % | NA | NA % | 1.1 | 1.6 % | 0.6 | 0.8 % | 0.6 | 0.8 % |
| International | Canada | 0.8 | 1 % | 0.8 | 1 % | NA | NA % | 1.1 | 1.7 % | 1.1 | 1.5 % | 0.9 | 1.2 % |
| International | Mexcio | 0.1 | 0.1 % | 0.1 | 0.1 % | NA | NA % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| Not State Tagged | | 35.7 | 48.5 % | 35.7 | 48.5 % | NA | NA % | 33.9 | 50.9 % | 34.1 | 47 % | 33.7 | 44.8 % |

| | | RI: AJ (440030002) | | | | VT: Underhill (500070007) | | | | VA: Aurora Hills (510130020) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Exceedance Avg | | 4th High Avg. | | Exceedance Avg. | | 4th High Avg. | | Exceedance Avg. | | 4th High Avg. | |
| Region | State | Total | % | Total | % | Total | % | Total | % | Total | % | Total | % |
| OTC+VA | CT | NA | NA % | 2.9 | 4.3 % | NA | NA % | 0.5 | 1 % | 0.4 | 0.6 % | 0.3 | 0.4 % |
| OTC+VA | DC | NA | NA % | 0.1 | 0.1 % | NA | NA % | 0 | 0.1 % | 2.6 | 3.6 % | 2.8 | 3.9 % |
| OTC+VA | DE | NA | NA % | 0.7 | 1.1 % | NA | NA % | 0.2 | 0.4 % | 1 | 1.3 % | 0.7 | 1 % |
| OTC+VA | MA | NA | NA % | 0.2 | 0.4 % | NA | NA % | 0.5 | 1 % | 0.4 | 0.6 % | 0.3 | 0.5 % |
| OTC+VA | MD | NA | NA % | 1.9 | 2.9 % | NA | NA % | 0.9 | 1.7 % | 11.6 | 16 % | 10.1 | 14 % |
| OTC+VA | ME | NA | NA % | 0 | 0 % | NA | NA % | 0.1 | 0.1 % | 0 | 0 % | 0 | 0 % |
| OTC+VA | NH | NA | NA % | 0 | 0 % | NA | NA % | 0.1 | 0.2 % | 0 | 0.1 % | 0 | 0.1 % |
| OTC+VA | NJ | NA | NA % | 3.6 | 5.4 % | NA | NA % | 1.3 | 2.6 % | 1.8 | 2.4 % | 1.3 | 1.8 % |
| OTC+VA | NY | NA | NA % | 7.1 | 10.6 % | NA | NA % | 4.2 | 8.1 % | 2 | 2.8 % | 1.5 | 2.1 % |
| OTC+VA | PA | NA | NA % | 4.4 | 6.6 % | NA | NA % | 3.3 | 6.4 % | 5.2 | 7.2 % | 3.9 | 5.5 % |
| OTC+VA | RI | NA | NA % | 0.8 | 1.2 % | NA | NA % | 0.1 | 0.1 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| OTC+VA | VA | NA | NA % | 2.4 | 3.5 % | NA | NA % | 0.6 | 1.3 % | 11.4 | 15.7 % | 11.7 | 16.3 % |
| OTC+VA | VT | NA | NA % | 0 | 0 % | NA | NA % | 0.6 | 1.2 % | 0 | 0 % | 0 | 0 % |
| LADCO | IL | NA | NA % | 0.7 | 1 % | NA | NA % | 1.1 | 2.1 % | 0.3 | 0.4 % | 0.4 | 0.6 % |
| LADCO | IN | NA | NA % | 1 | 1.5 % | NA | NA % | 0.4 | 0.9 % | 0.4 | 0.5 % | 0.6 | 0.8 % |
| LADCO | MI | NA | NA % | 0.6 | 0.9 % | NA | NA % | 1.1 | 2.2 % | 0.5 | 0.8 % | 0.4 | 0.6 % |
| LADCO | OH | NA | NA % | 2.1 | 3.2 % | NA | NA % | 1.6 | 3.1 % | 1 | 1.3 % | 1.2 | 1.7 % |
| SESARM | FL | NA | NA % | 0 | 0.1 % | NA | NA % | 0.1 | 0.2 % | 0 | 0.1 % | 0 | 0 % |
| SESARM | KY | NA | NA % | 0.9 | 1.4 % | NA | NA % | 0.2 | 0.3 % | 0.2 | 0.3 % | 0.6 | 0.9 % |
| SESARM | NC | NA | NA % | 0.5 | 0.8 % | NA | NA % | 0.2 | 0.4 % | 0.3 | 0.4 % | 0.2 | 0.3 % |
| SESARM | TN | NA | NA % | 0.3 | 0.5 % | NA | NA % | 0.1 | 0.2 % | 0.1 | 0.2 % | 0.1 | 0.2 % |
| SESARM | WV | NA | NA % | 1.9 | 2.9 % | NA | NA % | 0.6 | 1.2 % | 0.8 | 1.1 % | 2 | 2.7 % |
| CENSARA | LA | NA | NA % | 0.2 | 0.2 % | NA | NA % | 0 | 0.1 % | 0 | 0.1 % | 0.1 | 0.1 % |
| CENSARA | OK | NA | NA % | 0.1 | 0.2 % | NA | NA % | 0 | 0 % | 0.1 | 0.1 % | 0.1 | 0.1 % |
| CENSARA | TX | NA | NA % | 0.3 | 0.4 % | NA | NA % | 0.1 | 0.2 % | 0.1 | 0.2 % | 0.2 | 0.2 % |
| Multi-State | AL/AR/GA/MS/SC | NA | NA % | 0.6 | 0.9 % | NA | NA % | 0.3 | 0.5 % | 0.3 | 0.4 % | 0.3 | 0.4 % |
| Multi-State | CO/MT/ND/NE/NM/WY | NA | NA % | 0.3 | 0.4 % | NA | NA % | 0.1 | 0.1 % | 0.2 | 0.3 % | 0.3 | 0.4 % |
| Multi-State | IA/MO/MN/NE/SD/WI | NA | NA % | 0.8 | 1.3 % | NA | NA % | 1 | 1.9 % | 0.5 | 0.6 % | 0.6 | 0.8 % |
| International | Canada | NA | NA % | 0.7 | 1.1 % | NA | NA % | 1.6 | 3.1 % | 1.3 | 1.8 % | 1 | 1.4 % |
| International | Mexcio | NA | NA % | 0.1 | 0.1 % | NA | NA % | 0 | 0.1 % | 0 | 0 % | 0 | 0 % |
| Not State Tagged | | NA | NA % | 31.6 | 47.2 % | NA | NA % | 30.5 | 59.4 % | 29.6 | 41 % | 30.8 | 42.9 % |

# Appendix L

# Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2016 Based Modeling Platform Technical Support Document: OTC V2/V3 Modeling Platform Update

**Ozone Transport Commission**

**July 14, 2023**

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## Executive Summary

The purpose of this addendum to the "Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2016 Based Modeling Platform Support Document, dated January 31, 2023" (OTC 2023 TSD) is to describe recent modeling conducted that was not documented in the OTC 2023 TSD that may be used by OTC states for their State Implementation Plan (SIP) attainment demonstrations for the 2008 and 2015 Ozone National Ambient Air Quality Standard (NAAQS).

Because it is a long process and as a result of improving data and methods, EPA issued three versions of the 2016 emissions modeling platform throughout its development. Between releases of the three versions, interim changes to parts of the inventory were released which were later incorporated into the next version. The January 2023 TSD described OTC modeling based on version 1 (V1) of the 2016 emissions inventory platform, which included future year emission inventory projections to 2023 and 2028. Subsequent 2016 inventory platforms, V2 and V3, were released to reflect updates to underlying emissions data and methods for calculation of base and future year emissions as well as including projections for additional future years, including the addition of 2026.

This addendum documents attainment modeling using the 2016 V2 modeling platform updated with the early release of 2016 V3 emissions profiles for commercial marine vessels (CMV) and solvents. In addition, OTC-specific updates to the point source inventory from the Eastern Regional Technical Advisory Committee (ERTAC) EGU projection tool were used instead of emissions from the Integrated Planning Model (IPM) in the standard EPA 2016 V2 inventory. The information contained within this document includes:

- An overview of the updates in the OTC V2/V3 platform.
- A comparison of emission differences between OTC V1 and OTC V2/V3 modeling platforms.
- A comparison of model performance between the Community Multi-scale Air Quality model (CMAQ) and the Comprehensive Air Quality Model with Extensions (CAMx) using both the OTC V1 and OTC V2/V3 modeling platforms.

A summary of emissions inventory inputs and differences are provided in the OTC 2023 TSD, but greater detail on the development and differences in versions can be found in the Environmental Protection Agency's (EPA) documentation of the 2016 emissions modeling platforms versions 1, 2 and 3.[1]

[1] 2014-2016 Version 7 Air Emissions Modeling Platforms | US EPA

# 1 OTC V2/V3 Platform Updates

The EPA 2016 V1 emissions platform was first released in October 2019 after several years of work by the National Emission Inventory Collaborative, a partnership between state emissions inventory staff, multi-jurisdictional organizations (MJOs), federal land managers (FLMs), EPA, and others. It included estimated emissions for base year 2016 and projected years 2023 and 2028. Detailed documentation of the OTC V1 modeling platform can be found in the OTC 2023 TSD.

Emissions are occasionally updated with improved information or estimation methods. Revisions for the EPA 2016 V1 emissions platform were released for commercial marine vessels (CMV), airports, EPA electricity generating units (EGU) point sources, and OTC EGU point sources subsequent the initial release of the V1 platform. These specific updates are summarized in the OTC 2023 TSD.

With model updates and improved emissions data and forecasts, EPA released the 2016 V2 emissions platform[2] in 2021. Further changes resulted in the release of the 2016 V3 emissions platform[3] in the spring of 2023. The full EPA 2016 V3 emissions platform was not available for the modeling presented here, however portions of the EPA 2016 V3 platform have been incorporated into this version of the OTC modeling, specifically for CMV, solvents, and ERTAC. An overview of the major changes in this modeling platform is provided for the 2016 V2 emissions platform in Section 1.1 and the 2016 V3 emissions platform updates in Section 1.2.

## *1.1 V2 Emissions Updates*

The EPA 2016 V2 emissions platform incorporates updated data, model versions, and methods. Specifically, it includes updated emissions from the Motor Vehicle Emission Simulator version 3 (MOVES3), anthropogenic and biogenic nonpoint source emissions from the 2017 National Emissions Inventory (NEI), and the Western Regional Air Partnership (WRAP) oil and gas inventory. It also includes updated inventory data for emissions from Canada and Mexico.

Projections from the EPA 2016 V2 emissions platform are available for 2023, 2026, and 2032. For future year EGU emissions, the OTC uses projections from the Eastern Regional Technical Advisory Committee (ERTAC) EGU tool in place of EPA's projections from the Integrated Planning Model (IPM). For the 2016 V2/V3 OTC platform, the ERTAC EGU modeled emissions incorporate impacts from the Revised Cross-state Air Pollution Rule Update (RCU). Because the universe of sources in

[2] https://www.epa.gov/air-emissions-modeling/2016v2-platform
[3] https://www.epa.gov/air-emissions-modeling/2016v3-platform

ERTAC EGU and IPM is not an exact match, use of ERTAC EGU projections also involved adjustments to the non-EGU point inventory so that no sources are dropped or double-counted. Additional details are documented in EPA V2 modeling platform documentation referenced above.

### *1.2 V3 Emissions Updates*

At the time the modeling for this document was performed, the complete EPA 2016 V3 emissions platform was not released. However, there were interim updates to the V2 CMV and solvents sectors for inclusion in V3 that were released early and used in the modeling and analysis presented in this addendum. A list of emissions files used by OTC in the V2/V3 platform are available in Appendix A.

For the CMV Category 1 and 2 engines (CMV_c1c2) and Category 3 engines (CMV_c3) sectors, spatial allocation to county boundaries was improved in response to comments from relevant stakeholders. Overall CMV emissions do not change from V2, but the spatial allocation was improved such that emissions are more accurately assigned to some counties.

For the solvents sector, a new methodology for calculating evaporative emissions from the volatile chemical products (VCP) category of the non-point solvents sector was incorporated into the EPA 2016 V2 platform. The updates improved the distribution and characterization of emissions and removed overlap with the point source sector. EPA responded to several significant comments on the solvents in the 2016 V2 modeling platform inventory, creating an early 2016 V3 platform for use by the OTC states in their modeling. This methodology had not yet been used in any version of the EPA NEI and was a first iteration.

These early interim updates were subsequently used in the final EPA 2016 V3 platform. Additional details are documented in the EPA 2016 V3 modeling platform Technical Support Document.[4]

## 2 2016 V1 and 2016 V2/3 Emissions Comparisons

### *2.1 Emissions Totals by State*

Tables for emissions of carbon monoxide (CO), nitrogen oxides ($NO_X$), ammonia ($NH_3$), fine particulate matter ($PM_{2.5}$), volatile organic compounds (VOC), and sulfur dioxide ($SO_2$) per state per sector in the Ozone Transport Region (OTR) are shown below for V1 and V2/V3 2016 (Tables 1-6) and 2023 (Tables 7-12), with 2026 emissions totals

[4] https://www.epa.gov/system/files/documents/2023-03/2016v3_EmisMod_TSD_January2023_1.pdf

available upon request. The majority of V2/V3 emissions are from V2, with the combined CMV (CMV_c1c2 and CMV_c3) and non-point solvents (NP_Solvents) coming from V3. However we refer to this inventory as V2/V3 throughout the report. Some sectors show no changes between V1 and V2/V3, for example CO emissions from nonroad, while other sectors show large changes between platform versions, for example CO emissions from airports. Specific differences between V1 and V2/V3 for each sector and state may vary, but in general most sectors and states see decreases with V2/V3 with some notable increases in Oil & Gas VOCs, On-road and Agriculture (AG) $NH_3$, and slight increases for $SO_2$, VOC, and $NO_X$ from electricity generating units (PTERTAC).

*Table 1 CO Emissions for 2016.*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 157,510 | 147,054 | 114,949 | 114,949 | 273 | 273 | 7,555 | 6,914 | 2,787 | 2,073 | 130 | 130 | 2,668 | 2,668 | 33,798 | 26,204 |
| Delaware | 65,412 | 47,888 | 52,149 | 52,149 | 428 | 428 | 3,713 | 2,216 | 1,085 | 1,084 | 43 | 43 | 1,292 | 1,292 | 3,525 | 5,679 |
| District of Columbia | 24,211 | 21,256 | 7,500 | 7,500 | 25 | 25 | 133 | 150 | 4 | 4 | 32 | 32 | 0 | 0 | 348 | 86 |
| Maine | 85,007 | 73,492 | 92,124 | 92,124 | 439 | 439 | 87,451 | 47,395 | 2,322 | 2,035 | 126 | 126 | 8,017 | 8,017 | 38,840 | 57,629 |
| Maryland | 288,389 | 266,896 | 211,115 | 211,115 | 1,184 | 1,184 | 19,921 | 14,709 | 8,777 | 6,385 | 447 | 447 | 5,655 | 5,655 | 16,945 | 40,539 |
| Massachusetts | 272,379 | 236,291 | 229,432 | 229,432 | 762 | 762 | 14,283 | 12,070 | 13,244 | 8,779 | 531 | 531 | 7,798 | 7,798 | 47,930 | 35,073 |
| New Hampshire | 79,401 | 70,066 | 67,910 | 67,910 | 42 | 42 | 19,328 | 14,144 | 2,987 | 2,162 | 39 | 39 | 4,473 | 4,473 | 28,987 | 33,617 |
| New Jersey | 384,083 | 331,955 | 297,888 | 297,888 | 1,988 | 1,988 | 14,738 | 10,782 | 14,706 | 9,349 | 720 | 720 | 36,022 | 36,022 | 35,165 | 41,948 |
| New York | 645,089 | 472,513 | 561,467 | 561,467 | 1,020 | 1,020 | 78,644 | 54,164 | 29,771 | 18,985 | 2,128 | 2,128 | 27,960 | 27,960 | 125,104 | 65,607 |
| Pennsylvania | 644,261 | 563,190 | 409,724 | 409,724 | 342 | 342 | 67,794 | 53,680 | 17,118 | 12,251 | 2,612 | 2,612 | 66,732 | 66,732 | 146,541 | 102,378 |
| Rhode Island | 45,232 | 39,527 | 29,129 | 29,129 | 238 | 238 | 1,922 | 1,730 | 1,774 | 1,103 | 7 | 7 | 221 | 221 | 8,657 | 6,366 |
| Vermont | 36,886 | 29,494 | 33,318 | 33,318 | 0 | 0 | 17,615 | 11,941 | 1,158 | 970 | 73 | 73 | 2,856 | 2,856 | 48,946 | 38,950 |
| Virginia | 578,911 | 553,613 | 299,518 | 299,518 | 1,738 | 1,738 | 94,464 | 70,243 | 27,547 | 16,743 | 1,820 | 1,820 | 163,352 | 163,352 | 40,454 | 66,896 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 123 | 123 | 959 | 1,136 | 516 | 515 | - | - | 11,357 | 7,993 | - | - | - | - |
| Delaware | 11 | 11 | 826 | 902 | 1,774 | 1,741 | - | - | 2,784 | 3,040 | - | - | - | - |
| District of Columbia | 0 | 0 | | 19 | 224 | 199 | - | - | 1,334 | 1,103 | - | - | - | - |
| Maine | 42 | 42 | 6,668 | 6,692 | 5,695 | 5,694 | - | - | 18,088 | 26,581 | - | - | - | - |
| Maryland | 52 | 52 | 5,554 | 4,088 | 4,434 | 4,426 | - | - | 36,041 | 31,323 | - | - | - | - |
| Massachusetts | 156 | 156 | 5,191 | 5,326 | 32,502 | 2,296 | - | - | 56,287 | 34,903 | - | - | - | - |
| New Hampshire | 0 | 0 | 2,047 | 2,514 | 993 | 767 | - | - | 17,959 | 15,849 | - | - | - | - |
| New Jersey | 104 | 104 | 4,814 | 4,781 | 3,924 | 3,872 | - | - | 20,560 | 16,954 | - | - | - | - |
| New York | 1,920 | 1,960 | 9,637 | 8,546 | 25,196 | 24,680 | - | - | 107,802 | 78,367 | - | - | - | - |
| Pennsylvania | 48,690 | 57,815 | 45,642 | 38,762 | 33,960 | 32,693 | - | - | 136,928 | 114,713 | - | - | - | - |
| Rhode Island | 99 | 99 | 155 | 155 | 752 | 752 | - | - | 12,174 | 6,742 | - | - | - | - |
| Vermont | 0 | 0 | 193 | 1,065 | 1,481 | 135 | - | - | 8,279 | 5,647 | - | - | - | - |
| Virginia | 14,543 | 5,336 | 8,839 | 10,050 | 20,971 | 19,320 | - | - | 74,023 | 64,994 | - | - | - | - |

*CMV – commercial marine vessels*
*RWC – residential wood combustion*
*PTERTAC – electricity generating units*
*PTNONERTAC – non-electricity generating point sources*
*AG – agriculture*
*NONPT – non-point area sources*
*NP_Solvents – non-point solvent sources*
*AFDust - area fugitive dust*

*Table 2 $NO_X$ Emissions for 2016*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 20,743 | 17,481 | 7,840 | 7,840 | 1,856 | 1,720 | 598 | 604 | 622 | 334 | 1,041 | 1,041 | 46 | 46 | 540 | 471 |
| Delaware | 9,327 | 9,194 | 3,741 | 3,741 | 3,182 | 3,636 | 736 | 1,093 | 233 | 232 | 251 | 251 | 18 | 18 | 56 | 90 |
| District of Columbia | 3,137 | 2,167 | 664 | 664 | 162 | 191 | 13 | 24 | 0 | 0 | 200 | 200 | 0 | 0 | 8 | 5 |
| Maine | 16,291 | 15,301 | 6,622 | 6,622 | 3,004 | 3,106 | 2,325 | 2,348 | 365 | 283 | 1,013 | 1,013 | 97 | 97 | 542 | 870 |
| Maryland | 50,604 | 47,924 | 10,930 | 10,930 | 8,380 | 8,573 | 2,970 | 4,195 | 3,041 | 2,131 | 2,735 | 2,735 | 87 | 87 | 271 | 658 |
| Massachusetts | 40,627 | 37,717 | 15,334 | 15,334 | 5,183 | 5,171 | 873 | 910 | 3,493 | 1,988 | 4,027 | 4,027 | 125 | 125 | 743 | 660 |
| New Hampshire | 11,943 | 10,490 | 4,452 | 4,452 | 286 | 222 | 683 | 618 | 625 | 395 | 313 | 313 | 69 | 69 | 421 | 513 |
| New Jersey | 67,673 | 58,183 | 21,115 | 21,115 | 14,178 | 10,445 | 1,283 | 1,988 | 6,099 | 3,227 | 5,344 | 5,344 | 473 | 473 | 610 | 802 |
| New York | 104,823 | 86,805 | 38,463 | 38,463 | 7,249 | 10,733 | 8,734 | 11,280 | 10,581 | 5,630 | 12,776 | 12,776 | 406 | 406 | 1,895 | 1,131 |
| Pennsylvania | 122,046 | 115,683 | 31,177 | 31,177 | 2,544 | 2,639 | 9,906 | 12,364 | 4,201 | 2,357 | 14,372 | 14,372 | 956 | 956 | 2,136 | 1,698 |
| Rhode Island | 8,404 | 8,099 | 2,327 | 2,327 | 1,642 | 1,785 | 149 | 160 | 365 | 220 | 54 | 54 | 4 | 4 | 143 | 121 |
| Vermont | 5,314 | 4,612 | 5,067 | 5,067 | 1 | 5 | 1,198 | 1,276 | 209 | 162 | 584 | 584 | 40 | 40 | 863 | 785 |
| Virginia | 94,572 | 85,665 | 22,137 | 22,137 | 12,705 | 12,648 | 9,166 | 11,373 | 7,801 | 4,222 | 9,821 | 9,821 | 2,863 | 2,863 | 642 | 1,067 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 214 | 214 | 4,057 | 4,064 | 745 | 745 | - | - | 10,619 | 10,615 | - | - | - | - |
| Delaware | 19 | 19 | 1,407 | 1,493 | 1,951 | 1,867 | - | - | 2,648 | 2,657 | - | - | - | - |
| District of Columbia | 0 | 0 | 0 | 68 | 365 | 285 | - | - | 1,650 | 1,643 | - | - | - | - |
| Maine | 25 | 25 | 4,919 | 4,924 | 5,041 | 5,039 | - | - | 6,244 | 8,980 | - | - | - | - |
| Maryland | 158 | 157 | 10,419 | 10,447 | 7,941 | 7,930 | - | - | 11,075 | 11,975 | - | - | - | - |
| Massachusetts | 263 | 263 | 7,643 | 7,975 | 11,827 | 3,888 | - | - | 23,072 | 21,852 | - | - | - | - |
| New Hampshire | 0 | 0 | 1,707 | 2,187 | 925 | 453 | - | - | 8,427 | 8,137 | - | - | - | - |
| New Jersey | 233 | 233 | 6,852 | 6,442 | 4,655 | 4,606 | - | - | 20,116 | 20,142 | - | - | - | - |
| New York | 1,984 | 2,014 | 16,177 | 19,358 | 17,324 | 14,154 | - | - | 53,415 | 51,475 | - | - | - | - |
| Pennsylvania | 44,692 | 49,931 | 81,836 | 84,500 | 36,249 | 33,034 | - | - | 51,747 | 50,556 | - | - | - | - |
| Rhode Island | 59 | 59 | 448 | 448 | 904 | 904 | - | - | 2,792 | 2,617 | - | - | - | - |
| Vermont | 0 | 0 | 135 | 312 | 273 | 106 | - | - | 3,004 | 2,941 | - | - | - | - |
| Virginia | 10,932 | 4,252 | 26,484 | 28,740 | 21,192 | 18,654 | - | - | 16,988 | 17,267 | - | - | - | - |

*Table 3 $NH_3$ Emissions for 2016*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 898 | 959 | 14 | 14 | - | - | - | - | - | - | 0 | 0 | 44 | 44 | 225 | 198 |
| Delaware | 309 | 324 | 7 | 7 | - | - | - | - | - | - | 0 | 0 | 21 | 21 | 25 | 47 |
| District of Columbia | 140 | 129 | 1 | 1 | - | - | - | - | - | - | 0 | 0 | 0 | 0 | 2 | 0 |
| Maine | 442 | 475 | 14 | 14 | - | - | - | - | - | - | 0 | 0 | 131 | 131 | 267 | 400 |
| Maryland | 1,688 | 1,837 | 22 | 22 | - | - | - | - | - | - | 1 | 1 | 93 | 93 | 122 | 335 |
| Massachusetts | 1,700 | 1,808 | 28 | 28 | - | - | - | - | - | - | 2 | 2 | 128 | 128 | 343 | 274 |
| New Hampshire | 389 | 420 | 10 | 10 | - | - | - | - | - | - | 0 | 0 | 74 | 74 | 219 | 240 |
| New Jersey | 2,240 | 2,365 | 43 | 43 | - | - | - | - | - | - | 2 | 2 | 591 | 591 | 241 | 350 |
| New York | 3,570 | 3,754 | 75 | 75 | - | - | - | - | - | - | 7 | 7 | 459 | 459 | 865 | 493 |
| Pennsylvania | 3,209 | 3,478 | 61 | 61 | - | - | - | - | - | - | 8 | 8 | 1,096 | 1,096 | 978 | 785 |
| Rhode Island | 237 | 256 | 4 | 4 | - | - | - | - | - | - | 0 | 0 | 4 | 4 | 58 | 50 |
| Vermont | 206 | 217 | 10 | 10 | - | - | - | - | - | - | 0 | 0 | 47 | 47 | 383 | 263 |
| Virginia | 2,782 | 2,939 | 40 | 40 | - | - | - | - | - | - | 6 | 6 | 2,693 | 2,693 | 289 | 517 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | - | - | 170 | 172 | 229 | 229 | 2,414 | 2,975 | 783 | 788 | - | - | - | - |
| Delaware | - | - | 83 | 89 | 120 | 116 | 6,825 | 6,436 | 154 | 79 | - | - | - | - |
| District of Columbia | - | - | 0 | 0 | 0 | 0 | 0 | 5 | 153 | 156 | - | - | - | - |
| Maine | - | - | 150 | 148 | 306 | 306 | 2,621 | 4,431 | 369 | 313 | - | - | - | - |
| Maryland | - | - | 147 | 120 | 230 | 230 | 12,018 | 3,213 | 1,288 | 1,161 | - | - | - | - |
| Massachusetts | - | - | 364 | 355 | 471 | 163 | 1,159 | 1,763 | 1,743 | 10,299 | - | - | - | - |
| New Hampshire | - | - | 101 | 133 | 15 | 11 | 705 | 1,339 | 205 | 202 | - | - | - | - |
| New Jersey | - | - | 857 | 780 | 681 | 674 | 1,781 | 2,832 | 415 | 408 | - | - | - | - |
| New York | - | - | 884 | 783 | 548 | 519 | 33,884 | 39,126 | 1,664 | 1,638 | - | - | - | - |
| Pennsylvania | - | - | 1,368 | 1,617 | 1,463 | 1,403 | 53,722 | 58,405 | 3,175 | 3,177 | - | - | - | - |
| Rhode Island | - | - | 24 | 24 | 17 | 16 | 164 | 269 | 253 | 254 | - | - | - | - |
| Vermont | - | - | 0 | 17 | 24 | 7 | 5,562 | 6,187 | 110 | 121 | - | - | - | - |
| Virginia | - | - | 1,195 | 695 | 2,213 | 1,991 | 33,138 | 37,186 | 1,140 | 1,157 | - | - | - | - |

*Table 4 PM$_{2.5}$ Emissions for 2016*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 656 | 514 | 791 | 790 | 46 | 46 | - | - | 36 | 31 | 30 | 30 | 237 | 237 | 4,930 | 3,523 |
| Delaware | 264 | 284 | 293 | 293 | 66 | 66 | - | - | 29 | 29 | 7 | 7 | 112 | 112 | 505 | 767 |
| District of Columbia | 155 | 105 | 73 | 72 | 4 | 4 | - | - | 0 | 0 | 6 | 6 | 0 | 0 | 53 | 17 |
| Maine | 572 | 528 | 694 | 693 | 72 | 72 | - | - | 45 | 43 | 29 | 29 | 682 | 682 | 5,648 | 7,939 |
| Maryland | 1,814 | 1,583 | 1,287 | 1,285 | 172 | 172 | - | - | 147 | 133 | 78 | 78 | 495 | 495 | 2,422 | 5,449 |
| Massachusetts | 1,626 | 1,402 | 1,578 | 1,576 | 126 | 126 | - | - | 161 | 138 | 115 | 115 | 687 | 687 | 7,220 | 4,761 |
| New Hampshire | 427 | 348 | 506 | 505 | 7 | 7 | - | - | 42 | 36 | 9 | 9 | 392 | 392 | 4,258 | 4,578 |
| New Jersey | 2,298 | 1,946 | 2,099 | 2,092 | 322 | 322 | - | - | 171 | 131 | 152 | 152 | 3,092 | 3,092 | 5,014 | 5,702 |
| New York | 4,442 | 3,444 | 3,791 | 3,783 | 162 | 162 | - | - | 334 | 263 | 368 | 368 | 2,429 | 2,429 | 17,988 | 9,003 |
| Pennsylvania | 4,169 | 3,701 | 3,347 | 3,340 | 66 | 66 | - | - | 227 | 195 | 415 | 415 | 5,788 | 5,788 | 21,459 | 13,896 |
| Rhode Island | 325 | 288 | 216 | 216 | 40 | 40 | - | - | 18 | 15 | 2 | 2 | 20 | 20 | 1,263 | 866 |
| Vermont | 220 | 154 | 500 | 498 | 0 | 0 | - | - | 21 | 20 | 17 | 17 | 247 | 247 | 7,546 | 4,959 |
| Virginia | 2,626 | 2,322 | 2,372 | 2,368 | 268 | 268 | - | - | 406 | 278 | 285 | 285 | 14,563 | 14,563 | 5,766 | 8,825 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 16 | 16 | 318 | 305 | 142 | 141 | - | - | 3,143 | 2,917 | - | - | 3,371 | 4,007 |
| Delaware | 6 | 6 | 174 | 196 | 437 | 434 | - | - | 371 | 454 | - | - | 2,494 | 2,343 |
| District of Columbia | 0 | 0 | 0 | 6 | 29 | 23 | - | - | 434 | 433 | - | - | 378 | 406 |
| Maine | 1 | 1 | 697 | 694 | 1,266 | 1,265 | - | - | 3,305 | 9,602 | - | - | 5,941 | 8,669 |
| Maryland | 11 | 11 | 2,427 | 2,053 | 997 | 995 | - | - | 5,472 | 6,570 | - | - | 16,716 | 11,928 |
| Massachusetts | 14 | 14 | 536 | 569 | 3,653 | 733 | - | - | 8,832 | 8,820 | - | - | 18,148 | 9,355 |
| New Hampshire | 0 | 0 | 202 | 212 | 289 | 231 | - | - | 2,951 | 2,580 | - | - | 4,569 | 4,277 |
| New Jersey | 19 | 19 | 1,162 | 1,161 | 1,314 | 1,306 | - | - | 4,040 | 4,382 | - | - | 9,034 | 6,016 |
| New York | 105 | 107 | 1,371 | 1,616 | 2,218 | 1,915 | - | - | 20,436 | 17,025 | - | - | 43,956 | 33,524 |
| Pennsylvania | 1,136 | 1,213 | 5,734 | 5,033 | 11,258 | 10,483 | - | - | 24,407 | 25,524 | - | - | 37,698 | 24,363 |
| Rhode Island | 6 | 6 | 93 | 93 | 93 | 93 | - | - | 1,442 | 1,246 | - | - | 783 | 772 |
| Vermont | 0 | 0 | 1 | 49 | 135 | 87 | - | - | 1,295 | 1,354 | - | - | 3,265 | 8,439 |
| Virginia | 284 | 102 | 1,647 | 2,121 | 3,630 | 3,516 | - | - | 15,756 | 17,530 | - | - | 36,874 | 20,114 |

*Table 5 VOC Emissions for 2016*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 14,748 | 10,146 | 8,833 | 8,884 | 72 | 72 | 68,677 | 75,710 | 257 | 156 | 46 | 46 | 632 | 632 | 5,489 | 3,735 |
| Delaware | 5,764 | 3,126 | 7,152 | 7,226 | 207 | 207 | 25,255 | 13,972 | 132 | 132 | 12 | 12 | 305 | 305 | 569 | 849 |
| District of Columbia | 2,325 | 1,260 | 539 | 547 | 5 | 5 | 1,478 | 1,267 | 0 | 0 | 9 | 9 | 0 | 0 | 62 | 22 |
| Maine | 7,857 | 5,450 | 17,730 | 17,683 | 118 | 118 | 437,655 | 275,305 | 180 | 155 | 45 | 45 | 1,888 | 1,888 | 6,028 | 8,172 |
| Maryland | 23,013 | 17,666 | 17,994 | 18,134 | 514 | 514 | 157,380 | 127,237 | 1,264 | 955 | 125 | 125 | 1,337 | 1,337 | 2,732 | 6,044 |
| Massachusetts | 24,150 | 16,871 | 19,296 | 19,384 | 225 | 225 | 107,668 | 104,291 | 1,233 | 788 | 179 | 179 | 1,845 | 1,845 | 7,724 | 4,978 |
| New Hampshire | 6,870 | 4,869 | 9,103 | 9,137 | 14 | 14 | 113,453 | 95,220 | 542 | 325 | 14 | 14 | 1,058 | 1,058 | 4,405 | 4,716 |
| New Jersey | 30,779 | 21,706 | 24,843 | 25,031 | 703 | 703 | 114,470 | 97,617 | 2,041 | 1,150 | 237 | 237 | 8,494 | 8,494 | 5,694 | 5,837 |
| New York | 57,504 | 37,752 | 53,331 | 53,366 | 368 | 368 | 437,431 | 364,307 | 2,911 | 1,712 | 587 | 587 | 6,603 | 6,603 | 19,627 | 9,304 |
| Pennsylvania | 62,012 | 43,187 | 36,000 | 36,185 | 147 | 147 | 532,770 | 474,762 | 1,653 | 1,031 | 668 | 668 | 15,757 | 15,757 | 23,401 | 14,355 |
| Rhode Island | 4,301 | 3,059 | 2,443 | 2,457 | 71 | 71 | 18,303 | 18,623 | 154 | 100 | 2 | 2 | 52 | 52 | 1,415 | 910 |
| Vermont | 3,359 | 2,105 | 4,896 | 4,882 | 0 | 0 | 87,629 | 71,303 | 103 | 87 | 26 | 26 | 674 | 674 | 7,326 | 5,462 |
| Virginia | 50,020 | 36,093 | 26,631 | 26,853 | 729 | 729 | 899,017 | 754,378 | 6,593 | 3,519 | 460 | 460 | 38,717 | 38,717 | 6,504 | 10,181 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 86 | 86 | 111 | 116 | 666 | 536 | 181 | 181 | 8,923 | 5,254 | 33,206 | 26,778 | - | - |
| Delaware | 5 | 5 | 103 | 107 | 850 | 766 | 540 | 471 | 1,488 | 1,429 | 4,659 | 6,768 | - | - |
| District of Columbia | 0 | 0 | 0 | 2 | 55 | 15 | 0 | 0 | 425 | 285 | 4,404 | 4,464 | - | - |
| Maine | 53 | 53 | 197 | 206 | 2,365 | 1,951 | 168 | 168 | 2,956 | 3,018 | 11,990 | 10,833 | - | - |
| Maryland | 40 | 40 | 260 | 288 | 1,846 | 1,652 | 881 | 42 | 14,132 | 8,756 | 35,397 | 44,962 | - | - |
| Massachusetts | 78 | 78 | 316 | 327 | 4,846 | 1,412 | 74 | 74 | 17,917 | 15,190 | 55,620 | 51,584 | - | - |
| New Hampshire | 0 | 0 | 80 | 83 | 238 | 146 | 47 | 47 | 2,472 | 2,422 | 10,605 | 11,219 | - | - |
| New Jersey | 125 | 125 | 222 | 223 | 6,616 | 5,562 | 118 | 118 | 46,372 | 18,538 | 32,507 | 68,267 | - | - |
| New York | 7,018 | 6,087 | 950 | 1,150 | 6,380 | 4,851 | 2,309 | 2,309 | 37,117 | 37,599 | 169,342 | 147,231 | - | - |
| Pennsylvania | 90,763 | 115,443 | 974 | 1,107 | 20,160 | 11,789 | 3,952 | 3,952 | 27,086 | 24,629 | 143,382 | 127,769 | - | - |
| Rhode Island | 33 | 33 | 7 | 7 | 933 | 570 | 10 | 10 | 1,562 | 1,092 | 9,371 | 8,386 | - | - |
| Vermont | 0 | 0 | 4 | 42 | 320 | 33 | 404 | 404 | 1,732 | 1,502 | 5,747 | 5,034 | - | - |
| Virginia | 11,848 | 8,642 | 798 | 924 | 16,371 | 8,843 | 2,357 | 2,357 | 31,315 | 30,477 | 58,634 | 70,189 | - | - |

*Table 6 $SO_2$ Emissions for 2016*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 297 | 300 | 18 | 15 | 7 | 7 | - | - | 89 | 48 | 0 | 0 | 23 | 23 | 114 | 95 |
| Delaware | 104 | 100 | 9 | 8 | 84 | 84 | - | - | 23 | 23 | 0 | 0 | 10 | 10 | 10 | 19 |
| District of Columbia | 52 | 49 | 1 | 1 | 0 | 0 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Maine | 159 | 156 | 18 | 16 | 23 | 23 | - | - | 47 | 35 | 0 | 0 | 56 | 56 | 150 | 278 |
| Maryland | 616 | 594 | 28 | 26 | 153 | 153 | - | - | 389 | 254 | 2 | 2 | 45 | 45 | 49 | 134 |
| Massachusetts | 627 | 617 | 36 | 31 | 54 | 54 | - | - | 469 | 262 | 2 | 2 | 64 | 64 | 164 | 126 |
| New Hampshire | 142 | 139 | 12 | 11 | 4 | 4 | - | - | 82 | 50 | 0 | 0 | 36 | 36 | 105 | 154 |
| New Jersey | 774 | 753 | 52 | 41 | 227 | 227 | - | - | 713 | 377 | 3 | 3 | 265 | 265 | 107 | 141 |
| New York | 1,332 | 1,325 | 95 | 81 | 94 | 94 | - | - | 1,410 | 744 | 8 | 8 | 217 | 217 | 444 | 269 |
| Pennsylvania | 1,034 | 972 | 74 | 54 | 55 | 55 | - | - | 603 | 332 | 9 | 9 | 515 | 515 | 544 | 397 |
| Rhode Island | 84 | 79 | 5 | 4 | 15 | 15 | - | - | 51 | 29 | 0 | 0 | 2 | 2 | 28 | 21 |
| Vermont | 80 | 76 | 11 | 7 | 0 | 0 | - | - | 28 | 20 | 0 | 0 | 22 | 22 | 262 | 178 |
| Virginia | 908 | 883 | 49 | 40 | 260 | 260 | - | - | 1,060 | 566 | 6 | 6 | 1,422 | 1,422 | 119 | 228 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 3 | 3 | 517 | 521 | 94 | 94 | - | - | 7,882 | 7,878 | - | - | - | - |
| Delaware | 0 | 0 | 568 | 579 | 753 | 745 | - | - | 425 | 399 | - | - | - | - |
| District of Columbia | 0 | 0 | 0 | 0 | 21 | 21 | - | - | 40 | 40 | - | - | - | - |
| Maine | 1 | 1 | 1,643 | 1,668 | 1,549 | 1,549 | - | - | 6,011 | 6,345 | - | - | - | - |
| Maryland | 0 | 0 | 17,010 | 17,077 | 10,043 | 10,043 | - | - | 3,590 | 3,765 | - | - | - | - |
| Massachusetts | 2 | 2 | 2,344 | 2,348 | 4,255 | 814 | - | - | 7,451 | 7,316 | - | - | - | - |
| New Hampshire | 0 | 0 | 655 | 692 | 508 | 486 | - | - | 4,362 | 4,337 | - | - | - | - |
| New Jersey | 6 | 6 | 1,924 | 1,932 | 834 | 834 | - | - | 1,062 | 1,076 | - | - | - | - |
| New York | 23 | 28 | 4,919 | 4,943 | 16,459 | 7,153 | - | - | 6,282 | 6,022 | - | - | - | - |
| Pennsylvania | 1,107 | 1,743 | 98,810 | 98,709 | 21,400 | 15,772 | - | - | 9,247 | 9,075 | - | - | - | - |
| Rhode Island | 2 | 2 | 14 | 14 | 328 | 328 | - | - | 322 | 276 | - | - | - | - |
| Vermont | 0 | 0 | 1 | 2 | 44 | 42 | - | - | 511 | 492 | - | - | - | - |
| Virginia | 54 | 45 | 11,151 | 14,935 | 22,183 | 22,101 | - | - | 3,704 | 3,693 | - | - | - | - |

*Table 7 CO emissions for 2023*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 106,103 | 93,131 | 113,627 | 113,627 | 274 | 274 | 7,555 | 6,914 | 2,824 | 2,092 | 128 | 128 | 2,668 | 2,668 | 32,777 | 26,287 |
| Delaware | 45,935 | 34,267 | 53,899 | 53,899 | 499 | 499 | 3,713 | 2,216 | 1,144 | 1,154 | 43 | 43 | 1,292 | 1,292 | 3,499 | 5,629 |
| District of Columbia | 17,083 | 16,221 | 7,647 | 7,647 | 25 | 25 | 133 | 150 | 4 | 4 | 32 | 32 | 0 | 0 | 352 | 92 |
| Maine | 59,583 | 52,543 | 86,371 | 86,371 | 451 | 451 | 87,451 | 47,395 | 2,569 | 2,220 | 127 | 127 | 8,017 | 8,017 | 36,690 | 54,854 |
| Maryland | 202,542 | 188,137 | 215,559 | 215,559 | 1,340 | 1,340 | 19,921 | 14,709 | 9,355 | 7,062 | 443 | 443 | 5,655 | 5,655 | 16,830 | 40,230 |
| Massachusetts | 191,085 | 165,465 | 227,652 | 227,652 | 792 | 792 | 14,283 | 12,070 | 14,565 | 9,466 | 515 | 515 | 7,798 | 7,798 | 47,370 | 35,380 |
| New Hampshire | 56,935 | 52,566 | 66,049 | 66,049 | 45 | 45 | 19,328 | 14,144 | 2,752 | 2,097 | 39 | 39 | 4,473 | 4,473 | 28,026 | 32,360 |
| New Jersey | 256,511 | 210,903 | 296,604 | 296,604 | 2,144 | 2,144 | 14,738 | 10,782 | 16,915 | 10,406 | 693 | 693 | 36,022 | 36,022 | 34,099 | 42,888 |
| New York | 475,427 | 369,044 | 588,967 | 588,967 | 1,085 | 1,085 | 78,644 | 54,164 | 32,117 | 19,202 | 2,093 | 2,093 | 27,960 | 27,960 | 119,192 | 64,672 |
| Pennsylvania | 433,476 | 385,790 | 405,486 | 405,486 | 370 | 370 | 67,794 | 53,680 | 18,714 | 13,076 | 2,630 | 2,630 | 66,732 | 66,732 | 139,724 | 101,652 |
| Rhode Island | 30,722 | 26,391 | 28,491 | 28,491 | 247 | 247 | 1,922 | 1,730 | 1,881 | 1,074 | 7 | 7 | 221 | 221 | 8,446 | 6,484 |
| Vermont | 26,868 | 21,939 | 32,505 | 32,505 | 0 | 0 | 17,615 | 11,941 | 1,109 | 837 | 74 | 74 | 2,856 | 2,856 | 50,544 | 41,020 |
| Virginia | 411,777 | 401,467 | 293,639 | 293,639 | 1,958 | 1,958 | 94,464 | 70,243 | 28,700 | 16,425 | 1,833 | 1,833 | 163,352 | 163,352 | 40,070 | 65,578 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 179 | 155 | 3,776 | 1,297 | 535 | 532 | - | - | 11,606 | 8,703 | - | - | - | - |
| Delaware | 11 | 11 | 972 | 945 | 1,878 | 1,842 | - | - | 3,075 | 3,390 | - | - | - | - |
| District of Columbia | 0 | 0 | 1 | 466 | 239 | 209 | - | - | 1,441 | 1,236 | - | - | - | - |
| Maine | 62 | 53 | 2,858 | 5,456 | 5,142 | 4,941 | - | - | 18,197 | 26,377 | - | - | - | - |
| Maryland | 76 | 65 | 10,181 | 5,673 | 4,331 | 4,084 | - | - | 36,467 | 31,938 | - | - | - | - |
| Massachusetts | 154 | 152 | 6,962 | 4,766 | 32,631 | 2,354 | - | - | 56,847 | 35,999 | - | - | - | - |
| New Hampshire | 0 | 0 | 1,121 | 1,062 | 987 | 756 | - | - | 18,031 | 16,032 | - | - | - | - |
| New Jersey | 132 | 118 | 14,513 | 5,827 | 4,092 | 4,096 | - | - | 20,976 | 17,236 | - | - | - | - |
| New York | 2,143 | 2,027 | 21,837 | 18,208 | 25,153 | 23,672 | - | - | 107,886 | 78,406 | - | - | - | - |
| Pennsylvania | 51,416 | 66,015 | 76,662 | 44,550 | 35,430 | 33,122 | - | - | 138,686 | 117,313 | - | - | - | - |
| Rhode Island | 148 | 128 | 1,881 | 675 | 928 | 746 | - | - | 12,233 | 6,880 | - | - | - | - |
| Vermont | 0 | 0 | 42 | 1,320 | 1,483 | 137 | - | - | 8,344 | 5,770 | - | - | - | - |
| Virginia | 12,382 | 4,784 | 17,233 | 10,868 | 22,488 | 20,898 | - | - | 75,011 | 66,203 | - | - | - | - |

*Table 8 $NO_X$ emissions for 2023*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 8,758 | 6,911 | 5,446 | 5,446 | 1,341 | 1,341 | 598 | 604 | 688 | 374 | 1,024 | 1,024 | 46 | 46 | 560 | 504 |
| Delaware | 4,051 | 4,084 | 3,018 | 3,018 | 774 | 774 | 736 | 1,093 | 231 | 232 | 216 | 216 | 18 | 18 | 58 | 94 |
| District of Columbia | 1,689 | 1,051 | 390 | 390 | 2,076 | 2,076 | 13 | 24 | 0 | 0 | 178 | 178 | 0 | 0 | 9 | 5 |
| Maine | 7,562 | 7,208 | 5,092 | 5,092 | 2,232 | 2,232 | 2,325 | 2,348 | 415 | 297 | 1,023 | 1,023 | 97 | 97 | 550 | 918 |
| Maryland | 22,746 | 22,815 | 7,895 | 7,895 | 6,975 | 6,975 | 2,970 | 4,195 | 3,264 | 2,297 | 2,398 | 2,398 | 87 | 87 | 283 | 691 |
| Massachusetts | 19,509 | 19,702 | 10,423 | 10,423 | 3,912 | 3,912 | 873 | 910 | 4,415 | 2,501 | 3,804 | 3,804 | 125 | 125 | 775 | 712 |
| New Hampshire | 5,661 | 4,942 | 3,334 | 3,334 | 221 | 221 | 683 | 618 | 564 | 396 | 317 | 317 | 69 | 69 | 432 | 543 |
| New Jersey | 26,747 | 24,014 | 15,233 | 15,233 | 11,213 | 11,213 | 1,283 | 1,988 | 7,484 | 3,881 | 4,959 | 4,959 | 473 | 473 | 634 | 868 |
| New York | 52,134 | 46,234 | 29,238 | 29,238 | 5,803 | 5,803 | 8,734 | 11,280 | 12,210 | 6,149 | 10,979 | 10,979 | 406 | 406 | 1,938 | 1,210 |
| Pennsylvania | 57,905 | 56,412 | 22,071 | 22,071 | 2,019 | 2,019 | 9,906 | 12,364 | 5,552 | 2,963 | 12,215 | 12,215 | 956 | 956 | 2,181 | 1,804 |
| Rhode Island | 3,783 | 3,931 | 1,586 | 1,586 | 1,234 | 1,234 | 149 | 160 | 446 | 241 | 55 | 55 | 4 | 4 | 149 | 129 |
| Vermont | 2,670 | 2,251 | 3,481 | 3,481 | 1 | 1 | 1,198 | 1,276 | 215 | 171 | 591 | 591 | 40 | 40 | 963 | 903 |
| Virginia | 42,759 | 39,482 | 14,235 | 14,235 | 10,544 | 10,544 | 9,166 | 11,373 | 8,950 | 4,651 | 8,265 | 8,265 | 2,863 | 2,863 | 672 | 1,115 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 237 | 219 | 4,777 | 4,026 | 791 | 789 | - | - | 10,546 | 11,327 | - | - | - | - |
| Delaware | 19 | 19 | 1,198 | 1,011 | 2,006 | 1,955 | - | - | 2,968 | 3,123 | - | - | - | - |
| District of Columbia | 0 | 0 | 1 | 93 | 390 | 292 | - | - | 1,788 | 1,881 | - | - | - | - |
| Maine | 26 | 24 | 3,056 | 3,417 | 4,727 | 4,606 | - | - | 6,033 | 8,757 | - | - | - | - |
| Maryland | 209 | 185 | 9,706 | 4,792 | 7,661 | 5,532 | - | - | 11,516 | 12,815 | - | - | - | - |
| Massachusetts | 254 | 248 | 5,559 | 4,658 | 12,008 | 3,577 | - | - | 22,821 | 22,564 | - | - | - | - |
| New Hampshire | 0 | 0 | 597 | 1,103 | 907 | 430 | - | - | 8,253 | 8,254 | - | - | - | - |
| New Jersey | 297 | 266 | 8,203 | 6,185 | 4,721 | 4,652 | - | - | 20,047 | 20,068 | - | - | - | - |
| New York | 2,190 | 2,068 | 22,147 | 18,866 | 15,840 | 12,105 | - | - | 53,417 | 51,476 | - | - | - | - |
| Pennsylvania | 48,843 | 56,920 | 47,762 | 34,026 | 44,494 | 31,244 | - | - | 52,918 | 54,018 | - | - | - | - |
| Rhode Island | 87 | 75 | 890 | 554 | 945 | 876 | - | - | 2,787 | 2,785 | - | - | - | - |
| Vermont | 0 | 0 | 21 | 298 | 274 | 108 | - | - | 2,990 | 3,010 | - | - | - | - |
| Virginia | 11,587 | 4,698 | 15,314 | 16,189 | 16,051 | 13,995 | - | - | 17,824 | 19,014 | - | - | - | - |

*Table 9 $NH_3$ emissions for 2023*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 769 | 816 | 16 | 16 | - | - | - | - | - | - | 0 | 0 | 44 | 44 | 215 | 198 |
| Delaware | 272 | 311 | 7 | 7 | - | - | - | - | - | - | 0 | 0 | 21 | 21 | 25 | 46 |
| District of Columbia | 142 | 126 | 1 | 1 | - | - | - | - | - | - | 0 | 0 | 0 | 0 | 2 | 0 |
| Maine | 398 | 454 | 15 | 15 | - | - | - | - | - | - | 0 | 0 | 131 | 131 | 246 | 373 |
| Maryland | 1,550 | 1,797 | 25 | 25 | - | - | - | - | - | - | 1 | 1 | 93 | 93 | 122 | 334 |
| Massachusetts | 1,529 | 1,623 | 31 | 31 | - | - | - | - | - | - | 2 | 2 | 128 | 128 | 339 | 276 |
| New Hampshire | 368 | 422 | 11 | 11 | - | - | - | - | - | - | 0 | 0 | 74 | 74 | 211 | 228 |
| New Jersey | 1,916 | 2,046 | 50 | 50 | - | - | - | - | - | - | 2 | 2 | 591 | 591 | 230 | 359 |
| New York | 3,312 | 3,770 | 86 | 86 | - | - | - | - | - | - | 7 | 7 | 459 | 459 | 809 | 484 |
| Pennsylvania | 2,812 | 3,225 | 68 | 68 | - | - | - | - | - | - | 8 | 8 | 1,096 | 1,096 | 913 | 777 |
| Rhode Island | 208 | 224 | 5 | 5 | - | - | - | - | - | - | 0 | 0 | 4 | 4 | 56 | 51 |
| Vermont | 195 | 214 | 12 | 12 | - | - | - | - | - | - | 0 | 0 | 47 | 47 | 399 | 281 |
| Virginia | 2,416 | 2,761 | 43 | 43 | - | - | - | - | - | - | 6 | 6 | 2,693 | 2,693 | 286 | 507 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | - | - | 399 | 210 | 233 | 233 | 2,520 | 3,060 | 790 | 839 | - | - | - | - |
| Delaware | - | - | 102 | 84 | 79 | 64 | 7,524 | 7,004 | 164 | 91 | - | - | - | - |
| District of Columbia | - | - | 0 | 8 | 0 | 0 | 0 | 5 | 171 | 174 | - | - | - | - |
| Maine | - | - | 65 | 45 | 277 | 277 | 2,732 | 4,520 | 363 | 312 | - | - | - | - |
| Maryland | - | - | 883 | 879 | 231 | 231 | 12,599 | 3,214 | 1,336 | 1,212 | - | - | - | - |
| Massachusetts | - | - | 474 | 272 | 462 | 156 | 1,174 | 1,778 | 1,774 | 10,422 | - | - | - | - |
| New Hampshire | - | - | 98 | 126 | 15 | 11 | 719 | 1,352 | 201 | 208 | - | - | - | - |
| New Jersey | - | - | 1,690 | 983 | 703 | 697 | 1,697 | 2,747 | 409 | 401 | - | - | - | - |
| New York | - | - | 1,708 | 1,552 | 537 | 518 | 34,236 | 39,382 | 1,664 | 1,638 | - | - | - | - |
| Pennsylvania | - | - | 3,718 | 3,631 | 1,552 | 1,489 | 55,791 | 60,476 | 3,210 | 3,397 | - | - | - | - |
| Rhode Island | - | - | 99 | 19 | 17 | 17 | 170 | 274 | 258 | 273 | - | - | - | - |
| Vermont | - | - | 0 | 21 | 23 | 6 | 5,539 | 6,151 | 108 | 124 | - | - | - | - |
| Virginia | - | - | 2,564 | 1,784 | 1,829 | 1,646 | 34,353 | 38,457 | 1,207 | 1,278 | - | - | - | - |

*Table 10 $PM_{2.5}$ emissions for 2023*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 435 | 354 | 568 | 565 | 35 | 35 | - | - | 35 | 30 | 30 | 30 | 237 | 237 | 4,717 | 3,472 |
| Delaware | 164 | 147 | 213 | 212 | 68 | 68 | - | - | 30 | 30 | 6 | 6 | 112 | 112 | 495 | 750 |
| District of Columbia | 109 | 81 | 40 | 40 | 3 | 3 | - | - | 0 | 0 | 5 | 5 | 0 | 0 | 53 | 18 |
| Maine | 331 | 290 | 454 | 451 | 57 | 57 | - | - | 48 | 46 | 29 | 29 | 682 | 682 | 5,253 | 7,410 |
| Maryland | 1,107 | 914 | 976 | 972 | 165 | 165 | - | - | 148 | 140 | 66 | 66 | 495 | 495 | 2,375 | 5,334 |
| Massachusetts | 1,035 | 895 | 1,084 | 1,077 | 101 | 101 | - | - | 164 | 136 | 108 | 108 | 687 | 687 | 7,080 | 4,729 |
| New Hampshire | 255 | 209 | 362 | 360 | 6 | 6 | - | - | 38 | 35 | 9 | 9 | 392 | 392 | 4,069 | 4,318 |
| New Jersey | 1,187 | 980 | 1,507 | 1,493 | 282 | 282 | - | - | 183 | 138 | 139 | 139 | 3,092 | 3,092 | 4,785 | 5,753 |
| New York | 2,735 | 2,119 | 2,702 | 2,683 | 137 | 137 | - | - | 340 | 250 | 302 | 302 | 2,429 | 2,429 | 16,860 | 8,730 |
| Pennsylvania | 2,451 | 2,051 | 2,396 | 2,378 | 58 | 58 | - | - | 236 | 195 | 330 | 330 | 5,788 | 5,788 | 20,186 | 13,558 |
| Rhode Island | 185 | 154 | 144 | 143 | 31 | 31 | - | - | 18 | 14 | 2 | 2 | 20 | 20 | 1,217 | 869 |
| Vermont | 145 | 108 | 334 | 330 | 0 | 0 | - | - | 18 | 17 | 17 | 17 | 247 | 247 | 7,736 | 5,123 |
| Virginia | 1,624 | 1,394 | 1,626 | 1,616 | 258 | 258 | - | - | 400 | 251 | 224 | 224 | 14,563 | 14,563 | 5,635 | 8,498 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 23 | 20 | 645 | 568 | 146 | 145 | - | - | 3,100 | 2,869 | - | - | 3,477 | 4,119 |
| Delaware | 6 | 6 | 198 | 157 | 460 | 441 | - | - | 390 | 477 | - | - | 2,626 | 2,592 |
| District of Columbia | 0 | 0 | 17 | 57 | 32 | 25 | - | - | 464 | 467 | - | - | 398 | 454 |
| Maine | 1 | 1 | 344 | 451 | 1,187 | 1,181 | - | - | 3,279 | 9,314 | - | - | 6,069 | 8,923 |
| Maryland | 16 | 14 | 3,204 | 1,676 | 967 | 682 | - | - | 5,558 | 6,661 | - | - | 17,616 | 12,951 |
| Massachusetts | 18 | 16 | 587 | 481 | 3,682 | 639 | - | - | 8,810 | 8,740 | - | - | 18,374 | 9,610 |
| New Hampshire | 0 | 0 | 93 | 187 | 285 | 227 | - | - | 2,936 | 2,584 | - | - | 4,951 | 4,837 |
| New Jersey | 29 | 25 | 2,145 | 1,369 | 1,338 | 1,323 | - | - | 4,110 | 4,452 | - | - | 9,257 | 6,120 |
| New York | 136 | 126 | 2,891 | 2,824 | 2,089 | 1,668 | - | - | 20,478 | 17,066 | - | - | 44,946 | 35,150 |
| Pennsylvania | 1,718 | 1,799 | 7,959 | 5,930 | 12,043 | 10,371 | - | - | 24,370 | 25,364 | - | - | 38,770 | 26,310 |
| Rhode Island | 9 | 8 | 214 | 93 | 116 | 92 | - | - | 1,436 | 1,248 | - | - | 832 | 836 |
| Vermont | 0 | 0 | 4 | 80 | 129 | 81 | - | - | 1,289 | 1,349 | - | - | 3,317 | 8,553 |
| Virginia | 287 | 110 | 2,929 | 2,899 | 3,617 | 3,540 | - | - | 15,949 | 17,751 | - | - | 37,490 | 21,240 |

*Table 11 VOC emissions for 2023*

| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 8,781 | 6,390 | 7,185 | 7,233 | 55 | 55 | 68,677 | 75,710 | 267 | 161 | 48 | 48 | 632 | 632 | 5,268 | 3,744 |
| Delaware | 3,524 | 1,982 | 4,694 | 4,756 | 242 | 242 | 25,255 | 13,972 | 133 | 133 | 10 | 10 | 305 | 305 | 549 | 832 |
| District of Columbia | 1,664 | 874 | 439 | 447 | 3 | 3 | 1,478 | 1,267 | 0 | 0 | 8 | 8 | 0 | 0 | 62 | 24 |
| Maine | 4,599 | 3,537 | 11,597 | 11,561 | 99 | 99 | 437,655 | 275,305 | 186 | 159 | 47 | 47 | 1,888 | 1,888 | 5,701 | 7,933 |
| Maryland | 13,746 | 11,515 | 14,531 | 14,667 | 581 | 581 | 157,380 | 127,237 | 1,333 | 1,017 | 107 | 107 | 1,337 | 1,337 | 2,636 | 5,917 |
| Massachusetts | 15,242 | 11,061 | 14,750 | 14,832 | 204 | 204 | 107,668 | 104,291 | 1,439 | 900 | 175 | 175 | 1,845 | 1,845 | 7,542 | 5,014 |
| New Hampshire | 4,408 | 3,444 | 6,542 | 6,574 | 14 | 14 | 113,453 | 95,220 | 507 | 322 | 15 | 15 | 1,058 | 1,058 | 4,237 | 4,603 |
| New Jersey | 17,677 | 12,973 | 19,152 | 19,323 | 707 | 707 | 114,470 | 97,617 | 2,311 | 1,279 | 227 | 227 | 8,494 | 8,494 | 5,446 | 5,932 |
| New York | 36,864 | 26,960 | 42,839 | 42,896 | 359 | 359 | 437,431 | 364,307 | 3,143 | 1,756 | 490 | 490 | 6,603 | 6,603 | 18,611 | 9,240 |
| Pennsylvania | 36,570 | 27,189 | 29,070 | 29,350 | 142 | 142 | 532,770 | 474,762 | 1,796 | 1,099 | 536 | 536 | 15,757 | 15,757 | 22,258 | 14,300 |
| Rhode Island | 2,593 | 1,968 | 1,815 | 1,827 | 63 | 63 | 18,303 | 18,623 | 173 | 103 | 3 | 3 | 52 | 52 | 1,363 | 923 |
| Vermont | 2,178 | 1,470 | 3,667 | 3,653 | 0 | 0 | 87,629 | 71,303 | 81 | 81 | 28 | 28 | 674 | 674 | 7,518 | 5,678 |
| Virginia | 29,306 | 23,056 | 20,662 | 20,878 | 811 | 811 | 899,017 | 754,378 | 6,711 | 3,508 | 363 | 363 | 38,717 | 38,717 | 6,265 | 9,860 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 128 | 111 | 160 | 173 | 698 | 561 | - | - | 38,638 | 27,211 | 30,317 | 21,171 | - | - |
| Delaware | 5 | 5 | 91 | 92 | 820 | 685 | - | - | 6,229 | 8,491 | 4,823 | 5,077 | - | - |
| District of Columbia | 0 | 0 | 14 | 60 | 56 | 16 | - | - | 5,321 | 5,268 | 4,905 | 4,008 | - | - |
| Maine | 79 | 68 | 267 | 292 | 2,213 | 1,798 | - | - | 14,812 | 13,547 | 11,938 | 9,947 | - | - |
| Maryland | 59 | 50 | 451 | 1,489 | 1,832 | 1,349 | - | - | 45,842 | 47,525 | 32,398 | 34,092 | - | - |
| Massachusetts | 79 | 79 | 341 | 476 | 4,767 | 1,400 | - | - | 73,868 | 67,759 | 56,850 | 43,214 | - | - |
| New Hampshire | 0 | 0 | 72 | 97 | 248 | 157 | - | - | 13,072 | 13,621 | 10,664 | 9,436 | - | - |
| New Jersey | 187 | 161 | 571 | 413 | 6,405 | 5,324 | - | - | 79,787 | 87,879 | 33,370 | 61,436 | - | - |
| New York | 6,416 | 5,442 | 1,598 | 2,372 | 6,507 | 4,842 | - | - | 203,924 | 181,407 | 170,675 | 106,445 | - | - |
| Pennsylvania | 104,903 | 130,059 | 1,820 | 2,244 | 20,004 | 11,503 | - | - | 172,353 | 155,658 | 146,649 | 97,887 | - | - |
| Rhode Island | 49 | 42 | 116 | 54 | 1,004 | 588 | - | - | 10,968 | 9,391 | 9,488 | 6,224 | - | - |
| Vermont | 0 | 0 | 5 | 101 | 290 | 32 | - | - | 7,416 | 6,492 | 5,770 | 4,745 | - | - |
| Virginia | 10,997 | 7,329 | 987 | 1,599 | 15,121 | 8,732 | - | - | 90,601 | 103,651 | 61,346 | 64,490 | - | - |

*Table 12 $SO_2$ emissions for 2023.*

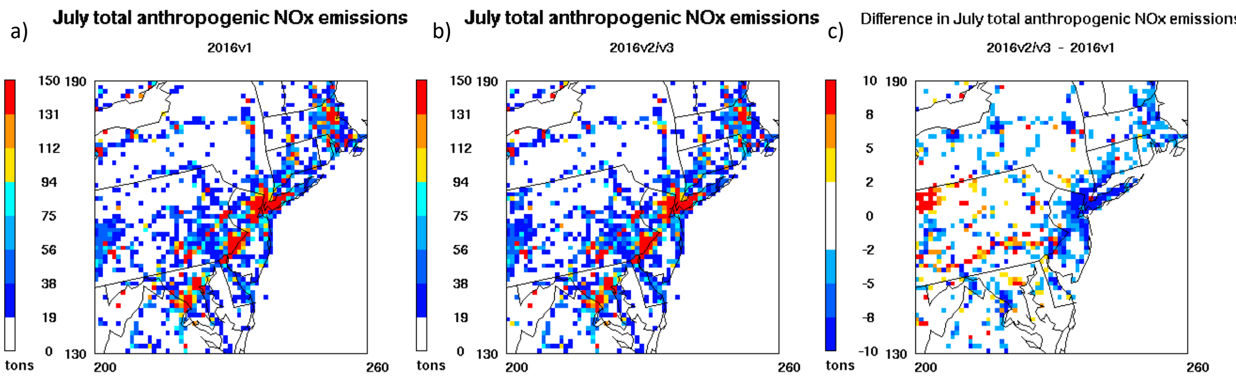
| State | Onroad | | Nonroad | | CMV | | Biogenic | | Airports | | Rail | | Fires | | RWC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 88 | 83 | 12 | 8 | 7 | 7 | - | - | 98 | 53 | 0 | 0 | 23 | 23 | 105 | 89 |
| Delaware | 34 | 32 | 5 | 4 | 105 | 105 | - | - | 23 | 23 | 0 | 0 | 10 | 10 | 10 | 18 |
| District of Columbia | 15 | 15 | 1 | 1 | 0 | 0 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Maine | 56 | 49 | 10 | 7 | 25 | 25 | - | - | 55 | 37 | 0 | 0 | 56 | 56 | 131 | 242 |
| Maryland | 213 | 190 | 17 | 12 | 192 | 192 | - | - | 423 | 278 | 2 | 2 | 45 | 45 | 49 | 127 |
| Massachusetts | 198 | 175 | 23 | 15 | 61 | 61 | - | - | 592 | 330 | 2 | 2 | 64 | 64 | 157 | 120 |
| New Hampshire | 46 | 43 | 7 | 5 | 5 | 5 | - | - | 74 | 49 | 0 | 0 | 36 | 36 | 95 | 136 |
| New Jersey | 245 | 213 | 38 | 23 | 270 | 270 | - | - | 882 | 454 | 2 | 2 | 265 | 265 | 98 | 139 |
| New York | 425 | 405 | 65 | 43 | 100 | 100 | - | - | 1,616 | 809 | 7 | 7 | 217 | 217 | 392 | 246 |
| Pennsylvania | 408 | 345 | 53 | 31 | 63 | 63 | - | - | 767 | 408 | 9 | 9 | 515 | 515 | 485 | 366 |
| Rhode Island | 31 | 25 | 4 | 2 | 16 | 16 | - | - | 63 | 32 | 0 | 0 | 2 | 2 | 26 | 20 |
| Vermont | 25 | 22 | 10 | 5 | 0 | 0 | - | - | 31 | 21 | 0 | 0 | 22 | 22 | 272 | 190 |
| Virginia | 311 | 280 | 31 | 20 | 322 | 322 | - | - | 1,201 | 619 | 6 | 6 | 1,422 | 1,422 | 119 | 213 |

| State | Oil & Gas | | PTERTAC | | PTNONERTAC | | AG | | NONPT | | NP_Solvents | | AFDust | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 | V1 | V2/V3 |
| Connecticut | 4 | 3 | 868 | 898 | 91 | 91 | - | - | 362 | 372 | - | - | - | - |
| Delaware | 0 | 0 | 577 | 397 | 733 | 712 | - | - | 81 | 55 | - | - | - | - |
| District of Columbia | 0 | 0 | 0 | 0 | 17 | 17 | - | - | 43 | 50 | - | - | - | - |
| Maine | 1 | 1 | 760 | 1,297 | 1,127 | 1,121 | - | - | 272 | 585 | - | - | - | - |
| Maryland | 0 | 0 | 8,646 | 3,430 | 9,334 | 389 | - | - | 3,788 | 4,062 | - | - | - | - |
| Massachusetts | 2 | 2 | 1,254 | 1,096 | 3,955 | 447 | - | - | 769 | 652 | - | - | - | - |
| New Hampshire | 0 | 0 | 181 | 194 | 205 | 182 | - | - | 194 | 171 | - | - | - | - |
| New Jersey | 9 | 8 | 2,480 | 1,970 | 813 | 811 | - | - | 353 | 367 | - | - | - | - |
| New York | 67 | 64 | 2,379 | 2,253 | 11,326 | 5,994 | - | - | 6,282 | 6,022 | - | - | - | - |
| Pennsylvania | 998 | 2,131 | 69,095 | 40,546 | 21,519 | 15,516 | - | - | 3,674 | 3,685 | - | - | - | - |
| Rhode Island | 3 | 2 | 10 | 6 | 160 | 160 | - | - | 131 | 86 | - | - | - | - |
| Vermont | 0 | 0 | 0 | 2 | 14 | 12 | - | - | 129 | 107 | - | - | - | - |
| Virginia | 133 | 67 | 3,256 | 8,190 | 11,273 | 11,164 | - | - | 3,860 | 4,291 | - | - | - | - |

## 2.2 Spatial Variations in Emissions Differences

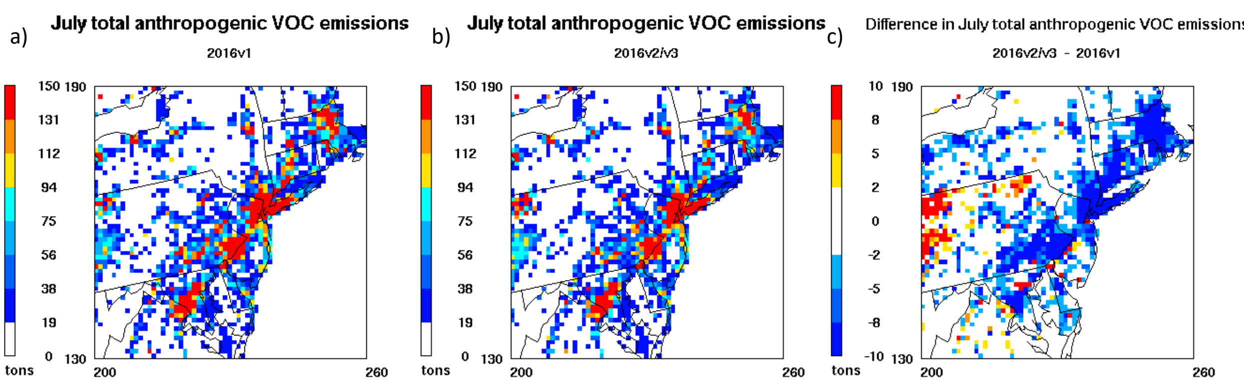
As the emissions totals changed from V1 to V2/V3, so did the spatial allocation. Examples of these changes in anthropogenic $NO_X$ emissions totals are shown in Figure 1 for July 2016.

*Figure 1 July 2016 total anthropogenic NOx emissions for (a) V1, (b) CMAQ with V2/V3, and (c) the difference, V2/V3-V1.*



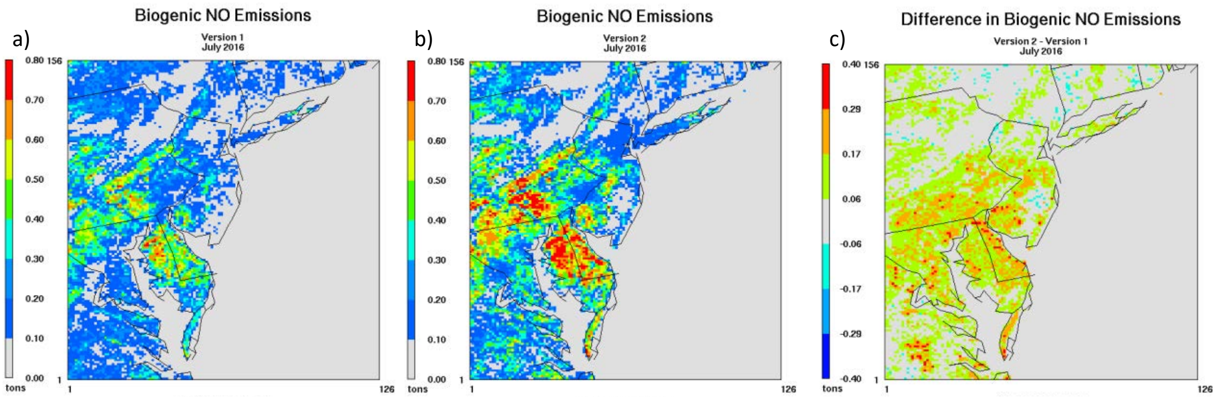

Anthropogenic $NO_X$ emissions decrease across the OTR between V1 and V2/V3, especially in urban areas (Figure 1c). Large decreases of more than 10 tons per month per grid cell can be found around Washington, D.C. and Philadelphia, and in New Jersey and Long Island, NY. Increases of approximately 10 tons per month between V1 and V2/V3 trace I-76 in Pennsylvania, are common in western Pennsylvania, and are scattered elsewhere in the domain.

*Figure 2 July 2016 total anthropogenic VOC emissions for (a) 2016 V1, (b) V2/V3, and (c) the difference, V2/V3-V1.*



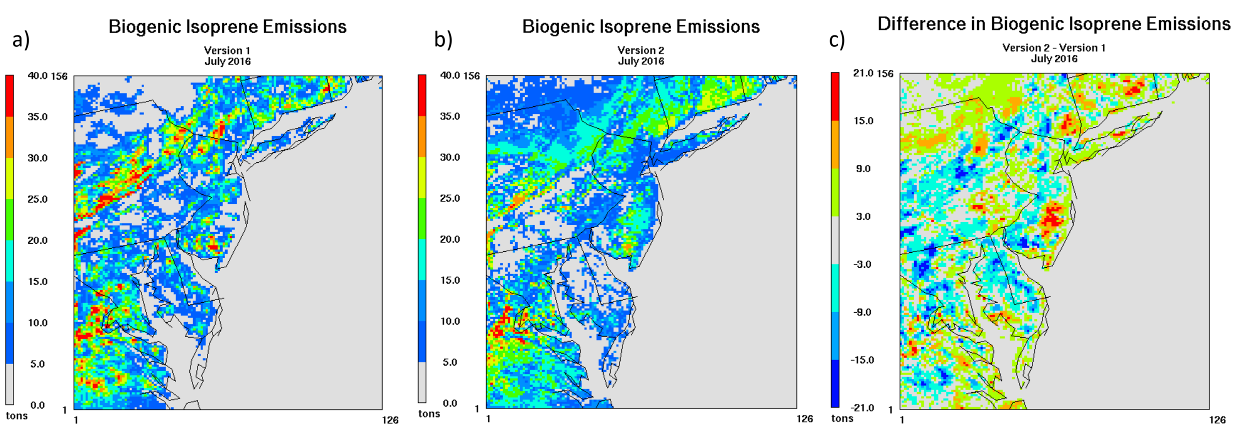

Similarly, anthropogenic VOC emissions are largely reduced in the eastern part of the OTR with increases common in western Pennsylvania (Figure 2). The largest decreases in VOC emissions are found around Baltimore; Philadelphia; New York City and Long Island, New York; Connecticut; and Massachusetts.

*Figure 3 July 2016 total biogenic NO emissions for (a) V1, (b) V2/V3, and (c) the difference, V2/V3-V1.*




Biogenic emissions also changed from V1 to V2/V3. Monthly total emissions from the inventory for July 2016 are shown in Figure 3 for biogenic NO emissions and Figure 4 for biogenic isoprene emissions. Biogenic NO emissions show an increase in parts of Maryland, Pennsylvania, and Delaware in the V2/V3 inventory as compared to the V1 inventory (Figure 3), with darker reds indicating greater increases. This is contrary to what happens with isoprene between the V1 and V2/V3 inventories. Figure 4 shows a general decrease in isoprene emissions in the southern part of the domain, with increases of 30-60% across grid cells more towards the Northeast.

*Figure 4 July 2016 total biogenic isoprene emissions for (a) V1, (b) V2/V3, and (c) the difference, V2/V3-V1.*




# 3 Modeled Concentration Differences from V1

## 3.1 Model Performance Statistics

Emissions for V1 and V2/V3 were used to model ozone concentrations using the Community Multi-scale Air Quality (CMAQ) model and the Comprehensive Air Quality Model with Extensions (CAMx). More detail on the V1 modeling and set up can be found in OTC 2023 TSD. Generally, the same model specifications were used for the V2/V3 modeling reported here, but with the following model upgrades:

- CAMx model version upgrade from v7.1.0 to v7.2.0. This update reflected modifications including using the Piecewise Parabolic Method vertical advection solver, which is less numerically diffusive than the original implicit scheme. Additional updates and modifications can be found in the CAMx User Guide.[5]
- CMAQ model version upgrade from v5.3.1 to v5.3.3. This is a minor update including bug fixes. Detailed information can be found in the CMAQv5.3.3 User Guide.[6]
- Boundary conditions for 2023 and 2026 were updated from an in-house 36 km by 36 km contiguous U.S. domain using EPA 2016 V2 emissions and EPA-produced boundary conditions from the hemispheric CMAQ model.

Table 13 and Table 14 show model performance statistics mean bias (MB), mean error (ME), normalized mean bias (NMB), and normalized mean error (NME) for CMAQ and CAMx, respectively, when observed maximum daily 8-hour ozone concentrations (MDA8) are equal to or exceed 60 ppb. Model data are evaluated against available observations, indicated in the second column, and are grouped by non-attainment areas as indicated in the first column.

Overall, upgrading to the V2/V3 emissions platform slightly degrades model performance from an average mean bias of -6 ppb to about -8 ppb for CMAQ, and about -1 ppb to -4.3 ppb for CAMx. Mean errors slightly worsened, with average mean errors growing from 9.3 ppb to 10 ppb for CMAQ and from 7 ppb to 7.6 ppb for CAMx. However, model performance varies by individual monitoring location.

*Table 13 Performance statistics for the CMAQ model when Maximum Daily 8-hour Observations are greater than or equal to 60 ppb by OTR Non-Attainment Area (NAA) for April to October 2016.*

| | | V1_CMAQ531 | | | | V2/V3_CMAQ533 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **NAA area** | **# of Observations** | **MB** | **ME** | **NMB** | **NME** | **MB** | **ME** | **NMB** | **NME** |
| **CT** | 116 | -7.6 | 12 | -11.3 | 17.8 | -10.1 | 12.2 | -15 | 18 |
| **NY-NJ-CT** | 685 | -5.2 | 9 | -7.7 | 13.2 | -7.3 | 9.9 | -10.7 | 14.6 |
| **PA-NJ-MD-DE** | 519 | -6.6 | 8.2 | -9.9 | 12.3 | -8.3 | 9.2 | -12.5 | 13.8 |
| **MD** | 278 | -5.3 | 9.1 | -7.9 | 13.4 | -6.7 | 10.2 | -9.9 | 15.1 |
| **DC-MD-VA** | 323 | -5.6 | 8 | -8.5 | 12.2 | -7.4 | 8.8 | -11.3 | 13.5 |

*Table 14 Performance statistics for the CAMx model when Maximum Daily 8-hour Observations are greater than or equal to 60 ppb by OTR Non-Attainment Area (NAA) for April to October 2016.*

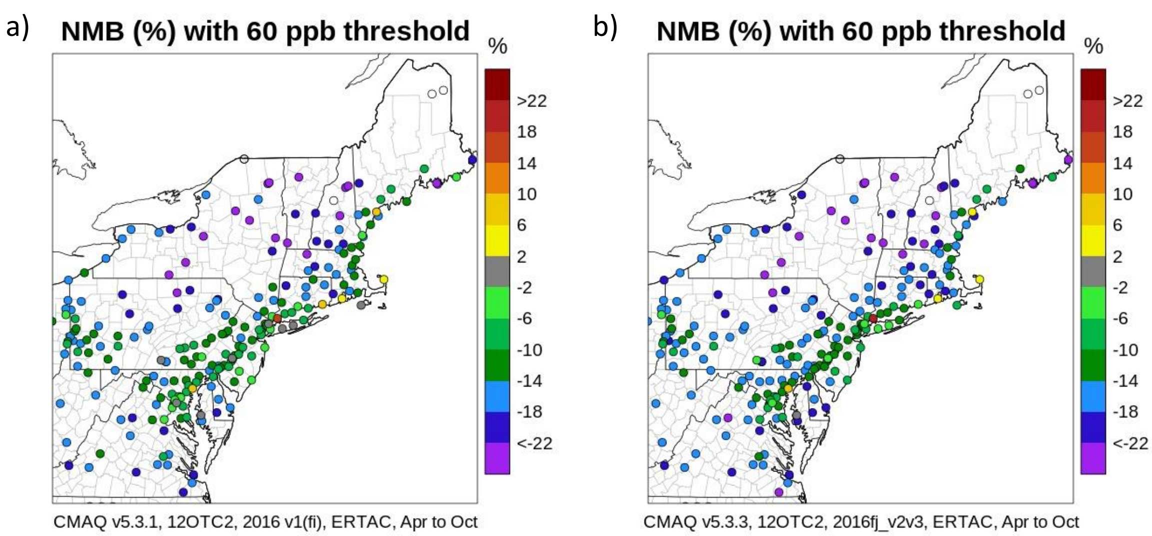
| | | V1_CAMx710 | | | | V2/V3_CAMx720 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **NAA area** | **# of Observations** | **MB** | **ME** | **NMB** | **NME** | **MB** | **ME** | **NMB** | **NME** |

[5] https://camx-wp.azurewebsites.net/Files/CAMxUsersGuide_v7.20.pdf
[6] https://github.com/USEPA/CMAQ/tree/5.3.3/DOCS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **CT** | 116 | -4.6 | 8.4 | -2.3 | 11.1 | -7.5 | 9.7 | -11.1 | 14.4 |
| **NY-NJ-CT** | 685 | -1.6 | 7.5 | -0.6 | 9.2 | -4.9 | 7.9 | -7.2 | 11.6 |
| **PA-NJ-MD-DE** | 519 | -0.4 | 6.1 | -0.8 | 9.5 | -3.4 | 6.6 | -5.1 | 9.9 |
| **MD** | 278 | -0.5 | 6.4 | 2.2 | 10.7 | -3.7 | 7 | -5.5 | 10.4 |
| **DC-MD-VA** | 323 | 1.5 | 7 | -6.8 | 12.4 | -2 | 7 | -3.1 | 10.7 |

Using model output compared at surface observations for ozone concentrations greater than or equal to 60 ppb, we can see where NMB changes occur across the domain between V1 and V2/V3 for CMAQ and CAMx (Figure 5 and 6). For CMAQ, NMB values fall between greater than -22% to +18%, with nearly all monitors showing negative biases in the model data (Figure 5). Coastal monitor locations show more consistent increased negative biases in V2/V3 than in V1 as compared to in-land monitors. In general, NMB values change by a few percent or less at individual monitor locations.

*Figure 5 Normalized Mean Bias in CMAQ for (a) V1 and (b) V2/V3*




For CAMx, NMBs are considerably smaller than those from CMAQ, with most values falling between -22% and +18% (Figure 6). Differences between V1 and V2/V3 are most prominent near urban and coastal areas, where many positive biases turn negative between emissions platform versions.

*Figure 6 Normalized Mean Bias in CAMx for (a) V1 and (b) V2/V3*

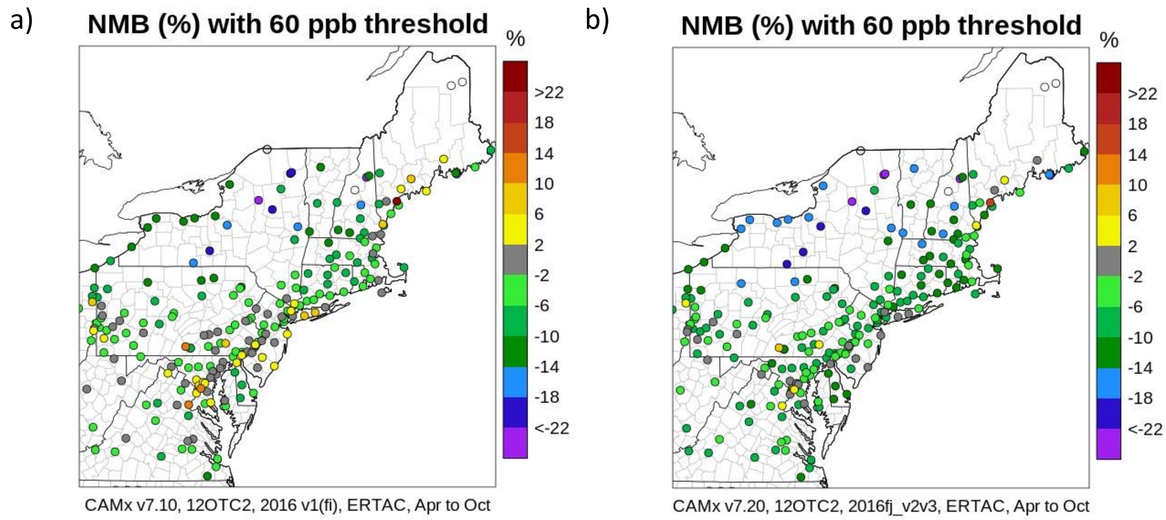
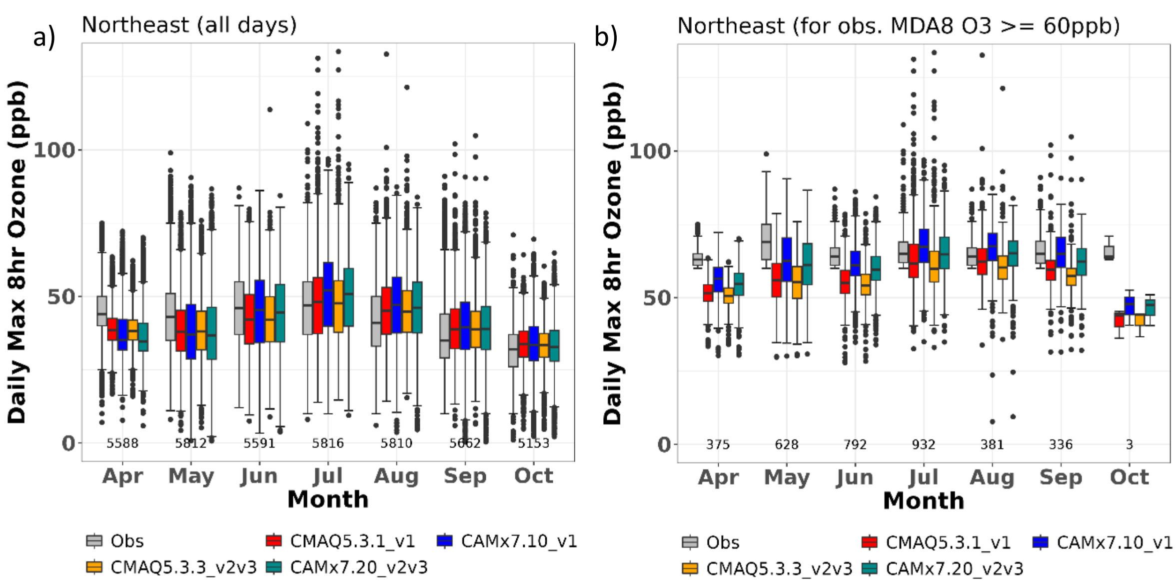



*Figure 7 Monthly boxplot distributions for (a) all days and (b) days when MDA8 Ozone is greater than or equal to 60 ppb comparing observations (gray), CMAQ with V1 (red), CAMx with V1 (blue), CMAQ with V2/V3 (orange), and CAMx with V2/V3 (green), April-October 2016.*

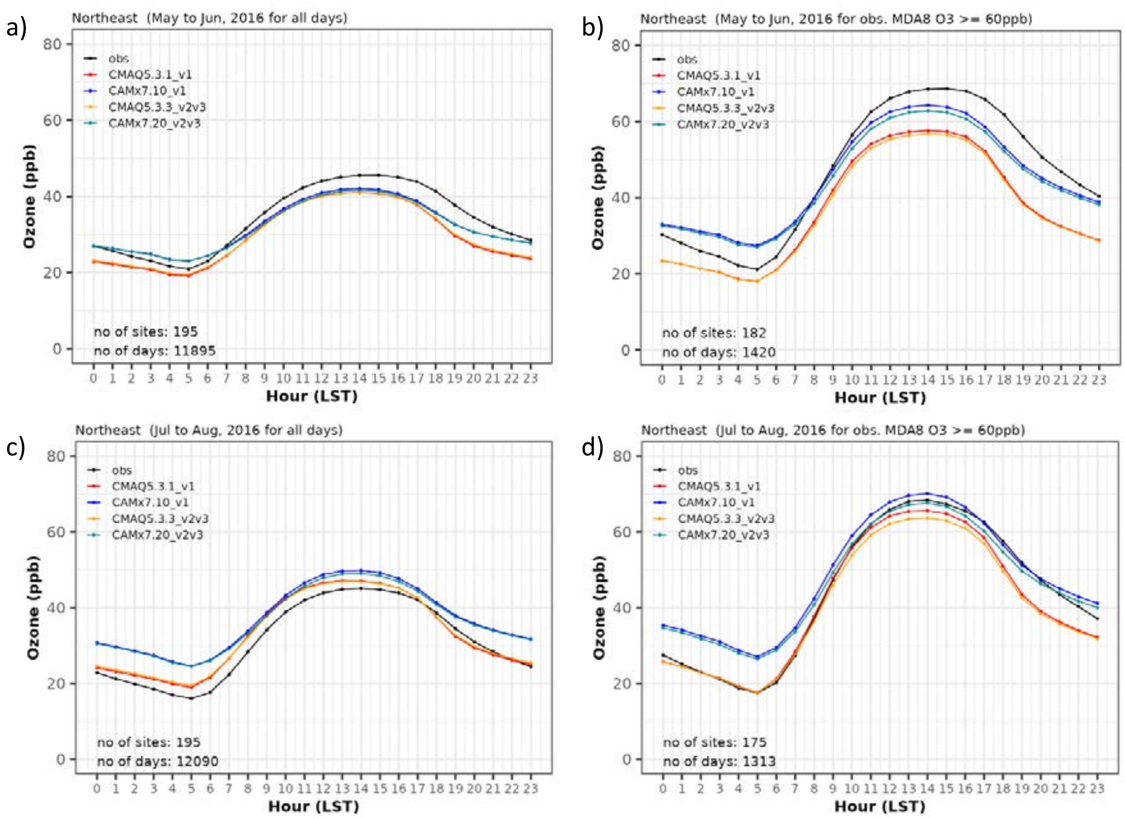



We also show model evaluation at monitors in the Northeast NOAA Climate Region[7] broken down by month, comparing observations (gray), CMAQ with V1 (red), CAMx with V1 (blue), CMAQ with V2/V3 (orange), and CAMx with V2/V3 (green) distributions for all days (Figure 7a) and days with observed MDA8 ozone concentrations greater than or equal to 60 ppb (Figure 7b). For all days, the models consistently underestimate

[7] https://www.ncei.noaa.gov/access/monitoring/reference-maps/us-climate-regions

concentrations in the springtime (April and May) and tend to overestimate concentrations in late summer and fall (July through October). Each model and emissions platform model prediction and spread are similar, with the upper bounds of springtime CAMx predictions more in-line with observed values. Model performance is similar between V1 and V2/V3 when ozone is greater than 60 ppb, though CAMx is better able to capture higher concentrations than CMAQ overall (Figure 7b).

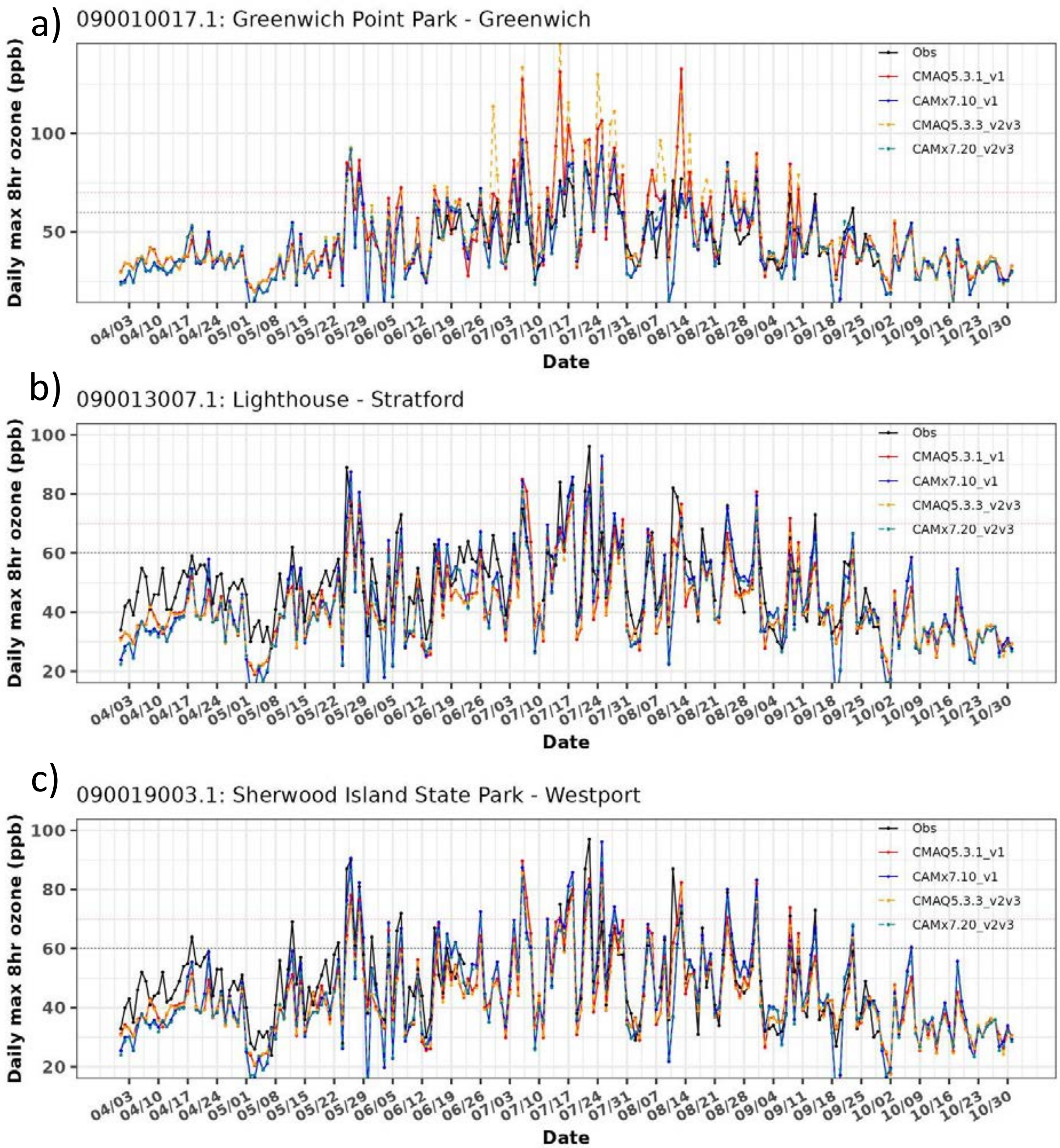
*Figure 8 Diurnal pattern at monitors in the Northeast for (a) all days May to June, (b) days when MDA8 Ozone is greater than or equal to 60 ppb for May and June, (c) all days July and August, and (d) same as (b) except for July to August for observations (black), CMAQ with V1 (red), CAMx with V1 (blue), CMAQ with V2/V3 (orange), and CAMx with V2/V3 (green).*




Further, investigating the diurnal profile at monitor locations can indicate model performance with respect to ozone production and loss on average (Figure 8). Splitting the high ozone season into two segments, May to June 2016 and July to August 2016, observations (black) are used to evaluate CMAQ with V1 (red), CAMx with V1 (blue), CMAQ with V2/V3 (orange), and CAMx with V2/V3 (green) for all days and for days when observed MDA8 is greater than or equal to 60 ppb. For all days in May and June, CAMx tends to better predict concentrations in the morning. However, both CMAQ and CAMx underestimate daytime concentrations (Figure 8a). At MDA8 concentrations greater than 60 ppb, CMAQ underestimates and CAMx overestimates morning concentrations, but they both underestimate daytime concentrations, with CMAQ having greater low biases during the day and into the overnight hours, regardless of emissions platform (Figure 8b). For July and August, both models tend to overestimate concentrations on average across all days, with CAMx overestimating concentrations more than those from CMAQ (Figure 8c). When observed MDA8 concentrations exceed 60 ppb, CMAQ with both emissions platforms tends to match observations very well during the first half of the day, before underestimating observed concentrations during the evening rush hour and into the evening, while CAMx is the opposite and overestimates observations in the morning and performs better in the evening (Figure 8d).

Finally, we show model evaluation at individual monitor locations to indicate performance and changes in emissions platform at key nonattainment monitors (Figure 9). As before, observations (black solid) are compared with CMAQ with V1 (red solid), CAMx with V1 (blue solid), CMAQ with V2/V3 (orange dashed) and CAMx with V2/V3 (green dashed). While early season monitored data is missing for Greenwich Point Park (Figure 9a), all model iterations track available observations quite well except for several July and August days where there was a divergence between the models and emissions platform versions and CMAQ greatly overestimated observed concentrations. These extreme mid-season daily deviations are not seen at the nearby sites of Stratford (Figure 9b) and Westport (Figure 9c). However, these sites show model underestimates that are strong in the early part of the ozone season and become more sporadic in later, warmer months. This coincides with the tendency of the models to underestimate on average in springtime and propensity to overestimate concentrations in July and August.

*Figure 9 Time series plot from April-October 2016 for (a) Greenwich, CT, (b) Stratford, CT, and (c) Westport, CT comparing observations (black), CMAQ with V1 (red), CAMx with V1 (blue), CMAQ with V2/V3 (orange), and CAMx with V2/V3 (green).*



## 3.2 Future Design Values

Future Design Values (DVFs) for the ozone season calculated from 2023 model output are presented in Figure 10 for CMAQ and Figure 11 for CAMx. Both figures show DVFs determined using the 3x3 and 3x3 No Water 1 methodologies comparing the V1 and V2/V3 platforms. Details on DVF calculations including the differences in the water-cell exclusion methodology are in Section 8 of the OTC 2023 TSD. Predicted 2026 DVFs for CMAQ and CAMx are included in Appendix B.

With CMAQ, DVFs are greatest, and predicted monitor DVFs exceed 66 ppb in New York City, coastal Connecticut, on Long Island, and at locations in New Jersey and near Philadelphia, Pennsylvania (Figure 10). For the V1 platform, there are some slight changes in DVFs between the 3x3 (Figure 10a) and the 3x3 No Water 1 (Figure 10b) methodology. With 3x3 No Water 1, there are more monitors in coastal Connecticut exceeding 71 ppb while one New Jersey and several Long Island monitors fall below 71 ppb that otherwise exceed with the 3x3 method. With the V2/V3 platform, CMAQ predicts the same number of monitors where DVFs exceed 71 ppb with the 3x3 methodology (Figure 10c) as with the 3x3 No Water 1 methodology (Figure 10d).

DVF calculations with CAMx model output reflect similar distributions to those from CMAQ, where the greatest DVFs are in New York City, coastal Connecticut, Long Island, and scattered across New Jersey (Figure 11). However, there is a reduction in coastal DVFs greater than 71 ppb from six when using the 3x3 (Figure 11a) methodology to five with the 3x3 No Water 1 (Figure 11b). When using the 2016 V2/V3 platform, several monitors in the New York City area that exceed 76 ppb with the 3x3 methodology (Figure 11c) decrease but still fall above 71 ppb with the 3x3 No Water 1 methodology (Figure 11d). Additionally, CAMx predicts the Bristol, Pennsylvania monitor to exceed 71 ppb.

Additional details of modeled design values for the top 21 OTR monitoring sites using the V2/V3 platform are shown in Table 15. DVFs for all monitors in the modeling domain for 2023 can be found in Appendix C and for 2026 for the top 21 OTR monitoring sites and all monitors in the modeling domain can be found in Appendix D.

*Figure 10 Future Design Values (DVF) for 2023 for (a) CMAQ with V1 and 3x3 methodology, (b) CMAQ with V1 platform with 3x3 No Water 1 methodology, (c) CMAQ with V2/V3 and 3x3 methodology, and (d) CMAQ with V2/V3 platform with 3x3 No Water 1 methodology.*

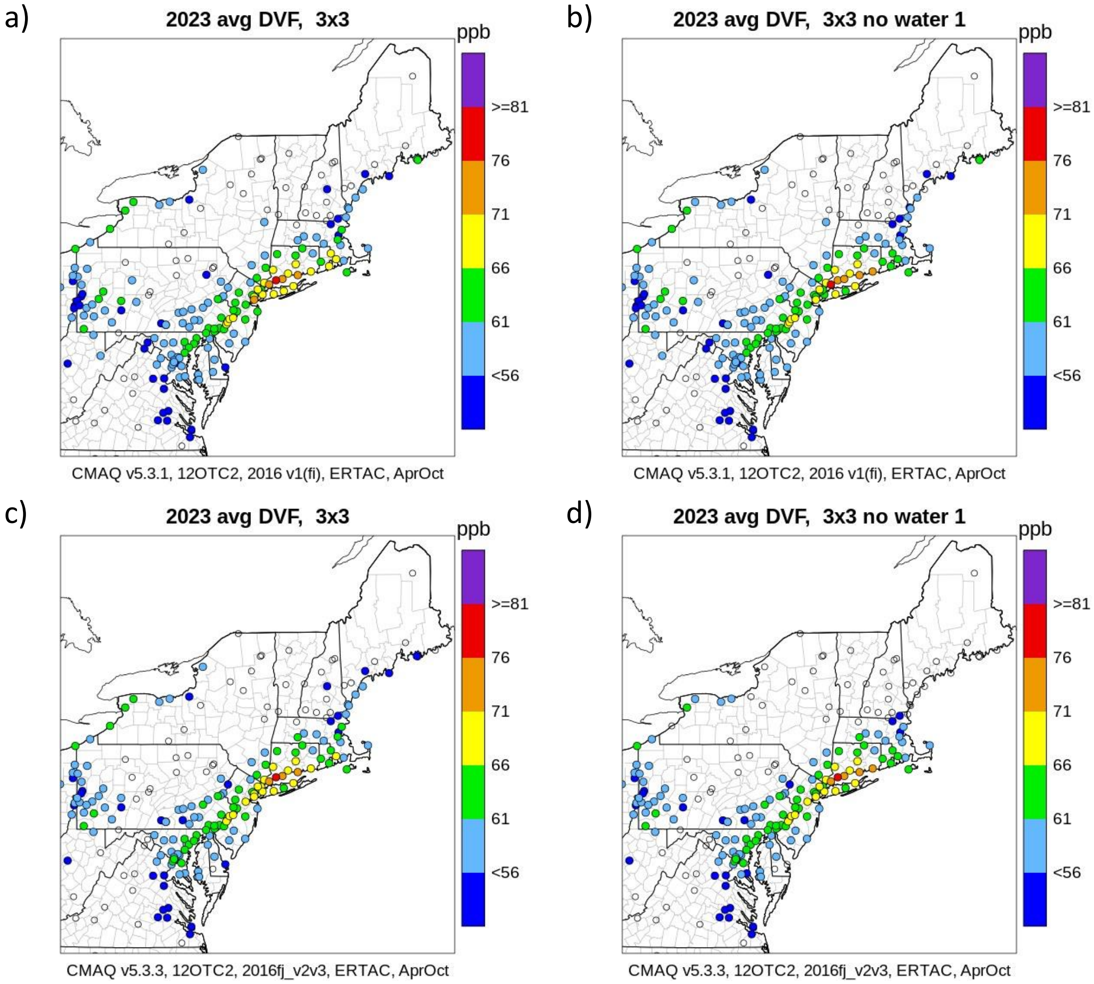


*Figure 11 Future Design Values (DVF) for 2023 for (a) CAMx with V1 and 3x3 methodology, (b) CAMx with V1 platform with 3x3 No Water 1 methodology, (c) CAMx with V2/V3 and 3x3 methodology, and (d) CAMx with V2/V3 platform with 3x3 No Water 1 methodology.*

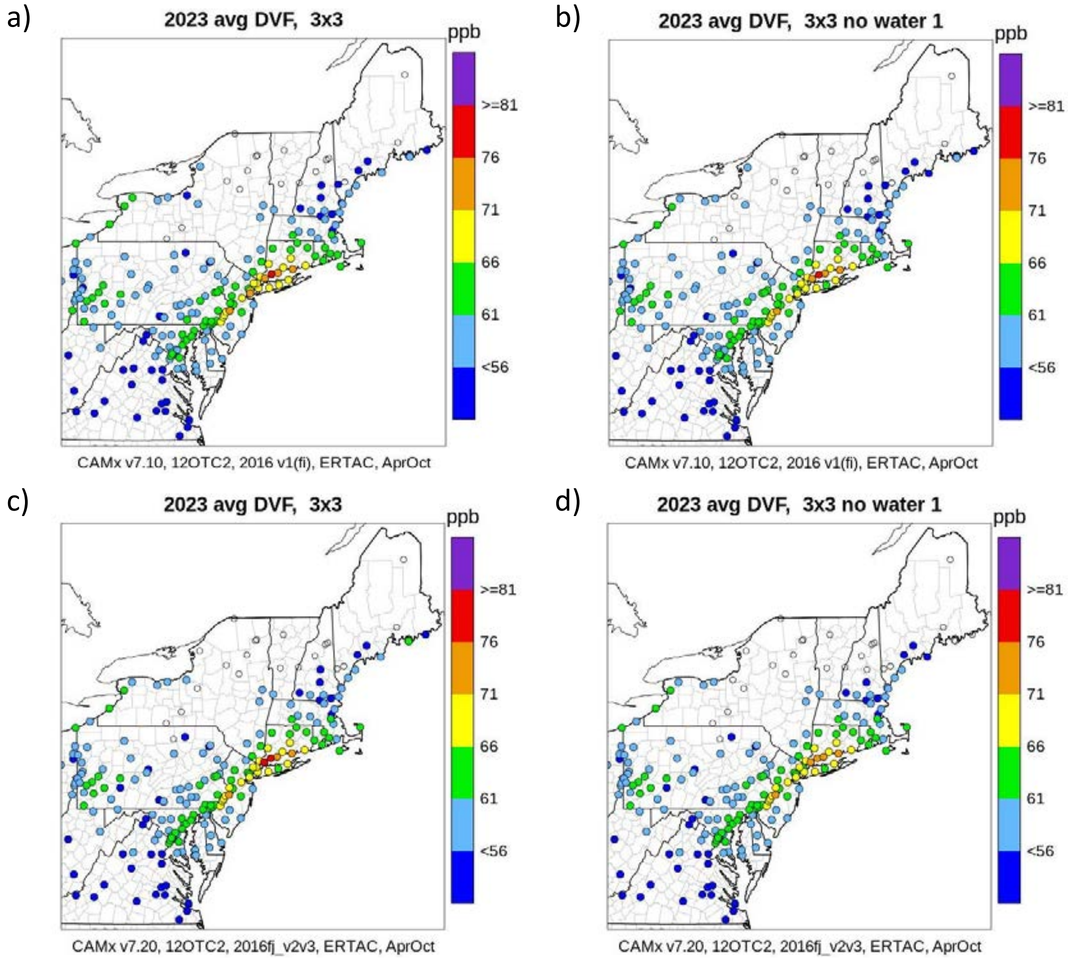


*Table 15 Top 21 OTR ozone monitors showing the 2016 (2014-2018) base observed design value (DVB) compared to the 2019-2021 and 2020-2022 preliminary monitored DVs and 2023 modeling future predicted design values (DVFs) for 3x3 and 3x3 No Water 1 methodology for CMAQ (green header) and CAMx (blue header) using the V2/V3 inventory.*

| | | | Monitored DVs | | | | Modeled DVs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2023 CMAQ v5.3. 3 | | | | 2023 CAMx v7.20 | | | |
| | | | 2016 (2014-2018) DVB | | 2019-2021 DV | 2020-2022 DV | 3x3 | | 3x3 No Water 1 | | 3x3 | | 3x3 No Water 1 | |
| Site ID | State | County | AVG | MAX | | Prelim | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 90013007 | CT | Fairfield | 82 | 83 | 81 | 81 | 74.7 | 75.6 | 74.7 | 75.6 | 75.3 | 76.2 | 75.1 | 76.1 |
| 90019003 | CT | Fairfield | 82.7 | 83 | 80 | 80 | 77.4 | 77.6 | 76 | 76.3 | 76.8 | 77 | 75.6 | 75.9 |
| 90099002 | CT | New Haven | 79.7 | 82 | 82 | 79 | 72.8 | 74.9 | 71.1 | 73.2 | 72.3 | 74.3 | 72.7 | 74.8 |
| 420170012 | PA | Bucks | 79.3 | 81 | 71 | 72 | 70.2 | 71.7 | 70.2 | 71.7 | 71.6 | 73.1 | 71.6 | 73.1 |
| 90010017 | CT | Fairfield | 79.3 | 80 | 79 | 77 | 75.5 | 76.2 | 74.6 | 75.3 | 76.3 | 76.9 | 73.4 | 74.1 |
| 90079007 | CT | Middlesex | 78.7 | 79 | 74 | 73 | 69.6 | 69.9 | 69.6 | 69.9 | 70.5 | 70.8 | 70.5 | 70.8 |
| 90011123 | CT | Fairfield | 77 | 78 | 70 | 71 | 69.3 | 70.2 | 69.3 | 70.2 | 69.5 | 70.4 | 69.5 | 70.4 |
| 421010024 | PA | Philadelphia | 77.7 | 78 | 71 | 70 | 69 | 69.3 | 69 | 69.3 | 70.4 | 70.7 | 70.4 | 70.7 |
| 90090027 | CT | New Haven | 75.7 | 77 | 72 | 70 | 69.5 | 70.7 | 68.4 | 69.6 | 69.1 | 70.3 | 68.8 | 70 |
| 340070002 | NJ | Camden | 75.3 | 77 | 66 | 64 | 67.2 | 68.7 | 67.2 | 68.7 | 68.3 | 69.8 | 68.3 | 69.8 |
| 361030002 | NY | Suffolk | 74 | 76 | 73 | 74 | 69.5 | 71.4 | 67.7 | 69.5 | 68.5 | 70.3 | 68.5 | 70.3 |
| 90110124 | CT | New London | 74.3 | 76 | 73 | 72 | 68.5 | 70.1 | 71 | 72.7 | 67.6 | 69.2 | 67.8 | 69.3 |
| 361030004 | NY | Suffolk | 74.3 | 76 | 69 | 68 | 67.8 | 69.4 | 67.1 | 68.6 | 68.2 | 69.8 | 67.6 | 69.1 |
| 421010048 | PA | Philadelphia | 75.3 | 76 | 70 | 68 | 66.9 | 67.5 | 66.9 | 67.5 | 68.1 | 68.7 | 68.1 | 68.7 |
| 240251001 | MD | Harford | 74 | 75 | 72 | 68 | 65.4 | 66.3 | 63.9 | 64.8 | 65.4 | 66.2 | 64.8 | 65.7 |
| 340030006 | NJ | Bergen | 74.3 | 75 | 71 | 68 | 68.7 | 69.3 | 68.7 | 69.3 | 68.6 | 69.3 | 68.6 | 69.3 |
| 340230011 | NJ | Middlesex | 74.7 | 75 | 68 | 68 | 66.9 | 67.2 | 66.9 | 67.2 | 66.7 | 66.9 | 66.7 | 66.9 |
| 361192004 | NY | Westchester | 74 | 75 | 69 | 68 | 70.5 | 71.4 | 68.8 | 69.7 | 69.9 | 70.8 | 67.5 | 68.4 |
| 360810124 | NY | Queens | 72.3 | 74 | 71 | 70 | 67.4 | 69 | 66.4 | 68 | 68.9 | 70.5 | 68 | 69.6 |
| 90031003 | CT | Hartford | 71.7 | 74 | 67 | 68 | 62.4 | 64.4 | 62.4 | 64.4 | 63.7 | 65.7 | 63.7 | 65.7 |
| 240031003 | MD | Anne Arundel | 74 | 74 | 70 | 66 | 65.3 | 65.3 | 64.3 | 64.3 | 65.4 | 65.4 | 64.8 | 64.8 |

# 4 Summary of Major Changes in Model Platform Updates

This OTC 2023 TSD addendum provides an overview of ozone design values and model performance based on emission and model upgrades. Generally, emissions decline from V1 to V2/V3 except for a few sectors and/or pollutants including PTERTAC. Model performance evaluation shows that switching to the V2 platform and upgrading to later CMAQ and CAMx model versions results in slight increases in model biases and errors on average compared to the V1 platform and earlier model versions. However, this degradation in base year ozone modeled performance statistics results in minor changes to the predicted DVF outcomes at individual monitors for the 2023 ozone season when compared to those from V1 (Table 16).

*Table 16 Top 21 OTR ozone monitors showing the 2016 (2014-2018) base observed design value (DVB) compared to the 2019-2021 and 2020-2022 preliminary monitored DVs and average 2023 modeling future predicted design values (DVFs) for 3x3 and 3x3 No Water 1 methodology for CMAQ (green header) and CAMx (blue header) comparing using the V1 and the V2/V3 inventories for each model.*

| | | | Monitored DVs | | | Modeled DVs Avg | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2023 CMAQ | | | | 2023 CAMx | | | |
| | | | 2016 (2014-2018) DVB | 2019-2021 DV | 2020-2022 DV | V1 (CMAQ v5.3.1) | | V2/V3 (CMAQ v5.3.3) | | V1 (CAMx v7.10) | | V2/V3 (CAMx v7.20) | |
| **Site ID** | **State** | **County** | **AVG** | | **Prelim** | **3x3** | **NW1** | **3x3** | **NW1** | **3x3** | **NW1** | **3x3** | **NW1** |
| 90013007 | CT | Fairfield | 82 | 81 | 81 | 74 | 75 | 74.7 | 74.7 | 75 | 75 | 75.3 | 75.1 |
| 90019003 | CT | Fairfield | 82.7 | 80 | 80 | 80 | 75 | 77.4 | 76 | 78 | 76 | 76.8 | 75.6 |
| 90099002 | CT | New Haven | 79.7 | 82 | 79 | 71 | 71 | 72.8 | 71.1 | 71 | 72 | 72.3 | 72.7 |
| 420170012 | PA | Bucks | 79.3 | 71 | 72 | 69 | 69 | 70.2 | 70.2 | 71 | 71 | 71.6 | 71.6 |
| 90010017 | CT | Fairfield | 79.3 | 79 | 77 | 71 | 78 | 75.5 | 74.6 | 74 | 74 | 76.3 | 73.4 |
| 90079007 | CT | Middlesex | 78.7 | 74 | 73 | 69 | 69 | 69.6 | 69.6 | 70 | 70 | 70.5 | 70.5 |
| 90011123 | CT | Fairfield | 77 | 70 | 71 | 69 | 69 | 69.3 | 69.3 | 69 | 69 | 69.5 | 69.5 |
| 421010024 | PA | Philadelphia | 77.7 | 71 | 70 | 68 | 68 | 69 | 69 | 69 | 69 | 70.4 | 70.4 |
| 90090027 | CT | New Haven | 75.7 | 72 | 70 | 69 | 68 | 69.5 | 68.4 | 69 | 68 | 69.1 | 68.8 |
| 340070002 | NJ | Camden | 75.3 | 66 | 64 | 66 | 66 | 67.2 | 67.2 | 67 | 67 | 68.3 | 68.3 |
| 361030002 | NY | Suffolk | 74 | 73 | 74 | 68 | 67 | 69.5 | 67.7 | 69 | 68 | 68.5 | 68.5 |
| 90110124 | CT | New London | 74.3 | 73 | 72 | 67 | 71 | 68.5 | 71 | 67 | 68 | 67.6 | 67.8 |
| 361030004 | NY | Suffolk | 74.3 | 69 | 68 | 66 | 66 | 67.8 | 67.1 | 68 | 67 | 68.2 | 67.6 |
| 421010048 | PA | Philadelphia | 75.3 | 70 | 68 | 66 | 66 | 66.9 | 66.9 | 67 | 67 | 68.1 | 68.1 |
| 240251001 | MD | Harford | 74 | 72 | 68 | 63 | 64 | 65.4 | 63.9 | 65 | 64 | 65.4 | 64.8 |
| 340030006 | NJ | Bergen | 74.3 | 71 | 68 | 68 | 68 | 68.7 | 68.7 | 69 | 69 | 68.6 | 68.6 |
| 340230011 | NJ | Middlesex | 74.7 | 68 | 68 | 65 | 65 | 66.9 | 66.9 | 66 | 66 | 66.7 | 66.7 |
| 361192004 | NY | Westchester | 74 | 69 | 68 | 66 | 68 | 70.5 | 68.8 | 70 | 67 | 69.9 | 67.5 |
| 360810124 | NY | Queens | 72.3 | 71 | 70 | 66 | 65 | 67.4 | 66.4 | 67 | 68 | 68.9 | 68 |
| 90031003 | CT | Hartford | 71.7 | 67 | 68 | 62 | 62 | 62.4 | 62.4 | 63 | 63 | 63.7 | 63.7 |
| 240031003 | MD | Anne Arundel | 74 | 70 | 66 | 65 | 63 | 65.3 | 64.3 | 64 | 64 | 65.4 | 64.8 |

*Appendix A: Emission file names used in the V2/V3 inventory for 2016, 2023 and 2026 where applicable.*

**Fugitive Dust (afdust_adj)**

- 2016

2016_MY_from_afdust_2017NEI_NONPOINT_20200415_06jul2020_v0.csv

- 2023

2023fj_from_2016_MY_from_afdust_2017NEI_NONPOINT_20200415_24jun2021_v0.csv

- 2026

2026fj_from_2016_MY_from_afdust_2017NEI_NONPOINT_20200415_20jul2021_v0.csv

**Airports (airports)**

- 2016

2016_from_airports_2017NEIpost_POINT_20200618_21apr2021_nf_v3.csv

- 2023

2023fj_from_airports_2017NEIpost_POINT_20200618_09jun2021_v0.csv

- 2026

2026fj_from_airports_2017NEIpost_POINT_20200618_14jul2021_v0.csv

**Biogenic (beis)**

- 2016

BELD5_12US1_FIA6.1_2017CLD_Canada.ncf
beld5_facs_csv_fmt_2017NEI_CDC_21apr2020_v0
bioseason.cmaq.2016j_12US1.ncf_full

- 2023

BELD5_12US1_FIA6.1_2017CLD_Canada.ncf
beld5_facs_csv_fmt_2017NEI_CDC_21apr2020_v0
bioseason.cmaq.2016j_12US1.ncf_full

- 2026

BELD5_12US1_FIA6.1_2017CLD_Canada.ncf
beld5_facs_csv_fmt_2017NEI_CDC_21apr2020_v0
bioseason.cmaq.2016j_12US1.ncf_full

**Fertilizer (fertilizer)**

- 2016

2016fj_fertilizer_NH3_monthly_19may2021_v0.csv

- 2023

2016fj_fertilizer_NH3_monthly_19may2021_v0.csv

- 2026

2016fj_fertilizer_NH3_monthly_19may2021_v0.csv

**Livestock (livestock)**

- 2016

ag_livestock_2017NEI_NONPOINT_20200307_backcast_2016_MYR_21apr2021_nf_v1.csv

- 2023

2023fj_from_ag_livestock_2017NEI_NONPOINT_20200307_23jun2021_nf_v1.csv
2023fj_from_2016fj_ag_livestock_2017NEI_NONPOINT_20200307_NConly_23jun2021_v0.csv

- 2026

2026fj_from_ag_livestock_2017NEI_NONPOINT_20200307_16jul2021_v1.csv
2026fj_from_2016fj_ag_livestock_2017NEI_NONPOINT_20200307_NConly_16jul2021_v0.csv

**Nonpoint (nonpt)**

- 2016

MYR_nonpt_2016only_08sep2020_v0.csv
composting_2014_2017MYR_from_2017NEI_NONPOINT_20200415_19aug2020_v0.csv
biomass_combustion_2016MYR_from_2017NEI_NONPOINT_20200415_26aug2020_v0.csv
MYR_NONPOINT_gas_stations_interpolation_2016only_09sep2020_v0.csv
MYR_nonpt_constant_2017NEI_NONPOINT_20200415_28sep2020_v1.csv

- 2023

2023fj_from_MYR_NONPOINT_gas_stations_interpolation_2016only_02jul2021_v0.csv
cellulosic_v1platform_2023fh_nonpt_fromVolpe_02jul2021_nf_v1.csv
2023fj_from_composting_2014_2017MYR_from_2017NEI_NONPOINT_20200415_02jul2021_v0.csv
2023fj_from_MYR_nonpt_constant_2017NEI_NONPOINT_20200415_02jul2021_v0.csv
2023fj_from_biomass_combustion_2016MYR_from_2017NEI_NONPOINT_20200415_02jul2021_v0.csv
2023fj_from_MYR_nonpt_2016only_02jul2021_v0.csv

- 2026

2026fj_proj_MYR_nonpt_constant_2017NEI_NONPOINT_20200415_19jul2021_v0.csv

2026fj_proj_MYR_NONPOINT_gas_stations_interpolation_2016only_19jul2021_v0.csv

2026fj_proj_composting_2014_2017MYR_from_2017NEI_NONPOINT_20200415_19jul2021_v0.csv cellulosic_v1platform_2026fj_nonpt_fromVolpe_16jul2021_v0.csv

2026fj_proj_biomass_combustion_2016MYR_from_2017NEI_NONPOINT_20200415_19jul2021_v0.csv

2026fj_proj_MYR_nonpt_2016only_19jul2021_v0.csv

**Non-Point Oil & Gas (np_oilgas)**

- 2016

2014_oil_gas_nonpoint_fromWRAP_20190913_12may2021_nf_v2.csv
MYR_np_oilgas_2016_12may2021_nf_v3.csv
2016ff_np_oilgas_Oklahoma_21dec2018_v2.csv
MYR_np_oilgas_2016_WRAP_exploration_12may2021_v0.csv

- 2023

2023fj_from_MYR_np_oilgas_2016_23jun2021_v0.csv
2016_version1_2028_oil_gas_nonpoint_fromWRAP_20200211_23jun2021_nf_v3.csv
2023fj_from_2016v2_np_oilgas_exploration_average_2014_2017_23jun2021_v0.csv
2023fj_from_2016ff_np_oilgas_Oklahoma_23jun2021_v0.csv

- 2026

2016_version1_2028_oil_gas_nonpoint_fromWRAP_20200211_23jun2021_nf_v3.csv
2026fj_proj_2016ff_np_oilgas_Oklahoma_14jul2021_v0.csv
2026fj_proj_2016v2_np_oilgas_exploration_average_2014_2017_14jul2021_v0.csv
2026fj_proj_MYR_np_oilgas_2016_14jul2021_v0.csv

**Rail (rail)**

- 2016

2016beta_rail_class1_ERTAC_15jul2019_v2.csv
2016beta_rail_passenger_ERTAC_15jul2019_v3.csv
2016version1_rail_class2_class3_ERTAC_15jul2019_v1.csv

- 2023

2016version1_2023_rail_class1_ERTAC_16sep2019_nf_v1.csv
2016version1_2023_rail_class2_class3_ERTAC_16sep2019_nf_v1.csv
2023fh_proj_from_2016version1_2016_rail_allNC_16sep2019_v0.csv
2016version1_2023_rail_passenger_ERTAC_16sep2019_nf_v1.csv

- 2026

2016version2_2026interp_rail_passenger_ERTAC_15jul2021_v0.csv
2016version2_2026interp_rail_class2_class3_ERTAC_15jul2021_v0.csv
2016version2_2026interp_rail_class1_ERTAC_15jul2021_v0.csv
2016version2_2026interp_rail_allNC_15jul2021_v0.csv

**Residential Wood Combustion (rwc)**

- 2016

rwc_2016MYR_from_2017NEI_NONPOINT_20200415_26aug2020_v0.csv

- 2023

2023fj_from_rwc_2017NEI_NONPOINT_20200415_22jun2021_v0.csv

- 2026

2026fj_from_rwc_2017NEI_NONPOINT_20200415_19jul2021_v0.csv

**Nonroad (nonroad)**

- 2016

2016fj_v2platform_nonroad_from_MOVES_aggSCC_27apr2021_nf_v1.csv
2016v1platform_2016_california_nonroad_27apr2021_nf_v6.csv
2016v1platform_2016_texas_nonroad_27apr2021_nf_v5.csv

- 2023

2016v1platform_2023_california_nonroad_11jun2021_nf_v2.csv
2016v1platform_2023_texas_nonroad_11jun2021_nf_v1.csv
2023fj_v2platform_nonroad_from_MOVES_aggSCC_11jun2021_nf_v1.csv

- 2026

2016v2platform_2026interp_california_nonroad_12jul2021_nf_v1.csv
2016v2platform_2026interp_texas_nonroad_12jul2021_nf_v1.csv
2026fj_v2platform_nonroad_from_MOVES_aggSCC_12jul2021_nf_v1.csv

**Mobile Source (onroad)**

- 2016

HOTELING_2016fj_17may2021_nf_v4.csv
ONI_IDLING_2016fj_MOVES3_fromOTAQ_18may2021_nf_v1.csv
SPEED_2017NEI_from_CDBs_MOVES3_fuels_03may2021_v8.csv
STARTS_2016fj_MOVES3_17may2021_nf_v4.csv
VMT_2016fj_MOVES3_20may2021_v6.csv
VPOP_2016fj_MOVES3_17may2021_nf_v5.csv

- 2023

VMT_2023fj_MOVES3_03jun2021_nf_v2.csv
SPEED_2017NEI_from_CDBs_MOVES3_fuels_03may2021_v8.csv
ONI_IDLING_2023fj_MOVES3_03jun2021_nf_v1.csv
HOTELING_2023fj_03jun2021_nf_v1.csv
VPOP_2023fj_MOVES3_03jun2021_nf_v2.csv
STARTS_2023fj_MOVES3_03jun2021_nf_v1.csv

- 2026

HOTELING_2026fj_13jul2021_nf_v1.csv
ONI_IDLING_2026fj_MOVES3_13jul2021_nf_v1.csv
SPEED_2017NEI_from_CDBs_MOVES3_fuels_03may2021_v8.csv
STARTS_2026fj_MOVES3_13jul2021_nf_v1.csv
VMT_2026fj_MOVES3_13jul2021_nf_v1.csv
VPOP_2026fj_MOVES3_13jul2021_nf_v1.csv

**Wildfire (ptfire-wild)**

- 2016

ptinv_sf2_2016v1_split_haps_22apr2021_nf_v6.csv
ptday_2016v2_ptfire_all_prevdec_22apr2021_nf_v3
ptday_sf2_2016v1_22apr2021_nf_v4
ptinv_ptfire_2016beta_GADNR_caps_ff10_reapportion_12jul2019_nf_v2.csv
ptday_ptfire_2016beta_GADNR_haps_ff10_reapportion_csv_16jul2019_nf_v3
ptday_ptfire_2016beta_GADNR_caps_ff10_reapportion_csv_12jul2019_nf_v2
ptday_sf2_2016v1_split_haps_22apr2021_nf_v5
ptinv_sf2_2016v1_split_22apr2021_nf_v4.csv
ptinv_ptfire_2016beta_GADNR_haps_ff10_reapportion_12jul2019_nf_v3.csv

**Prescribed Fires (ptfire-rx)**

- 2016

ptinv_ptfire_2016beta_GADNR_haps_ff10_reapportion_12jul2019_nf_v2.csv
ptinv_sf2_2016v1_split_haps_22apr2021_nf_v5.csv
ptinv_sf2_2016v1_split_22apr2021_nf_v3.csv
ptday_ptfire_2016beta_GADNR_caps_ff10_reapportion_csv_12jul2019_nf_v1
ptday_sf2_2016v1_ak_22apr2021_nf_v1
ptday_ptfire_2016_ks_flinthills_reapportion_ff10_26mar2019_v0
ptday_sf2_2016v1_split_haps_22apr2021_nf_v4
ptinv_ptfire_2016_ks_flinthills_reapportion_ff10_26mar2019_v0.csv
ptday_sf2_2016v1_22apr2021_nf_v3
ptday_2016v2_ptfire_all_prevdec_22apr2021_nf_v2
ptinv_ptfire_2016beta_GADNR_caps_ff10_reapportion_12jul2019_nf_v1.csv
ptday_ptfire_2016_ks_flinthills_haps_reapportion_ff10_26mar2019_v0
ptday_sf2_2016v1_ak_haps_22apr2021_nf_v1
ptinv_ptfire_2016_ks_flinthills_haps_reapportion_ff10_26mar2019_v0.csv
ptday_ptfire_2016beta_GADNR_haps_ff10_reapportion_csv_12jul2019_nf_v2

**Fires Canada & Mexico (ptfire_othna)**

- 2016

ptinv_finn_ONA_finn_2016_ff10_24Aug2020_25aug2020_v0.csv
ptday_finn_MX_finn_2016b_prevdec_13nov2018_v0
ptday_finn_MX_finn_2016b_25sep2018_v0
ptinv_finn_MX_finn_2016b_ff10_25sep2018_v0.csv

ptday_finn_ONA_finn_2016_ff10_24Aug2020_prevdec_csv_09sep2020_v0
ptday_finn_CA_finn_2016b_19oct2018_v1
ptday_finn_ONA_finn_2016_ff10_24Aug2020_csv_25aug2020_v0
ptday_ptfire_canada_2016_EC_shortfac_ff10_csv_07aug2018_v0
ptday_finn_CA_finn_2016b_prevdec_noECoverlap_13nov2018_v0
ptinv_finn_CA_finn_2016b_ff10_25sep2018_v0.csv

**Agricultural Burning (ptagfire)**

- 2016

ptinv_agburn_2016_hi_05apr2019_v0.csv
ptday_2016v1_agburn_caps_28apr2021_nf_v1
ptday_2016_GA_agburn_haps_reapportion_19jul2019_v0
ptday_2016v1_agburn_haps_28apr2021_nf_v1
ptday_agburn_WA_2016_supplemental_01nov2018_v0
ptday_2016_GA_agburn_caps_reapportion_prevdec_19jul2019_v0
ptday_2016_GA_agburn_caps_reapportion_19jul2019_v0
ptday_agburn_WA_2016_supplemental_prevdec_14nov2018_v0
ptinv_2016_GA_agburn_caps_reapportion_16jul2019_v0.csv
ptinv_2016beta_agburn_ID_caps_17oct2018_v0.csv
ptday_2016v1_agburn_caps_prevdec_19jul2019_v0
ptday_2016beta_agburn_MN_caps_17oct2018_v0
ptinv_2016beta_agburn_MN_caps_17oct2018_v0.csv
agburn_WA_2016_supplemental_01nov2018_v0.csv
ptinv_2016v1_agburn_haps_28apr2021_nf_v1.csv
ptinv_2016_GA_agburn_haps_reapportion_16jul2019_v0.csv
ptday_2016v1_agburn_haps_prevdec_19jul2019_v0
ptday_agburn_2016_hi_05apr2019_v0
ptday_2016_GA_agburn_haps_reapportion_prevdec_19jul2019_v0
ptday_2016beta_agburn_ID_caps_17oct2018_v0
ptinv_2016v1_agburn_caps_28apr2021_nf_v1.csv

**Point Source Oil & Gas (pt_oilgas)**

- 2016

2016_version1_oil_gas_point_fromWRAP_20200117_27feb2020_v1.csv
2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_19may2021_nf_v4.csv
oilgas_2016b_POINT_20180612_19may2021_nf_v7.csv

- 2023

2016_version1_2028_oil_gas_point_fromWRAP_20200213_04mar2020_v1.csv
2023fj_from_oilgas_2016b_POINT_20180612_01jul2021_nf_v1.csv
2023fj_from_2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_01jul2021_nf_v1.csv
2023fj_oilgas_override_from_2018gc_01jul2021_v0.csv

- 2026

2016_version1_2028_oil_gas_point_fromWRAP_20200213_04mar2020_v1.csv
2026fj_proj_oilgas_2016b_POINT_20180612_23jul2021_nf_v1.csv
2026fj_proj_2016ff_proj_from_oilgas_2016b_POINT_20180612_calcyear2014_23jul2021_nf_v1.csv
2023fj_oilgas_override_from_2018gc_01jul2021_v0.csv

**EGU Point Source -ERTAC Platform (ptertac)**

- 2016

2016fh_proj_from_egunoncems_2016b_ERTAC_Platform_POINT_20180612_2016v1_calcyear2014_17may2021_v1.csv
C2.2CONUSv16.2_BYFYHRLY_fs_ff10_future.csv
C2.2CONUSv16.2_BYFYHRLY_fs_ff10_hourly_future.csv
egunoncems_2016b_ERTAC_Platform_POINT_20180612_12nov2019_v11.csv

- 2023

C3.0CONUSv16.2_2023-RCU_fs_ff10_future.csv
C3.0CONUSv16.2_2023-RCU_fs_ff10_hourly_future.csv
ERTAC_egunoncems_epa620_2023_20210528_summer_09jul2021_v1_03aug2022_nf_v1.csv
ERTAC_egunoncems_epa620_2023_20210528_winter_09jul2021_v1_03aug2022_nf_v1.csv
ERTAC_egunoncems_epa620_2023_20210528_wintershld_09jul2021_v1_03aug2022_nf_v1.csv

- 2026

C3.0CONUSv16.2_2026-RCU1_fs_ff10_future.csv
C3.0CONUSv16.2_2026-RCU1_fs_ff10_hourly_future.csv
egunoncems_epa620_2026_ERTAC_Platform_20210609_summer_26jul2021_v0.csv
egunoncems_epa620_2026_ERTAC_Platform_20210609_winter_26jul2021_v0.csv
egunoncems_epa620_2026_ERTAC_Platform_20210609_wintershld_26jul2021_v0.csv

**Industrial Point Sources – ERTAC platform (ptnonertac)**

- 2016

  2016fh_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_20may2021_nf_v1.csv
  2016fh_proj_from_nonegu_2016version1_ERTAC_Platform_POINT_20180612_calcyear2014_17jun2021_nf_v6_v0.csv
  2016fj_nonegu_additions_from_2017_2018_17jun2021_nf_v1.csv
  nonegu_2016version1_ERTAC_Platform_POINT_20180612_25may2021_nf_v6_v0.csv
  point_railyards_2016version1_21may2021_nf_v3.csv
  pt_biorefinery_OTAQ_supplemental_2016version1_12nov2019_v1.csv

- 2023

2023fj_from_2016fh_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_28jun2021_v0.csv
2023fj_from_2016fj_nonegu_additions_from_2017_2018_28jun2021_v0.csv
2023fj_from_pt_biorefinery_OTAQ_supplemental_2016version1_28jun2021_v0.csv
2023fj_nonegu_override_from_2017NEIpost_POINT_20200514_29jun2021_nf_v1.csv
2023fj_nonegu_override_from_2019_draft_POINT_20210524_30jun2021_nf_v1.csv
ERTAC_2023fj_from_2016fh_proj_from_nonegu_2016version1_POINT_20180612_calcyear2014_29jun2021_nf_v1_03aug2022_nf_v1.csv
ERTAC_2023fj_from_nonegu_2016version1_POINT_20180612_01jul2021_nf_v1_03aug2022_nf_v1.csv
ERTAC_2023fj_nonegu_override_from_2018platform_POINT_20201206_01jul2021_nf_v1_17jul2022_nf_v1.csv
ERTAC_egunoncems_epa620_2023_20210528_summer_09jul2021_v1_03aug2022_nf_v1.csv
ERTAC_egunoncems_epa620_2023_20210528_winter_09jul2021_v1_03aug2022_nf_v1.csv
ERTAC_egunoncems_epa620_2023_20210528_wintershld_09jul2021_v1_03aug2022_nf_v1.csv
point_railyards_2016version1_2023fh_12aug2020_v1.csv

- 2026

2026fj_from_2016fh_from_nonegu_2016version1_POINT_20180612_biorefinery_calcyear2014_23jul2021_v0.csv
2026fj_from_2016fh_proj_from_nonegu_2016version1_ERTAC_Platform_POINT_20180612_calcyear2014_23jul2021_v0.csv
2026fj_from_nonegu_2016version1_ERTAC_Platform_POINT_20180612_23jul2021_v0.csv
2026fj_from_nonegu_override_from_2017NEIpost_POINT_20200514_23jul2021_v0.csv
2026fj_from_nonegu_override_from_2018platform_ERTAC_Platform_POINT_20201206_23jul2021_v0.csv
2026fj_from_nonegu_override_from_2019_draft_POINT_20210524_23jul2021_v0.csv
2026fj_from_pt_biorefinery_OTAQ_supplemental_2016version1_23jul2021_v0.csv
point_railyards_2016version2_2026interp_15jul2021_nf_v1.csv

**Commercial Marine Vessels - Category 1 & 2 (cmv_c1c2)**

- 2016

canada_c1c2_point_2015_aisremoved_07aug2019_v0.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_10_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_10_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_11_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_11_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_12_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_12_CA_nexthour.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_12_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_12_US_nexthour.csv

cmv_c1c2_2016adjust_20220127_sa_12US1_2017_1_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_1_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_2_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_2_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_3_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_3_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_4_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_4_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_5_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_5_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_6_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_6_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_7_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_7_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_8_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_8_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_9_CA_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_9_US_hourly.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_CA_annual_26jan2022_v0.csv
cmv_c1c2_2016adjust_20220127_sa_12US1_2017_US_annual_26jan2022_v0.cs

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cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_5_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_8_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_2_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_9_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_7_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_11_CA_hourly.csv
cmv_c1c2/cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_2_US_hourly.csv
cmv_c1c2/cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_9_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_12_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_6_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_3_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_6_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_5_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_12_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_11_US_hourly.csv
2023fh_proj_canada_c1c2_point_2015_aisremoved_24sep2019_v0.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_1_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_8_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_3_US_hourly.csv
2023_from_cmv_c1c2_2016adjust_20220127_sa_12US1_2017_CA_annual_31jan2022_v0
.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_4_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_12_CA_nexthour.csv

cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_1_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_4_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_10_CA_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_12_US_nexthour.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_7_US_hourly.csv
cmv_c1c2_2016adjust_2023_20220127_sa_12US1_2017_10_US_hourly.csv
2023_from_cmv_c1c2_2016adjust_20220127_sa_12US1_2017_US_annual_31jan2022_v0.csv

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cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_5_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_12_CA_nexthour.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_4_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_7_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_12_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_12_US_nexthour.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_1_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_12_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_10_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_10_CA_hourly.csv
2026_from_cmv_c1c2_2016adjust_20220127_sa_12US1_2017_US_annual_01feb2022_v0.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_8_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_6_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_8_US_hourly.csv
2026_from_cmv_c1c2_2016adjust_20220127_sa_12US1_2017_CA_annual_01feb2022_v0.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_4_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_2_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_6_CA_hourly.csv
2026fj_proj_canada_c1c2_point_2015_aisremoved_15jul2021_v0.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_3_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_9_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_11_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_5_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_11_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_2_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_3_CA_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_9_US_hourly.csv
cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_1_CA_hourly.csv
/cmv_c1c2_2016adjust_2026_20220127_sa_12US1_2017_7_US_hourly.csv

**Commercial Marine Vessels - Category 3 (cmv_c3)**

- 2016

canada_c3_point_2015_aisremoved_05aug2019_v0.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_10_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_10_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_11_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_11_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_12_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_12_CA_nexthour.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_12_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_12_US_nexthour.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_1_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_1_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_2_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_2_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_3_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_3_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_4_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_4_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_5_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_5_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_6_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_6_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_7_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_7_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_8_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_8_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_9_CA_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_9_US_hourly.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_CA_annual_03feb2022_v0.csv
cmv_c3_2016adjust_20220203_sa_12US1_2017_US_annual_03feb2022_v0.csv

- 2023

cmv_c3/2023fh_proj_canada_c3_point_2015_aisremoved_24sep2019_v0.csv
2023_from_cmv_c3_2016adjust_20220203_sa_12US1_2017_US_annual_03feb2022_v0.c
sv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_10_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_1_US_hourly.csv
2023fh_proj_Mexico_2014v1_CMV_point_aisremoved_24sep2019_v0.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_11_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_12_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_8_US_hourly.csv
2023fh_proj2_ptinv_2016ff_proj_from_eca_imo_nonUS_nonCANADA_caps_vochaps_2011
_aisremoved_27jan2020_v0.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_7_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_11_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_2_US_hourly.csv

cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_4_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_12_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_4_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_6_CA_hourly.csv
2023_from_cmv_c3_2016adjust_20220203_sa_12US1_2017_CA_annual_03feb2022_v0.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_9_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_5_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_3_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_5_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_6_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_8_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_3_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_12_CA_nexthour.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_10_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_9_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_12_US_nexthour.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_7_US_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_2_CA_hourly.csv
cmv_c3_2016adjust_2023_20220203_sa_12US1_2017_1_CA_hourly.csv

- 2026

cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_11_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_10_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_3_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_4_US_hourly.csv
2026_from_cmv_c3_2016adjust_20220203_sa_12US1_2017_US_annual_03feb2022_v0.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_6_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_8_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_1_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_6_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_2_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_7_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_10_CA_hourly.csv
2026fj_proj_ptinv_2016ff_proj_from_eca_imo_nonUS_nonCANADA_caps_vochaps_2011_aisremoved_15jul2021_v0.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_4_CA_hourly.csv
2026fj_proj_canada_c3_point_2015_aisremoved_15jul2021_v0.csv
2026_from_cmv_c3_2016adjust_20220203_sa_12US1_2017_CA_annual_03feb2022_v0.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_7_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_3_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_5_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_11_US_hourly.csv

cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_9_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_8_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_12_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_12_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_5_CA_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_9_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_12_US_nexthour.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_12_CA_nexthour.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_2_US_hourly.csv
cmv_c3_2016adjust_2026_20220203_sa_12US1_2017_1_CA_hourly.csv

**Canadian Agricultural (canada_ag)**

- 2016

canada_MYR_2016_ag_fertilizer_NH3_monthly_12km_16apr2021_v0.csv
canada_MYR_2016_ag_animal_NH3_VOC_monthly_12km_aggregated_09jun2021_v0.csv

- 2023

canada_MYR_2023proj_ag_animal_NH3_VOC_monthly_12km_aggregated_01jul2021_v0.csv
canada_MYR_2023proj_ag_fertilizer_NH3_monthly_12km_01jul2021_v0.csv

- 2026

canada_MYR_2026proj_ag_animal_NH3_VOC_monthly_12km_aggregated_20jul2021_v0.csv
canada_MYR_2026proj_ag_fertilizer_NH3_monthly_12km_20jul2021_v0.csv

**Canadian Oil & Gas (canada_og2D)**

- 2016

canada_MYR_2016_point_UOG_15jun2021_nf_v1.csv

- 2023

canada_MYR_2023proj_point_UOG_2D_01jul2021_v0.csv

- 2026

canada_MYR_2026proj_point_UOG_2D_20jul2021_v0.csv

**Canadian Non-Point Fugitive Dust (othafdust)**

- 2016

canada_MYR_2016_area_dust_27dec2020_v0.csv

- 2023

canada_MYR_2023proj_area_dust_02jul2021_v0.csv

- 2026

canada_MYR_2026proj_area_dust_20jul2021_v0.csv

**Canadian & Mexican Nonpoint (othar)**

- 2016

Mexico_2016INEM_nonroad_27apr2020_v1.csv
canada_MYR_2016_T5_rail_27dec2020_v0.csv
canada_MYR_2016_area_other_27dec2020_v0.csv
canada_MYR_2016_T4_nonroad_monthly_27dec2020_v0.csv
Mexico_2016INEM_nonpoint_27may2020_v1.csv

- 2023

2023_proj_from_Mexico_2016INEM_nonroad_01jul2021_v0.csv
canada_2023_area_EPG_svn70_11apr2019_v1.csv
canada_MYR_2023proj_T5_rail_01jul2021_v0.csv
canada_MYR_2023proj_T4_nonroad_monthly_01jul2021_v0.csv
canada_MYR_2023proj_area_other_02jul2021_v0.csv
2023_proj_from_Mexico_2016INEM_nonpoint_01jul2021_v0.csv

- 2026

canada_2026interp_area_EPG_svn70_21jul2021_v0.csv
canada_MYR_2026proj_area_other_21jul2021_v0.csv
canada_MYR_2026proj_T4_nonroad_monthly_20jul2021_v0.csv
2026_proj_from_Mexico_2016INEM_nonpoint_21jul2021_v0.csv
2026_proj_from_Mexico_2016INEM_nonroad_21jul2021_v0.csv
canada_MYR_2026proj_T5_rail_20jul2021_v0.csv

**Canadian & Mexican Point Sources (othpt)**

- 2016

canada_MYR_2016_point_UOG_15jun2021_nf_v2.csv
canada_MYR_2016_point_nodust_noVOC_monthly_27dec2020_v0.csv
canada_MYR_2016_point_CB6VOC_monthly_27dec2020_v0.csv
canada_MYR_2016_point_VOC_INV_monthly_27dec2020_v0.csv
canada_MYR_2016_T1_airports_monthly_27dec2020_v0.csv
Mexico_2016_point_20191209_15may2023_nf_v4.csv

- 2023

canada_MYR_2023proj_point_UOG_3D_01jul2021_v0.csv
2023_proj_from_canada_MYR_2016_point_VOC_INV_monthly_02jul2021_v0.csv
2023_proj_from_canada_MYR_2016_point_CB6VOC_monthly_02jul2021_v0.csv
2023_proj_from_Mexico_2016_point_20191209_01jul2021_v0.csv
2023_proj_from_canada_MYR_2016_point_nodust_noVOC_monthly_02jul2021_v0.csv
2023_proj_from_canada_MYR_2016_T1_airports_monthly_02jul2021_v0.csv

- 2026

2026_proj_from_canada_MYR_2016_point_VOC_INV_monthly_21jul2021_v0.csv
2026_proj_from_canada_MYR_2016_point_nodust_noVOC_monthly_21jul2021_v0.csv
canada_MYR_2026proj_point_UOG_3D_20jul2021_v0.csv
2026_proj_from_canada_MYR_2016_T1_airports_monthly_21jul2021_v0.csv
2026_proj_from_Mexico_2016_point_20191209_21jul2021_v0.csv
2026_proj_from_canada_MYR_2016_point_CB6VOC_monthly_21jul2021_v0.csv

**Canadian Point Source Fugitive Dust (othptdust_adj)**

- 2016

canada_MYR_2016_ag_harvest_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_point_source_dust_monthly_27dec2020_v0.csv
canada_MYR_2016_ag_tillage_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_ag_animal_PM25_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_ag_animal_PM10_monthly_12km_27dec2020_v0.csv

- 2023

canada_MYR_2016_ag_harvest_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_point_source_dust_monthly_27dec2020_v0.csv
canada_MYR_2016_ag_tillage_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_ag_animal_PM25_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_ag_animal_PM10_monthly_12km_27dec2020_v0.csv

- 2026

canada_MYR_2016_ag_harvest_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_point_source_dust_monthly_27dec2020_v0.csv
canada_MYR_2016_ag_tillage_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_ag_animal_PM25_monthly_12km_27dec2020_v0.csv
canada_MYR_2016_ag_animal_PM10_monthly_12km_27dec2020_v0.csv

**Canadian Mobile Source (onroad_can)**

- 2016

canada_MYR_2016_T3_onroad_monthly_27dec2020_v0.csv
canada_MYR_2016_T3_onroad_refueling_27dec2020_v0.csv

- 2023

canada_MYR_2023proj_T3_onroad_monthly_01jul2021_v0.csv
canada_MYR_2023proj_T3_onroad_refueling_01jul2021_v0.csv

- 2026

canada_MYR_2026proj_T3_onroad_refueling_20jul2021_v0.csv
canada_MYR_2026proj_T3_onroad_monthly_20jul2021_v0.csv

**Mexican Mobile Source (onroad_mex)**

- 2016

Mexico_2016_onroad_MOVES_interpolated_02mar2018_v0.csv

- 2023

Mexico_2023_onroad_MOVES_aggSCC_21sep2016_v1.csv

- 2026

Mexico_2026interp_onroad_MOVES_aggSCC_13jul2021_v0.csv

**Non-Point Solvents (np_solvents)**

- 2016

VCPy_plus_other_solvents_2016v3_PSS_20220621_07jul2022_nf_v2.csv
nonVCPy_solvents_2017NEIpost_NONPOINT_20210129_07jul2022_nf_v2.csv
solvents_2017NEIpost_NONPOINT_20210129_nonVCPy_polls_for2016v3_2019ge_07jul2022_nf_v2.csv

- 2023

2023gf_from_VCPy_plus_other_solvents_2016v3_PSS_20220621_08jul2022_v0.csv
2023gf_from_nonVCPy_solvents_2017NEIpost_NONPOINT_20210129_08jul2022_v0.csv
2023gf_from_solvents_2017NEIpost_NONPOINT_20210129_nonVCPy_polls_for2016v3_2019ge_08jul2022_v0.csv

- 2026

2026gf_from_VCPy_plus_other_solvents_2016v3_PSS_20220621_08jul2022_v0.csv
2026gf_from_nonVCPy_solvents_2017NEIpost_NONPOINT_20210129_08jul2022_v0.csv
2026gf_from_solvents_2017NEIpost_NONPOINT_20210129_nonVCPy_polls_for2016v3_2019ge_08jul2022_v0.csv

**Point Source Solvent (pt_solvents)**

- 2016

2016fh_ptnonipm_all_point_solvents_23feb2022_v0.csv

- 2023

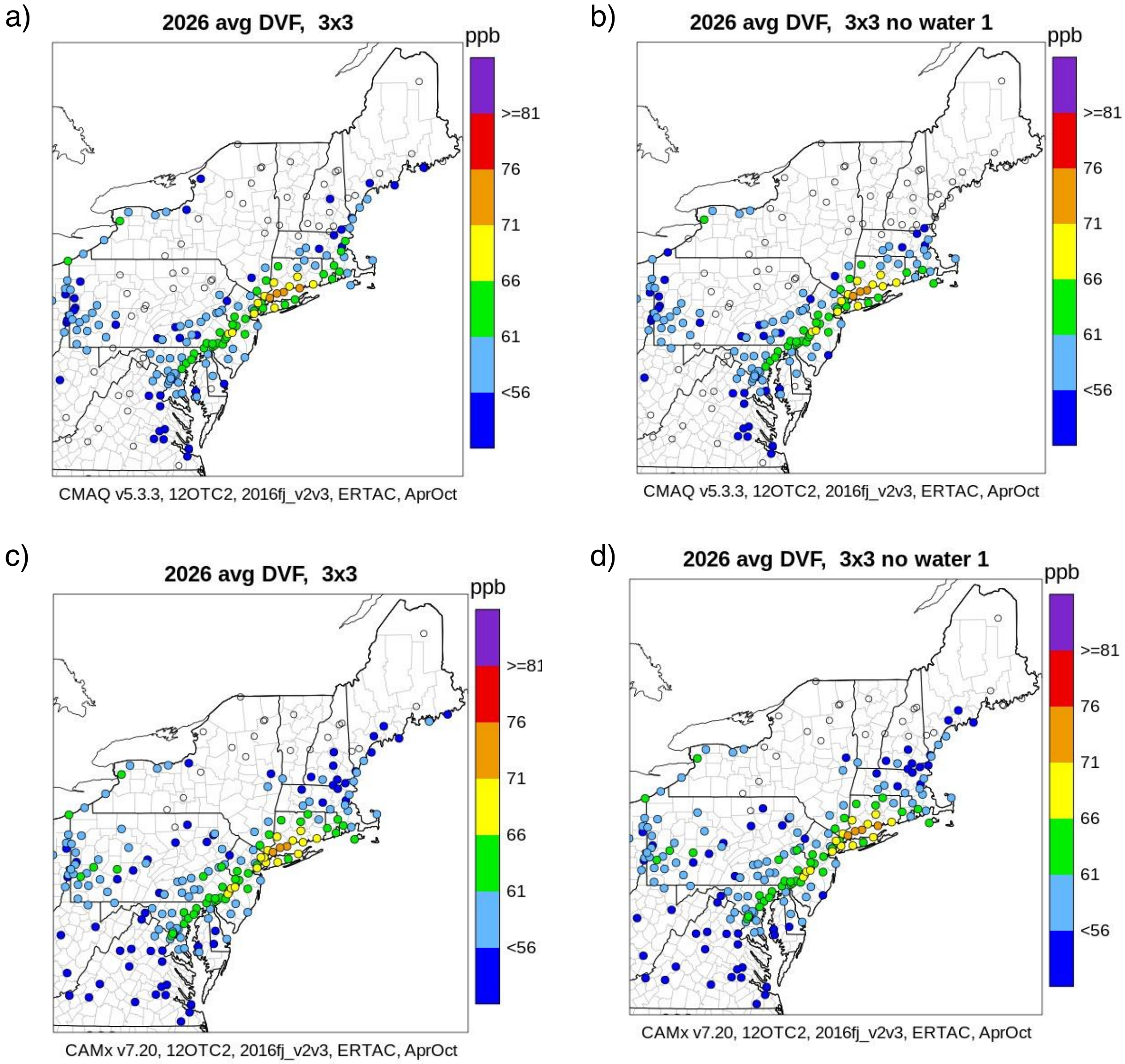
2023_v2platform_from_2016fh_ptnonipm_all_point_solvents_23feb2022_v0.csv

- 2026

2026_v2platform_from_2016fh_ptnonipm_all_point_solvents_23feb2022_v0.csv

## *Appendix B: Future Design Values for 2026 with the V2/V3 Inventory*

*Figure B1. Future Design Values (DVF) for 2026 for (a) CMAQ with V2/V3 and 3x3 methodology; (b) CMAQ with V2/V3 and 3x3 No Water 1 methodology; (c) CAMx with V2/V3 and 3x3 methodology; and (d) CAMx with V2/V3 and 3x3 No Water 1 methodology.*



*Appendix C: 2023 DVFs for All Monitors*

*Table C1: All monitors in the domain showing the 2016 (2014-2018) base observed design value (DVB) compared to the 2019-2021 and 2020-2022 preliminary monitored DVs and 2023 modeling future predicted design values (DVFs) for 3x3 and 3x3 No Water 1 methodology for CMAQ (green header) and CAMx (blue header) using the V2/V3 inventory. See Table 15 for Top 21 OTR Monitors.*

| | | | | | | 2014-2018 DVB | | 2019-2021 DV | 2020-2022 DV | CAMx v7.20 | | | | CMAQ v5.3.3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 3x3 | | 3x3 no water 1 | | 3x3 | | 3x3 no water 1 | |
| Site ID | State | County | Site name | Lat | Lon | AVG | MAX | | Prelim | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 90010017 | Connecticut | Fairfield | Greenwich Point Park - Greenwich | 41.00466 | -73.5851 | 79.3 | 80 | 79 | 77 | 76.3 | 76.9 | 73.4 | 74.1 | 75.5 | 76.2 | 74.6 | 75.3 |
| 90011123 | Connecticut | Fairfield | Western Conn State Univ - Danbury | 41.39917 | -73.4431 | 77 | 78 | 70 | 71 | 69.5 | 70.4 | 69.5 | 70.4 | 69.3 | 70.2 | 69.3 | 70.2 |
| 90013007 | Connecticut | Fairfield | Lighthouse - Stratford | 41.1525 | -73.1031 | 82 | 83 | 81 | 81 | 75.3 | 76.2 | 75.1 | 76.1 | 74.7 | 75.6 | 74.7 | 75.6 |
| 90019003 | Connecticut | Fairfield | Sherwood Island State Park - Westport | 41.11833 | -73.3367 | 82.7 | 83 | 80 | 80 | 76.8 | 77 | 75.6 | 75.9 | 77.4 | 77.6 | 76 | 76.3 |
| 90031003 | Connecticut | Hartford | McAuliffe Park | 41.78472 | -72.6317 | 71.7 | 74 | 67 | 68 | 63.7 | 65.7 | 63.7 | 65.7 | 62.4 | 64.4 | 62.4 | 64.4 |
| 90050005 | Connecticut | Litchfield | Mohawk Mt-Cornwall | 41.82134 | -73.2973 | 71.3 | 72 | 64 | 67 | 63.2 | 63.8 | 63.2 | 63.8 | 63.2 | 63.8 | 63.2 | 63.8 |
| 90079007 | Connecticut | Middlesex | Connecticut Valley Hospital - Middletown | 41.55 | -72.626 | 78.7 | 79 | 74 | 73 | 70.5 | 70.8 | 70.5 | 70.8 | 69.6 | 69.9 | 69.6 | 69.9 |
| 90090027 | Connecticut | New Haven | Criscuolo Park-New Haven | 41.3014 | -72.9029 | 75.7 | 77 | 72 | 70 | 69.1 | 70.3 | 68.8 | 70 | 69.5 | 70.7 | 68.4 | 69.6 |
| 90099002 | Connecticut | New Haven | Hammonasset State Park - Madison | 41.25679 | -72.5533 | 79.7 | 82 | 82 | 79 | 72.3 | 74.3 | 72.7 | 74.8 | 72.8 | 74.9 | 71.1 | 73.2 |
| 90110124 | Connecticut | New London | Fort Griswold Park - Groton | 41.35362 | -72.0788 | 74.3 | 76 | 73 | 72 | 67.6 | 69.2 | 67.8 | 69.3 | 68.5 | 70.1 | 71 | 72.7 |
| 90131001 | Connecticut | Tolland | | 41.97639 | -72.3881 | 71.7 | 73 | 67 | 66 | 63.4 | 64.6 | 63.4 | 64.6 | 62.3 | 63.4 | 62.3 | 63.4 |
| 90159991 | Connecticut | Windham | Abington | 41.84046 | -72.0104 | 69.7 | 71 | 65 | 64 | 61.6 | 62.8 | 61.6 | 62.8 | 60.6 | 61.7 | 60.6 | 61.7 |
| 100010002 | Delaware | Kent | PROPERTY OF KILLENS POND STATE PARK; BEHIND FARM BUILDINGS | 38.98667 | -75.5568 | 66.3 | 67 | NA | 63 | 57.2 | 57.8 | 57.7 | 58.3 | 58 | 58.7 | 57.9 | 58.5 |
| 100031007 | Delaware | New Castle | Lums Pond | 39.5513 | -75.732 | 68 | 69 | NA | NA | 59.4 | 60.3 | 59.4 | 60.3 | 58.9 | 59.8 | 58.9 | 59.8 |
| 100031010 | Delaware | New Castle | BCSP | 39.81722 | -75.5639 | 73.7 | 74 | NA | 62 | 65.4 | 65.7 | 65.4 | 65.7 | 65.5 | 65.8 | 65.5 | 65.8 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100031013 | Delaware | New Castle | BELLEVUE STATE PARK: FIELD IN SE PORTION OF PARK | 39.77389 | -75.4964 | 71 | 72 | NA | 63 | 62.6 | 63.5 | 62.6 | 63.5 | 62.8 | 63.7 | 62.8 | 63.7 |
| 100032004 | Delaware | New Castle | MLK CORNER OF MLK BLVD AND JUSTISON ST | 39.73944 | -75.5581 | 71.3 | 72 | NA | NA | 62.9 | 63.5 | 62.9 | 63.5 | 63.1 | 63.7 | 63.1 | 63.7 |
| 100051002 | Delaware | Sussex | Seaford Shipley State Service Center | 38.6539 | -75.6106 | 65.3 | 66 | NA | 61 | 56.9 | 57.5 | 56.9 | 57.5 | | | | |
| 100051003 | Delaware | Sussex | Lewes SPM SITE: NEAR UD ACID RAIN/MERCURY COLLECTORS | 38.7791 | -75.1632 | 67.7 | 69 | NA | NA | 59.4 | 60.6 | 60.2 | 61.4 | 55.1 | 56.1 | | |
| 110010041 | District Of Columbia | District of Columbia | RIVER TERRACE | 38.89557 | -76.9581 | 57 | 57 | 60 | 59 | 50.4 | 50.4 | 50.4 | 50.4 | 49.3 | 49.3 | 49.3 | 49.3 |
| 110010043 | District Of Columbia | District of Columbia | MCMILLAN NCore-PAMS | 38.92185 | -77.0132 | 71 | 72 | 68 | 67 | 62.8 | 63.7 | 62.8 | 63.7 | 61.4 | 62.3 | 61.4 | 62.3 |
| 110010050 | District Of Columbia | District of Columbia | Takoma Rec Center | 38.97009 | -77.0167 | 70 | 70 | 66 | 61 | 61.7 | 61.7 | 61.7 | 61.7 | 60.4 | 60.4 | 60.4 | 60.4 |
| 230010014 | Maine | Androscoggin | DURHAM FIRE STATION | 43.97462 | -70.1246 | 59.3 | 60 | 53 | 56 | 52.3 | 52.9 | 51.9 | 52.5 | 53.1 | 53.7 | | |
| 230039991 | Maine | Aroostook | Ashland | 46.6041 | -68.4135 | 52 | 52 | 52 | 50 | | | | | | | | |
| 230052003 | Maine | Cumberland | CETL - Cape Elizabeth Two Lights (State Park) | 43.56104 | -70.2073 | 64.7 | 65 | 62 | 62 | 57.2 | 57.5 | 57.4 | 57.7 | 59 | 59.3 | | |
| 230090102 | Maine | Hancock | TOP OF CADILLAC MTN (FENCED ENCLOSURE) | 44.3517 | -68.227 | 69 | 71 | 67 | 67 | 61 | 62.7 | | | | | | |
| 230090103 | Maine | Hancock | MCFARLAND HILL Air Pollutant Research Site | 44.37705 | -68.2609 | 63 | 64 | 60 | 61 | | | | | 55.7 | 56.6 | | |
| 230112005 | Maine | Kennebec | Gardiner: Pray Street School (GPSS) | 44.23062 | -69.785 | 61.3 | 63 | NA | NA | 53.7 | 55.2 | 53.7 | 55.2 | | | | |
| 230130004 | Maine | Knox | Marshall Point Lighthouse | 43.91796 | -69.2606 | 63.3 | 64 | 60 | 59 | 56 | 56.6 | 55.6 | 56.2 | 55.4 | 56 | | |
| 230194008 | Maine | Penobscot | WLBZ TV Transmitter Building - Summit of Rider Bluff | 44.73598 | -68.6708 | 58.3 | 60 | 57 | 59 | | | | | | | | |
| 230290019 | Maine | Washington | Harbor Masters Office; Jonesport Public Landing | 44.53191 | -67.5959 | 59.3 | 61 | 55 | 55 | 52.6 | 54.1 | | | | | | |
| 230310038 | Maine | York | WBFD - West Buxton (Hollis) Fire Department | 43.65676 | -70.6291 | 58.7 | 59 | NA | NA | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 230310040 | Maine | York | SBP - Shapleigh Ball Park | 43.58889 | -70.8773 | 61.3 | 62 | 56 | 57 | | | | | | | | |
| 230312002 | Maine | York | KPW - Kennebunkport Parson's Way | 43.34317 | -70.471 | 66.5 | 67 | 64 | 64 | 59.4 | 59.8 | 59 | 59.5 | 59.6 | 60 | | |
| 240031003 | Maryland | Anne Arundel | GLEN BURNIE | 39.16953 | -76.6279 | 74 | 74 | 70 | 66 | 65.4 | 65.4 | 64.8 | 64.8 | 65.3 | 65.3 | 64.3 | 64.3 |
| 240051007 | Maryland | Baltimore | Padonia | 39.46048 | -76.6335 | 72 | 72 | 69 | 68 | 63.3 | 63.3 | 63.3 | 63.3 | 62.2 | 62.2 | 62.2 | 62.2 |
| 240053001 | Maryland | Baltimore | Essex | 39.31083 | -76.4744 | 72.7 | 73 | 70 | 68 | 64.6 | 64.9 | 63.8 | 64.1 | 64.2 | 64.4 | 63 | 63.2 |
| 240090011 | Maryland | Calvert | Calvert | 38.53672 | -76.6172 | 67.7 | 69 | 58 | 58 | 59.6 | 60.7 | 58.1 | 59.2 | 58.6 | 59.7 | 55.8 | 56.9 |
| 240130001 | Maryland | Carroll | South Carroll | 39.44429 | -77.0423 | 68.3 | 69 | 64 | 64 | 59.6 | 60.2 | 59.6 | 60.2 | 58.4 | 59 | 58.4 | 59 |
| 240150003 | Maryland | Cecil | Fair Hill Natural Resource Management Area | 39.70144 | -75.8601 | 74 | 74 | 67 | 65 | 64.4 | 64.4 | 64.4 | 64.4 | 64.4 | 64.4 | 64.4 | 64.4 |
| 240170010 | Maryland | Charles | Southern Maryland | 38.50855 | -76.8119 | 69.3 | 70 | 59 | 59 | 60.5 | 61.1 | 60.5 | 61.1 | 59.3 | 59.9 | 59.3 | 59.9 |
| 240190004 | Maryland | Dorchester | Horn Point | 38.58753 | -76.141 | 64.7 | 66 | 64 | 63 | 56.6 | 57.7 | 56.2 | 57.4 | 57 | 58.2 | 56.3 | 57.5 |
| 240199991 | Maryland | Dorchester | Blackwater NWR | 38.44497 | -76.1113 | 65.7 | 66 | 62 | 61 | 57.8 | 58.1 | 56.5 | 56.8 | 58.6 | 58.8 | 57.5 | 57.8 |
| 240210037 | Maryland | Frederick | Frederick Airport | 39.42276 | -77.3752 | 68 | 69 | 65 | 63 | 59.2 | 60 | 59.2 | 60 | 58.4 | 59.3 | 58.4 | 59.3 |
| 240230002 | Maryland | Garrett | Piney Run | 39.70595 | -79.012 | 65.3 | 66 | 58 | 58 | 59.5 | 60.1 | 59.5 | 60.1 | | | | |
| 240251001 | Maryland | Harford | Edgewood | 39.41019 | -76.2969 | 74 | 75 | 72 | 68 | 65.4 | 66.2 | 64.8 | 65.7 | 65.4 | 66.3 | 63.9 | 64.8 |
| 240259001 | Maryland | Harford | Aldino | 39.56333 | -76.2039 | 73 | 73 | 68 | 67 | 63.6 | 63.6 | 63.6 | 63.6 | 63.6 | 63.6 | 62.6 | 62.6 |
| 240290002 | Maryland | Kent | Millington | 39.30502 | -75.7973 | 69.3 | 70 | 64 | 64 | 60.6 | 61.2 | 60.6 | 61.2 | 59.8 | 60.4 | 59.8 | 60.4 |
| 240313001 | Maryland | Montgomery | Rockville | 39.11431 | -77.1069 | 67.7 | 68 | 63 | 63 | 59.9 | 60.2 | 59.9 | 60.2 | 58.4 | 58.6 | 58.4 | 58.6 |
| 240330030 | Maryland | Prince George's | HU-Beltsville | 39.05528 | -76.8783 | 69.3 | 70 | 67 | 64 | 61 | 61.6 | 61 | 61.6 | 59.5 | 60.1 | 59.5 | 60.1 |
| 240338003 | Maryland | Prince George's | PG Equestrian Center | 38.81194 | -76.7442 | 70.7 | 71 | 65 | 64 | 62.1 | 62.3 | 62.1 | 62.3 | 61.2 | 61.4 | 61.2 | 61.4 |
| 240339991 | Maryland | Prince George's | Beltsville | 39.0284 | -76.8171 | 69.3 | 71 | 70 | 67 | 60.6 | 62.1 | 60.6 | 62.1 | 59.4 | 60.9 | 59.4 | 60.9 |
| 240430009 | Maryland | Washington | Hagerstown | 39.56418 | -77.7202 | 66.7 | 67 | 60 | 61 | 59.4 | 59.7 | 59.4 | 59.7 | 58.5 | 58.8 | 58.5 | 58.8 |
| 245100054 | Maryland | Baltimore (City) | Furley | 39.32881 | -76.5531 | 68.3 | 70 | NA | NA | 60.8 | 62.3 | 59.8 | 61.3 | 60.3 | 61.8 | 59.2 | 60.6 |
| 250010002 | Massachusetts | Barnstable | TRURO NATIONAL SEASHORE | 41.9758 | -70.0236 | 69 | 69 | 64 | 64 | 61.6 | 61.6 | 61.5 | 61.5 | 60.8 | 60.8 | 60.3 | 60.3 |
| 250051004 | Massachusetts | Bristol | FALL RIVER | 41.68571 | -71.1692 | 71.7 | 74 | NA | 65 | 64.9 | 66.9 | 64.6 | 66.7 | 66.7 | 68.8 | 63.6 | 65.6 |
| 250051006 | Massachusetts | Bristol | FAIRHAVEN2 | 41.64538 | -70.8975 | 67.3 | 69 | 63 | 62 | 60.8 | 62.3 | 60.9 | 62.4 | 60 | 61.5 | 59.6 | 61.1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 250070001 | Massachusetts | Dukes | 1 HERRING CREEK RD: AQUINNAH (WAMPANOAG TRIBAL SITE) | 41.33047 | -70.7852 | 70 | 70 | 65 | 62 | 63 | 63 | 63 | 63 | 62.3 | 62.3 | 63 | 63 |
| 250092006 | Massachusetts | Essex | LYNN WATER TREATMENT PLANT | 42.47464 | -70.9708 | 66.3 | 68 | 62 | 64 | 60.4 | 62 | 59.5 | 61.1 | 62 | 63.6 | 59.4 | 60.9 |
| 250094005 | Massachusetts | Essex | NEWBURYPORT HARBOR ST PARKING LOT | 42.81441 | -70.8178 | 64.5 | 65 | NA | NA | 57.7 | 58.2 | 57 | 57.4 | 58.1 | 58.5 | | |
| 250095005 | Massachusetts | Essex | CONSENTINO SCHOOL. | 42.77084 | -71.1023 | 62.7 | 64 | 58 | 60 | 55.6 | 56.8 | 55.6 | 56.8 | 55.2 | 56.3 | 55.2 | 56.3 |
| 250112005 | Massachusetts | Franklin | Greenfield 16 Barr Ave | 42.60582 | -72.5967 | 64.7 | 66 | 55 | 56 | 57.2 | 58.4 | 57.2 | 58.4 | | | | |
| 250130008 | Massachusetts | Hampden | WESTOVER AFB | 42.19438 | -72.5551 | 70 | 71 | 63 | 64 | 61.6 | 62.5 | 61.6 | 62.5 | 61 | 61.9 | 61 | 61.9 |
| 250154002 | Massachusetts | Hampshire | QUABBIN RES | 42.29849 | -72.3341 | 69 | 70 | NA | 62 | 60.4 | 61.3 | 60.4 | 61.3 | 59.5 | 60.3 | 59.5 | 60.3 |
| 250170009 | Massachusetts | Middlesex | USEPA REGION 1 LAB | 42.62668 | -71.3621 | 64 | 65 | 58 | 60 | 56 | 56.9 | 56 | 56.9 | 55.8 | 56.7 | 55.8 | 56.7 |
| 250213003 | Massachusetts | Norfolk | BLUE HILL OBSERVATORY | 42.21177 | -71.114 | 69 | 70 | 56 | 58 | 61.3 | 62.2 | 61 | 61.8 | 62.8 | 63.7 | 60.7 | 61.6 |
| 250230005 | Massachusetts | Plymouth | Brockton Buckley | 42.06511 | -71.0121 | 67 | 69 | 60 | 61 | 59.1 | 60.8 | 59.1 | 60.8 | 58.3 | 60 | 58.3 | 60 |
| 250250042 | Massachusetts | Suffolk | DUDLEY SQUARE ROXBURY | 42.3295 | -71.0826 | 60.3 | 64 | 59 | 61 | 54.4 | 57.7 | 53.4 | 56.7 | 55.2 | 58.6 | 52.6 | 55.9 |
| 250270015 | Massachusetts | Worcester | WORCESTER AIRPORT | 42.27432 | -71.8755 | 65 | 66 | 62 | 62 | 57.1 | 58 | 57.1 | 58 | 56 | 56.9 | 56 | 56.9 |
| 250270024 | Massachusetts | Worcester | UXBRIDGE | 42.0997 | -71.6194 | 66.3 | 69 | 60 | 59 | 58.5 | 60.9 | 58.5 | 60.9 | 57.8 | 60.2 | 57.8 | 60.2 |
| 330012004 | New Hampshire | Belknap | FIELD OFFICE ON THE GROUNDS OF THE FORMER STATE PRISON | 43.56612 | -71.4963 | 58.7 | 59 | 53 | 55 | 51.5 | 51.8 | | | 52.3 | 52.5 | | |
| 330050007 | New Hampshire | Cheshire | WATER STREET | 42.93052 | -72.2723 | 62.3 | 63 | 54 | 56 | 54.6 | 55.2 | 54.6 | 55.2 | | | | |
| 330074001 | New Hampshire | Coos | | 44.27009 | -71.3038 | 67.3 | 68 | NA | 58 | | | | | | | | |
| 330074002 | New Hampshire | Coos | CAMP DODGE: GREENS GRANT | 44.30813 | -71.2176 | 58.3 | 59 | 53 | 55 | | | | | | | | |
| 330090010 | New Hampshire | Grafton | LEBANON AIRPORT ROAD | 43.62961 | -72.3095 | 57.7 | 59 | 52 | 53 | | | | | | | | |
| 330099991 | New Hampshire | Grafton | Woodstock | 43.94452 | -71.7008 | 54.7 | 56 | 51 | 52 | | | | | | | | |
| 330111011 | New Hampshire | Hillsborough | GILSON ROAD | 42.71865 | -71.5224 | 63 | 64 | 56 | 58 | 55.2 | 56.1 | 55.2 | 56.1 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 330115001 | New Hampshire | Hillsborough | MILLER STATE PARK | 42.86183 | -71.8786 | 67 | 68 | 59 | 60 | 58.5 | 59.4 | 58.5 | 59.4 | | | | |
| 330131007 | New Hampshire | Merrimack | HAZEN DRIVE | 43.2185 | -71.5145 | 62 | 63 | 56 | 57 | 54.5 | 55.4 | 54.5 | 55.4 | | | | |
| 330150014 | New Hampshire | Rockingham | PORTSMOUTH - PEIRCE ISLAND | 43.07537 | -70.748 | 63.3 | 65 | 54 | 59 | 56.6 | 58.1 | 56.1 | 57.6 | 56.9 | 58.5 | | |
| 330150016 | New Hampshire | Rockingham | SEACOAST SCIENCE CENTER | 43.04527 | -70.714 | 66.7 | 67 | 62 | 65 | 59.7 | 59.9 | 59.1 | 59.4 | 60 | 60.3 | | |
| 330150018 | New Hampshire | Rockingham | MOOSEHILL SCHOOL | 42.86253 | -71.3801 | 65.3 | 66 | 57 | 58 | 57.3 | 58 | 57.3 | 58 | | | | |
| 340010006 | New Jersey | Atlantic | Brigantine | 39.46487 | -74.4487 | 63.7 | 64 | 59 | 59 | 57.6 | 57.9 | 57 | 57.3 | 58.4 | 58.7 | 56.7 | 56.9 |
| 340030006 | New Jersey | Bergen | Leonia | 40.87044 | -73.992 | 74.3 | 75 | 71 | 68 | 68.6 | 69.3 | 68.6 | 69.3 | 68.7 | 69.3 | 68.7 | 69.3 |
| 340070002 | New Jersey | Camden | Camden Spruce Street | 39.93456 | -75.1252 | 75.3 | 77 | 66 | 64 | 68.3 | 69.8 | 68.3 | 69.8 | 67.2 | 68.7 | 67.2 | 68.7 |
| 340071001 | New Jersey | Camden | Ancora State Hospital | 39.68425 | -74.8615 | 67.3 | 68 | 62 | 61 | 60.4 | 61 | 60.4 | 61 | 59.2 | 59.9 | 59.2 | 59.9 |
| 340110007 | New Jersey | Cumberland | Millville | 39.42227 | -75.0252 | 65.7 | 67 | 65 | 63 | 58.6 | 59.7 | 58.6 | 59.7 | 58.1 | 59.3 | 58.1 | 59.3 |
| 340130003 | New Jersey | Essex | Newark Firehouse | 40.72099 | -74.1929 | 68.3 | 70 | 65 | 64 | 62 | 63.6 | 62 | 63.6 | 61.8 | 63.3 | 61.8 | 63.3 |
| 340150002 | New Jersey | Gloucester | Clarksboro | 39.80034 | -75.2121 | 73.7 | 74 | 66 | 66 | 66.2 | 66.4 | 66.2 | 66.4 | 65.8 | 66 | 65.8 | 66 |
| 340170006 | New Jersey | Hudson | Bayonne | 40.67025 | -74.1261 | 71 | 72 | 66 | 66 | 65.1 | 66 | 65.1 | 66 | 66.1 | 67 | 65.6 | 66.6 |
| 340190001 | New Jersey | Hunterdon | Flemington | 40.51526 | -74.8067 | 71.3 | 72 | 63 | 62 | 64 | 64.6 | 64 | 64.6 | 63.3 | 64 | 63.3 | 64 |
| 340210005 | New Jersey | Mercer | Rider University | 40.28309 | -74.7426 | 71.3 | 72 | 69 | 69 | 64.5 | 65.1 | 64.5 | 65.1 | 63.3 | 63.9 | 63.3 | 63.9 |
| 340219991 | New Jersey | Mercer | Wash. Crossing | 40.3125 | -74.8729 | 73.3 | 74 | 66 | 65 | 66.4 | 67.1 | 66.4 | 67.1 | 65.5 | 66.1 | 65.5 | 66.1 |
| 340230011 | New Jersey | Middlesex | Rutgers University | 40.46218 | -74.4294 | 74.7 | 75 | 68 | 68 | 66.7 | 66.9 | 66.7 | 66.9 | 66.9 | 67.2 | 66.9 | 67.2 |
| 340250005 | New Jersey | Monmouth | Monmouth University | 40.27765 | -74.0051 | 67.3 | 69 | 66 | 67 | 60.2 | 61.7 | 60.2 | 61.7 | 59.1 | 60.5 | 59.2 | 60.7 |
| 340273001 | New Jersey | Morris | Chester | 40.78763 | -74.6763 | 69 | 70 | 62 | 62 | 61.6 | 62.5 | 61.6 | 62.5 | 61.2 | 62 | 61.2 | 62 |
| 340290006 | New Jersey | Ocean | Colliers Mills | 40.06483 | -74.4441 | 72.7 | 73 | 66 | 66 | 65.5 | 65.8 | 65.5 | 65.8 | 64.6 | 64.9 | 64.6 | 64.9 |
| 340315001 | New Jersey | Passaic | Ramapo | 41.05862 | -74.2555 | 67.7 | 68 | 62 | 60 | 60.5 | 60.8 | 60.5 | 60.8 | 60.5 | 60.8 | 60.5 | 60.8 |
| 340410007 | New Jersey | Warren | Columbia | 40.92458 | -75.0678 | 64.3 | 65 | 58 | 58 | 56.2 | 56.8 | 56.2 | 56.8 | 55 | 55.6 | 55 | 55.6 |
| 360010012 | New York | Albany | LOUDONVILLE | 42.68075 | -73.7573 | 64 | 64 | 57 | 57 | 57.5 | 57.5 | 57.5 | 57.5 | | | | |
| 360050110 | New York | Bronx | IS 52 | 40.816 | -73.902 | 67.7 | 69 | 68 | 66 | 65 | 66.2 | 62.7 | 63.9 | 63.2 | 64.4 | 63.3 | 64.6 |
| 360050133 | New York | Bronx | PFIZER LAB SITE | 40.8679 | -73.8781 | 70.7 | 72 | 70 | 69 | 68.4 | 69.7 | 65.7 | 66.9 | 66.3 | 67.5 | 65.9 | 67.1 |
| 360130006 | New York | Chautauqua | DUNKIRK | 42.49963 | -79.3188 | 68 | 68 | 65 | 67 | 61.6 | 61.6 | 61.3 | 61.3 | 61.4 | 61.4 | | |
| 360270007 | New York | Dutchess | MILLBROOK | 41.78555 | -73.7414 | 67 | 68 | 60 | 61 | 59.6 | 60.5 | 59.6 | 60.5 | 59.9 | 60.8 | 59.9 | 60.8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360290002 | New York | Erie | AMHERST | 42.99328 | -78.7715 | 69.3 | 70 | 65 | 66 | 62.7 | 63.3 | 62.6 | 63.2 | 62.4 | 63 | 62.5 | 63.1 |
| 360310002 | New York | Essex | WHITEFACE SUMMIT | 44.36608 | -73.9031 | 64 | 66 | 62 | 60 | | | | | | | | |
| 360310003 | New York | Essex | WHITEFACE BASE | 44.39308 | -73.8589 | 64.7 | 65 | 59 | 58 | | | | | | | | |
| 360319991 | New York | Essex | Huntington Wildlife Forest | 43.9731 | -74.2232 | 57 | 58 | 52 | 52 | | | | | | | | |
| 360337003 | New York | Franklin | Y001 | 44.98058 | -74.695 | 58 | 58 | NA | NA | | | | | | | | |
| 360410005 | New York | Hamilton | PISECO LAKE | 43.44957 | -74.5163 | 61.3 | 62 | 56 | 56 | | | | | | | | |
| 360430005 | New York | Herkimer | NICKS LAKE | 43.68578 | -74.9854 | 63 | 63 | NA | NA | | | | | | | | |
| 360450002 | New York | Jefferson | PERCH RIVER | 44.08747 | -75.9732 | 63 | 63 | 61 | 62 | | | | | 56.6 | 56.6 | | |
| 360551007 | New York | Monroe | ROCHESTER 2 | 43.14618 | -77.5482 | 65.7 | 68 | 62 | 65 | 59.9 | 62 | 59.9 | 62 | 59.3 | 61.3 | 59.3 | 61.3 |
| 360610135 | New York | New York | CCNY | 40.81976 | -73.9483 | 70.3 | 72 | 70 | 70 | 67.5 | 69.1 | 65.1 | 66.7 | 65.6 | 67.2 | 65.8 | 67.4 |
| 360631006 | New York | Niagara | MIDDLEPORT | 43.22386 | -78.4789 | 66.3 | 67 | 63 | 66 | 60.4 | 61 | 60.4 | 61 | 61.6 | 62.3 | 60.2 | 60.8 |
| 360671015 | New York | Onondaga | EAST SYRACUSE | 43.05235 | -76.0592 | 64.3 | 65 | 61 | 60 | | | | | | | | |
| 360715001 | New York | Orange | VALLEY CENTRAL HIGH SCHOOL | 41.52375 | -74.2153 | 64.3 | 66 | 58 | 57 | 57.6 | 59.2 | 57.6 | 59.2 | 56.8 | 58.3 | 56.8 | 58.3 |
| 360750003 | New York | Oswego | FULTON | 43.28428 | -76.4632 | 61 | 63 | 59 | 59 | 56.1 | 57.9 | | | 55.6 | 57.4 | | |
| 360790005 | New York | Putnam | MT NINHAM | 41.45589 | -73.7098 | 69 | 70 | 61 | 61 | 62.2 | 63.1 | 62.2 | 63.1 | 62.2 | 63.1 | 62.2 | 63.1 |
| 360810124 | New York | Queens | QUEENS COLLEGE 2 | 40.73614 | -73.8215 | 72.3 | 74 | 71 | 70 | 68.9 | 70.5 | 68 | 69.6 | 67.4 | 69 | 66.4 | 68 |
| 360850067 | New York | Richmond | SUSAN WAGNER HS | 40.59664 | -74.1253 | 76 | 76 | NA | NA | 70 | 70 | 70.2 | 70.2 | 70.7 | 70.7 | 70.3 | 70.3 |
| 360870005 | New York | Rockland | Rockland County | 41.18208 | -74.0282 | 71.3 | 72 | 63 | 62 | 65 | 65.6 | 65 | 65.6 | 64.7 | 65.3 | 64.7 | 65.3 |
| 360910004 | New York | Saratoga | STILLWATER | 43.01209 | -73.6489 | 63 | 64 | 56 | 58 | 56.5 | 57.4 | 56.5 | 57.4 | | | | |
| 361010003 | New York | Steuben | PINNACLE STATE PARK | 42.09142 | -77.2098 | 59.7 | 61 | 55 | 56 | | | | | | | | |
| 361030002 | New York | Suffolk | BABYLON | 40.74529 | -73.4192 | 74 | 76 | 73 | 74 | 68.5 | 70.3 | 68.5 | 70.3 | 69.5 | 71.4 | 67.7 | 69.5 |
| 361030004 | New York | Suffolk | RIVERHEAD | 40.96078 | -72.7124 | 74.3 | 76 | 69 | 68 | 68.2 | 69.8 | 67.6 | 69.1 | 67.8 | 69.4 | 67.1 | 68.6 |
| 361030009 | New York | Suffolk | HOLTSVILLE | 40.82799 | -73.0575 | 71 | 73 | 70 | 70 | 65.3 | 67.1 | 64.8 | 66.6 | 65 | 66.8 | 64.4 | 66.2 |
| 361099991 | New York | Tompkins | Connecticut Hill | 42.4006 | -76.6538 | 62.7 | 63 | 58 | 59 | | | | | | | | |
| 361173001 | New York | Wayne | WILLIAMSON | 43.23086 | -77.1714 | 65 | 67 | 61 | 61 | 59.6 | 61.5 | 59 | 60.8 | 59.4 | 61.2 | 58.9 | 60.7 |
| 361192004 | New York | Westchester | WHITE PLAINS | 41.05192 | -73.7637 | 74 | 75 | 69 | 68 | 69.9 | 70.8 | 67.5 | 68.4 | 70.5 | 71.4 | 68.8 | 69.7 |
| 420010001 | Pennsylvania | Adams | NARSTO SITE ARENDTSVILLE | 39.92002 | -77.3097 | 66.5 | 67 | 62 | 61 | 59.3 | 59.8 | 59.3 | 59.8 | 59.1 | 59.5 | 59.1 | 59.5 |
| 420019991 | Pennsylvania | Adams | Arendtsville | 39.9231 | -77.3078 | 66.3 | 67 | 61 | 62 | 59.1 | 59.8 | 59.1 | 59.8 | 58.9 | 59.5 | 58.9 | 59.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 420030008 | Pennsylvania | Allegheny | Lawrenceville | 40.46542 | -79.9608 | 68 | 69 | 64 | 63 | 61.9 | 62.8 | 61.9 | 62.8 | 59.9 | 60.8 | 59.9 | 60.8 |
| 420030067 | Pennsylvania | Allegheny | South Fayette | 40.37564 | -80.1699 | 69.7 | 71 | 66 | 66 | 63.3 | 64.5 | 63.3 | 64.5 | 60.9 | 62 | 60.9 | 62 |
| 420031008 | Pennsylvania | Allegheny | Harrison | 40.61749 | -79.7277 | 69 | 70 | 65 | 67 | 62.1 | 63 | 62.1 | 63 | 60.2 | 61.1 | 60.2 | 61.1 |
| 420050001 | Pennsylvania | Armstrong | LAT/LON IS CENTER OF TRAILER | 40.81418 | -79.5648 | 69 | 70 | 64 | 66 | 60.7 | 61.6 | 60.7 | 61.6 | 59.8 | 60.7 | 59.8 | 60.7 |
| 420070002 | Pennsylvania | Beaver | | 40.56252 | -80.5039 | 68.7 | 70 | 64 | 64 | 59.9 | 61 | 59.9 | 61 | 58.3 | 59.4 | 58.3 | 59.4 |
| 420070005 | Pennsylvania | Beaver | DRIVEWAY TO BAKEY RESIDENCE | 40.68472 | -80.3597 | 67.3 | 68 | 63 | 64 | 57.6 | 58.2 | 57.6 | 58.2 | 54.8 | 55.3 | 54.8 | 55.3 |
| 420070014 | Pennsylvania | Beaver | | 40.7478 | -80.3164 | 65.7 | 67 | 63 | 64 | 56.4 | 57.6 | 56.4 | 57.6 | 53.4 | 54.5 | 53.4 | 54.5 |
| 420110006 | Pennsylvania | Berks | Kutztown | 40.51408 | -75.7897 | 65.7 | 66 | 59 | 60 | 58.5 | 58.8 | 58.5 | 58.8 | 57.8 | 58.1 | 57.8 | 58.1 |
| 420110011 | Pennsylvania | Berks | Reading Airport | 40.38335 | -75.9686 | 70 | 70 | NA | 67 | 62.5 | 62.5 | 62.5 | 62.5 | 61.2 | 61.2 | 61.2 | 61.2 |
| 420130801 | Pennsylvania | Blair | | 40.53528 | -78.3708 | 63.5 | 64 | NA | NA | 56 | 56.4 | 56 | 56.4 | | | | |
| 420150011 | Pennsylvania | Bradford | Towanda | 41.70523 | -76.5127 | 57.3 | 59 | 56 | 58 | 50.9 | 52.5 | 50.9 | 52.5 | | | | |
| 420170012 | Pennsylvania | Bucks | A420170012LAT/LONG POINT IS OF SAMPLING INLET | 40.10722 | -74.8822 | 79.3 | 81 | 71 | 72 | 71.6 | 73.1 | 71.6 | 73.1 | 70.2 | 71.7 | 70.2 | 71.7 |
| 420210011 | Pennsylvania | Cambria | | 40.30972 | -78.915 | 62.3 | 63 | 59 | 62 | 55.2 | 55.8 | 55.2 | 55.8 | 53.4 | 54 | 53.4 | 54 |
| 420270100 | Pennsylvania | Centre | LAT/LON=POINT SW CORNER OF TRAILER | 40.81139 | -77.877 | 62.3 | 63 | 55 | 56 | 55.2 | 55.9 | 55.2 | 55.9 | | | | |
| 420279991 | Pennsylvania | Centre | Penn State | 40.7208 | -77.9319 | 64.7 | 65 | 61 | 61 | 57.3 | 57.6 | 57.3 | 57.6 | | | | |
| 420290100 | Pennsylvania | Chester | CHESTER COUNTY TRANSPORT SITE INTO PHILADELPHIA | 39.83446 | -75.7682 | 72.7 | 73 | NA | 60 | 63.8 | 64 | 63.8 | 64 | 63.8 | 64.1 | 63.8 | 64.1 |
| 420334000 | Pennsylvania | Clearfield | MOSHANNON STATE FOREST | 41.1175 | -78.5262 | 64.7 | 66 | 53 | 54 | 57.9 | 59.1 | 57.9 | 59.1 | | | | |
| 420430401 | Pennsylvania | Dauphin | A420430401LAT/LON POINT IS AT CORNER OF TRAILER | 40.24699 | -76.847 | 65.3 | 66 | 62 | 61 | 57.1 | 57.7 | 57.1 | 57.7 | 56.8 | 57.4 | 56.8 | 57.4 |
| 420431100 | Pennsylvania | Dauphin | A420431100LAT/LON POINT IS AT CORNER OF TRAILER | 40.27222 | -76.6814 | 66 | 67 | 60 | 60 | 57.7 | 58.5 | 57.7 | 58.5 | 57.1 | 57.9 | 57.1 | 57.9 |
| 420450002 | Pennsylvania | Delaware | A420450002LAT/LON POINT IS OF CORNER OF TRAILER | 39.83556 | -75.3725 | 71.3 | 72 | 66 | 65 | 63.3 | 63.9 | 63.3 | 63.9 | 63.4 | 64.1 | 63.4 | 64.1 |
| 420479991 | Pennsylvania | Elk | Kane Exp. Forest | 41.59812 | -78.7679 | 65.7 | 66 | 57 | 58 | 59.5 | 59.7 | 59.5 | 59.7 | | | | |
| 420490003 | Pennsylvania | Erie | | 42.14175 | -80.0386 | 65 | 66 | 60 | 59 | 58.9 | 59.8 | 58.3 | 59.2 | 59.3 | 60.2 | 57.1 | 58 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 420550001 | Pennsylvania | Franklin | HIGH ELEVATION OZONE SITE | 39.96111 | -77.4756 | 59.3 | 60 | 56 | 56 | 53.1 | 53.7 | 53.1 | 53.7 | 52.1 | 52.8 | 52.1 | 52.8 |
| 420590002 | Pennsylvania | Greene | 75 KM SSW OF PITTSBURGH RURAL SITE ON A KNOLL WITHIN A LARGE CLEARIN | 39.80933 | -80.2657 | 67 | 68 | NA | 61 | 61.5 | 62.4 | 61.5 | 62.4 | 61.3 | 62.2 | 61.3 | 62.2 |
| 420630004 | Pennsylvania | Indiana | | 40.56333 | -78.92 | 69.7 | 70 | 65 | 63 | 62.3 | 62.5 | 62.3 | 62.5 | 60.5 | 60.8 | 60.5 | 60.8 |
| 420690101 | Pennsylvania | Lackawanna | A420690101LAT/LON POINT IS AT CORNER OF TRAILER | 41.47912 | -75.5782 | 66 | 67 | 58 | 60 | 58.6 | 59.5 | 58.6 | 59.5 | | | | |
| 420692006 | Pennsylvania | Lackawanna | A420692006LAT/LON POINT IS AT CORNER OF TRAILER | 41.44278 | -75.6231 | 62.5 | 64 | 58 | 55 | 55.5 | 56.8 | 55.5 | 56.8 | | | | |
| 420710007 | Pennsylvania | Lancaster | A420710007LAT/LON POINT AT CORNER OF TRAILER | 40.04667 | -76.2833 | 69.3 | 70 | 64 | 62 | 60.4 | 61 | 60.4 | 61 | 60.1 | 60.7 | 60.1 | 60.7 |
| 420710012 | Pennsylvania | Lancaster | Lancaster DW | 40.04383 | -76.1124 | 65 | 66 | 63 | 61 | 58 | 58.9 | 58 | 58.9 | 56.9 | 57.8 | 56.9 | 57.8 |
| 420730015 | Pennsylvania | Lawrence | | 40.99585 | -80.3464 | 66.3 | 68 | 59 | 61 | 57.5 | 58.9 | 57.5 | 58.9 | 56.5 | 57.9 | 56.5 | 57.9 |
| 420750100 | Pennsylvania | Lebanon | Lebanon | 40.33733 | -76.3834 | 69 | 70 | NA | NA | 60.6 | 61.5 | 60.6 | 61.5 | 60 | 60.9 | 60 | 60.9 |
| 420770004 | Pennsylvania | Lehigh | A420770004LAT/LONG POINT IS OF SAMPLING INLET | 40.61194 | -75.4325 | 69.7 | 70 | 63 | 61 | 62.1 | 62.4 | 62.1 | 62.4 | 61 | 61.3 | 61 | 61.3 |
| 420791101 | Pennsylvania | Luzerne | A420791101LAT/LON POINT IS AT CORNER OF TRAILER | 41.26556 | -75.8464 | 64 | 64 | NA | 58 | 56.3 | 56.3 | 56.3 | 56.3 | | | | |
| 420810100 | Pennsylvania | Lycoming | MONTOURSVILLE | 41.2508 | -76.9238 | 63.7 | 64 | 57 | 57 | 56.6 | 56.8 | 56.6 | 56.8 | | | | |
| 420850100 | Pennsylvania | Mercer | | 41.21501 | -80.4848 | 68.7 | 69 | 63 | 65 | 60.3 | 60.6 | 60.3 | 60.6 | 59.4 | 59.7 | 59.4 | 59.7 |
| 420859991 | Pennsylvania | Mercer | M.K. Goddard | 41.4271 | -80.1451 | 65.3 | 66 | 62 | 62 | 57.8 | 58.4 | 57.8 | 58.4 | 56.7 | 57.4 | 56.7 | 57.4 |
| 420890002 | Pennsylvania | Monroe | SWIFTWATER | 41.08306 | -75.3233 | 66.7 | 68 | NA | NA | 58.9 | 60 | 58.9 | 60 | 58 | 59.1 | 58 | 59.1 |
| 420910013 | Pennsylvania | Montgomery | A420910013LAT/LON POINT IS OF CORNER OF TRAILER | 40.11222 | -75.3092 | 71.3 | 72 | NA | 67 | 64.5 | 65.1 | 64.5 | 65.1 | 64 | 64.6 | 64 | 64.6 |
| 420950025 | Pennsylvania | Northampton | LAT/LON POINT IS CENTER OF TRAILER | 40.62806 | -75.3411 | 70 | 71 | 64 | 64 | 62.4 | 63.3 | 62.4 | 63.3 | 60.9 | 61.7 | 60.9 | 61.7 |
| 420958000 | Pennsylvania | Northampton | COMBINED EASTON SITE (420950100) AND | 40.69222 | -75.2372 | 69 | 69 | NA | NA | 60.9 | 60.9 | 60.9 | 60.9 | 59.8 | 59.8 | 59.8 | 59.8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EASTON H2S SPECIAL STUDY SITES | | | | | | | | | | | | | | |
| 421010004 | Pennsylvania | Philadelphia | Air Management Services Laboratory (AMS LAB) | 40.00889 | -75.0978 | 61 | 61 | 66 | 64 | 55.2 | 55.2 | 55.2 | 55.2 | 54.2 | 54.2 | 54.2 | 54.2 |
| 421010024 | Pennsylvania | Philadelphia | North East Airport (NEA) | 40.07639 | -75.0119 | 77.7 | 78 | 71 | 70 | 70.4 | 70.7 | 70.4 | 70.7 | 69 | 69.3 | 69 | 69.3 |
| 421010048 | Pennsylvania | Philadelphia | North East Waste (NEW) | 39.99139 | -75.0808 | 75.3 | 76 | 70 | 68 | 68.1 | 68.7 | 68.1 | 68.7 | 66.9 | 67.5 | 66.9 | 67.5 |
| 421119991 | Pennsylvania | Somerset | Laurel Hill | 39.9878 | -79.2515 | 65 | 65 | 59 | 59 | 59.2 | 59.2 | 59.2 | 59.2 | 58.4 | 58.4 | 58.4 | 58.4 |
| 421174000 | Pennsylvania | Tioga | PENN STATE OZONE MONITORING SITE | 41.64472 | -76.9392 | 63.7 | 64 | 57 | 59 | | | | | | | | |
| 421250005 | Pennsylvania | Washington | | 40.14667 | -79.9022 | 67 | 68 | 62 | 63 | 61.3 | 62.2 | 61.3 | 62.2 | 61 | 61.9 | 61 | 61.9 |
| 421250200 | Pennsylvania | Washington | | 40.17056 | -80.2614 | 65 | 65 | NA | NA | 58.6 | 58.6 | 58.6 | 58.6 | 57.9 | 57.9 | 57.9 | 57.9 |
| 421255001 | Pennsylvania | Washington | | 40.44528 | -80.4208 | 68 | 68 | 53 | 55 | 60.4 | 60.4 | 60.4 | 60.4 | 58.9 | 58.9 | 58.9 | 58.9 |
| 421290008 | Pennsylvania | Westmoreland | LAT/LON POINT IS TRAILER | 40.30469 | -79.5057 | 67 | 68 | 55 | 51 | 61 | 61.9 | 61 | 61.9 | 60 | 60.9 | 60 | 60.9 |
| 421330008 | Pennsylvania | York | A421330008LAT/LON POINT AT CORNER OF TRAILER | 39.96528 | -76.6994 | 65.7 | 66 | 60 | 60 | 57.5 | 57.7 | 57.5 | 57.7 | 55.4 | 55.7 | 55.4 | 55.7 |
| 421330011 | Pennsylvania | York | York DW | 39.86097 | -76.4621 | 69 | 70 | NA | NA | 59.9 | 60.8 | 59.9 | 60.8 | 59.1 | 59.9 | 59.1 | 59.9 |
| 440030002 | Rhode Island | Kent | AJ | 41.61524 | -71.72 | 71.3 | 73 | 65 | 64 | 64.1 | 65.7 | 64.1 | 65.7 | 63.3 | 64.8 | 63.3 | 64.8 |
| 440071010 | Rhode Island | Providence | FRANCIS SCHOOL East Providence | 41.84104 | -71.361 | 69.7 | 73 | 65 | 65 | 62.6 | 65.5 | 62.1 | 65 | 64.8 | 67.9 | 61.3 | 64.2 |
| 440090007 | Rhode Island | Washington | US-EPA Laboratory | 41.49511 | -71.4237 | 69.3 | 71 | 67 | 66 | 63.4 | 65 | 62.2 | 63.8 | 63.4 | 64.9 | 62.1 | 63.7 |
| 500030004 | Vermont | Bennington | Morse Airport - State of Vermont Property | 42.88759 | -73.2498 | 64.3 | 65 | 57 | 57 | 57.6 | 58.3 | 57.6 | 58.3 | | | | |
| 500070007 | Vermont | Chittenden | PROCTOR MAPLE RESEARCH CTR | 44.52839 | -72.8688 | 61 | 62 | 57 | 58 | | | | | | | | |
| 500210002 | Vermont | Rutland | State of Vermont District Court Parking Lot | 43.60806 | -72.9828 | 63 | 63 | 53 | 54 | | | | | | | | |
| 510030001 | Virginia | Albemarle | Albemarle High School | 38.07657 | -78.504 | 60.5 | 61 | 57 | 57 | 53.9 | 54.4 | 53.9 | 54.4 | | | | |
| 510130020 | Virginia | Arlington | Aurora Hills Visitors Center | 38.8577 | -77.0592 | 71 | 72 | 66 | 64 | 62.9 | 63.8 | 62.9 | 63.8 | 61.5 | 62.4 | 61.5 | 62.4 |
| 510330001 | Virginia | Caroline | USGS Geomagnetic Center: Corbin | 38.20087 | -77.3774 | 61 | 61 | 59 | 58 | 52.7 | 52.7 | 52.7 | 52.7 | 51.8 | 51.8 | 51.8 | 51.8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 510360002 | Virginia | Charles | Shirley Plantation | 37.34438 | -77.2593 | 62.3 | 63 | 58 | 57 | 52.6 | 53.2 | 52.6 | 53.2 | 52.4 | 53 | 52.4 | 53 |
| 510410004 | Virginia | Chesterfield | VDOT Chesterfield Residency Shop | 37.35748 | -77.5936 | 61.3 | 62 | 58 | 58 | 51.8 | 52.4 | 51.8 | 52.4 | 51.6 | 52.1 | 51.6 | 52.1 |
| 510590030 | Virginia | Fairfax | Lee District Park | 38.77335 | -77.1047 | 70 | 71 | 65 | 62 | 61.1 | 62 | 61.1 | 62 | 60.4 | 61.3 | 60.4 | 61.3 |
| 510610002 | Virginia | Fauquier | Chester Phelps Wildlife Management Area: Sumerduck | 38.47367 | -77.7677 | 58.7 | 59 | 54 | 55 | 51.4 | 51.7 | 51.4 | 51.7 | 51.8 | 52.1 | 51.8 | 52.1 |
| 510690010 | Virginia | Frederick | Rest | 39.28102 | -78.0816 | 61.3 | 62 | 55 | 55 | 54.9 | 55.6 | 54.9 | 55.6 | | | | |
| 510719991 | Virginia | Giles | Horton Station | 37.3297 | -80.5578 | 62 | 62 | NA | NA | 55.1 | 55.1 | 55.1 | 55.1 | | | | |
| 510850003 | Virginia | Hanover | Turner Property: Old Church | 37.60613 | -77.2188 | 63.3 | 65 | 58 | 58 | 53.4 | 54.8 | 53.4 | 54.8 | 52.8 | 54.3 | 52.8 | 54.3 |
| 510870014 | Virginia | Henrico | MathScience Innovation Center | 37.55652 | -77.4003 | 65.5 | 66 | 60 | 59 | 54.9 | 55.3 | 54.9 | 55.3 | 54.9 | 55.4 | 54.9 | 55.4 |
| 511071005 | Virginia | Loudoun | Broad Run High School: Ashburn | 39.02473 | -77.4893 | 67 | 68 | 62 | 62 | 59.1 | 59.9 | 59.1 | 59.9 | 58.1 | 58.9 | 58.1 | 58.9 |
| 511130003 | Virginia | Madison | Shenandoah NP - Big Meadows | 38.5231 | -78.4347 | 63 | 63 | 57 | 58 | 56 | 56 | 56 | 56 | | | | |
| 511479991 | Virginia | Prince Edward | Prince Edward | 37.1655 | -78.3069 | 59.3 | 60 | 56 | 55 | 50.5 | 51.1 | 50.5 | 51.1 | | | | |
| 511530009 | Virginia | Prince William | James S. Long Park | 38.85287 | -77.6346 | 65.3 | 66 | 59 | 59 | 57.9 | 58.6 | 57.9 | 58.6 | 57.7 | 58.3 | 57.7 | 58.3 |
| 511611004 | Virginia | Roanoke | East Vinton Elementary School | 37.28342 | -79.8845 | 61.3 | 62 | 57 | 57 | 54.3 | 54.9 | 54.3 | 54.9 | | | | |
| 511630003 | Virginia | Rockbridge | Natural Bridge Ranger Station | 37.62668 | -79.5126 | 58 | 59 | 54 | 53 | 51.6 | 52.4 | 51.6 | 52.4 | | | | |
| 511650003 | Virginia | Rockingham | ROCKINGHAM CO. VDOT | 38.47753 | -78.8195 | 60 | 60 | 56 | 57 | 53.7 | 53.7 | 53.7 | 53.7 | | | | |
| 511790001 | Virginia | Stafford | Widewater Elementary School | 38.48123 | -77.3704 | 62.3 | 63 | 59 | 58 | 54.2 | 54.8 | 54 | 54.6 | 53.6 | 54.2 | 53.9 | 54.6 |
| 511970002 | Virginia | Wythe | Rural Retreat Sewage Treatment Plant | 36.89117 | -81.2542 | 60.7 | 61 | 56 | 57 | 54.1 | 54.4 | 54.1 | 54.4 | | | | |
| 516500008 | Virginia | Hampton City | NASA Langley Research Center | 37.10373 | -76.387 | 64.3 | 65 | 58 | 58 | 55.9 | 56.5 | 55.1 | 55.7 | 55.4 | 56 | 53.8 | 54.4 |
| 518000004 | Virginia | Suffolk City | Tidewater Community College | 36.90118 | -76.4381 | 61 | 62 | 56 | 55 | 54 | 54.9 | 54 | 54.9 | 55 | 55.9 | 53.7 | 54.6 |
| 518000005 | Virginia | Suffolk City | VA Tech Agricultural Research Station: Holland | 36.66525 | -76.7308 | 59.7 | 61 | 56 | 56 | 52.8 | 53.9 | 52.8 | 53.9 | | | | |
| 10030010 | Alabama | Baldwin | FAIRHOPE: Alabama | 30.49748 | -87.8803 | 63.7 | 65 | 58 | 58 | 56.9 | 58.1 | 56.6 | 57.7 | 56.1 | 57.3 | 55.9 | 57.1 |
| 10331002 | Alabama | Colbert | MUSCLE SHOALS | 34.76262 | -87.6381 | 58.7 | 59 | NA | NA | 51.7 | 52 | 51.7 | 52 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10499991 | Alabama | DeKalb | Sand Mountain | 34.289 | -85.9701 | 62.3 | 63 | 59 | 58 | 55.6 | 56.2 | 55.6 | 56.2 | | | | |
| 10550011 | Alabama | Etowah | SOUTHSIDE | 33.90404 | -86.0539 | 61.7 | 63 | 58 | 57 | 55.4 | 56.5 | 55.4 | 56.5 | | | | |
| 10690004 | Alabama | Houston | DOTHAN | 31.18893 | -85.4231 | 58.3 | 59 | NA | NA | | | | | | | | |
| 10730023 | Alabama | Jefferson | North Birmingham | 33.55306 | -86.815 | 66.3 | 68 | 65 | 63 | 56.4 | 57.9 | 56.4 | 57.9 | 55.9 | 57.3 | 55.9 | 57.3 |
| 10731003 | Alabama | Jefferson | Fairfield | 33.48556 | -86.915 | 65.7 | 66 | 66 | 63 | 55.7 | 56 | 55.7 | 56 | 55.8 | 56.1 | 55.8 | 56.1 |
| 10731005 | Alabama | Jefferson | McAdory | 33.33111 | -87.0036 | 65 | 65 | 65 | 62 | 55.5 | 55.5 | 55.5 | 55.5 | 54.7 | 54.7 | 54.7 | 54.7 |
| 10731010 | Alabama | Jefferson | Leeds | 33.54528 | -86.5492 | 64.3 | 66 | NA | 61 | 54.8 | 56.3 | 54.8 | 56.3 | 53.9 | 55.3 | 53.9 | 55.3 |
| 10732006 | Alabama | Jefferson | Hoover | 33.38639 | -86.8167 | 66 | 66 | NA | NA | 55.5 | 55.5 | 55.5 | 55.5 | 55.3 | 55.3 | 55.3 | 55.3 |
| 10735003 | Alabama | Jefferson | Corner | 33.80167 | -86.9425 | 63.5 | 64 | 60 | 59 | 55.5 | 55.9 | 55.5 | 55.9 | 55.3 | 55.8 | 55.3 | 55.8 |
| 10736002 | Alabama | Jefferson | Tarrant Elementary School | 33.57833 | -86.7739 | 67.7 | 68 | 62 | 60 | 57.4 | 57.7 | 57.4 | 57.7 | 57.9 | 58.2 | 57.9 | 58.2 |
| 10890014 | Alabama | Madison | HUNTSVILLE OLD AIRPORT | 34.68776 | -86.5864 | 64 | 64 | 60 | 61 | 55.7 | 55.7 | 55.7 | 55.7 | | | | |
| 10890022 | Alabama | Madison | HUNTSVILLE CAPSHAW ROAD | 34.77273 | -86.7562 | 62 | 62 | 59 | 58 | 54.3 | 54.3 | 54.3 | 54.3 | | | | |
| 10970003 | Alabama | Mobile | CHICKASAW | 30.77018 | -88.0878 | 63 | 64 | 56 | 57 | 55.8 | 56.7 | 55.8 | 56.7 | 55.6 | 56.5 | 55.6 | 56.5 |
| 10972005 | Alabama | Mobile | BAY ROAD | 30.47431 | -88.141 | 63.7 | 65 | NA | NA | 57.4 | 58.6 | 57.8 | 59 | 57.7 | 58.9 | 57.1 | 58.3 |
| 11011002 | Alabama | Montgomery | MOMS: ADEM | 32.41281 | -86.2634 | 61 | 62 | 58 | 58 | 53.2 | 54.1 | 53.2 | 54.1 | 52.6 | 53.4 | 52.6 | 53.4 |
| 11030011 | Alabama | Morgan | DECATUR: Alabama | 34.53072 | -86.9675 | 63.7 | 64 | 60 | 60 | 56.2 | 56.5 | 56.2 | 56.5 | 56.7 | 56.9 | 56.7 | 56.9 |
| 11130002 | Alabama | Russell | LADONIA: PHENIX CITY | 32.46735 | -85.0834 | 62 | 62 | NA | NA | 54.1 | 54.1 | 54.1 | 54.1 | 54 | 54 | 54 | 54 |
| 11170004 | Alabama | Shelby | HELENA | 33.31714 | -86.8258 | 66.7 | 67 | 63 | 61 | 56.9 | 57.1 | 56.9 | 57.1 | 56.1 | 56.4 | 56.1 | 56.4 |
| 11190003 | Alabama | Sumter | Ward: Sumter Co. | 32.36261 | -88.278 | 57 | 57 | 54 | 53 | 52.4 | 52.4 | 52.4 | 52.4 | | | | |
| 11250010 | Alabama | Tuscaloosa | DUNCANVILLE: TUSCALOOSA | 33.08977 | -87.4597 | 60 | 60 | 55 | NA | 52.2 | 52.2 | 52.2 | 52.2 | 51.5 | 51.5 | 51.5 | 51.5 |
| 50199991 | Arkansas | Clark | Caddo Valley | 34.1795 | -93.0988 | 57.7 | 58 | 56 | 57 | 50.6 | 50.8 | 50.6 | 50.8 | | | | |
| 50350005 | Arkansas | Crittenden | MARION | 35.19729 | -90.1931 | 67 | 68 | 68 | 70 | 61 | 61.9 | 61 | 61.9 | 60.1 | 61 | 60.1 | 61 |
| 51010002 | Arkansas | Newton | DEER | 35.83273 | -93.2083 | 58 | 59 | 58 | 60 | | | | | | | | |
| 51130003 | Arkansas | Polk | EAGLE MOUNTAIN | 34.45451 | -94.1435 | 61.7 | 62 | 61 | 61 | 56.6 | 56.9 | 56.6 | 56.9 | | | | |
| 51190007 | Arkansas | Pulaski | PARR | 34.75619 | -92.2813 | 62.3 | 64 | 60 | 62 | 54.8 | 56.3 | 54.8 | 56.3 | 54.3 | 55.8 | 54.3 | 55.8 |
| 51191002 | Arkansas | Pulaski | NLR AIRPORT | 34.83572 | -92.2606 | 63.7 | 64 | 63 | 63 | 55.8 | 56.1 | 55.8 | 56.1 | 54.8 | 55 | 54.8 | 55 |
| 51430005 | Arkansas | Washington | SPRINGDALE | 36.1797 | -94.1168 | 59.7 | 60 | 60 | 62 | 52.9 | 53.2 | 52.9 | 53.2 | | | | |
| 51430006 | Arkansas | Washington | Fayetteville Airport | 36.0117 | -94.1674 | 59.7 | 60 | 59 | 61 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80013001 | Colorado | Adams | Welby | 39.83812 | -104.95 | 67 | 67 | 72 | 77 | 63.5 | 63.5 | 63.5 | 63.5 | 62.9 | 62.9 | 62.9 | 62.9 |
| 80050002 | Colorado | Arapahoe | HIGHLAND RESERVOIR | 39.56789 | -104.957 | 73 | 73 | 80 | 80 | 68.9 | 68.9 | 68.9 | 68.9 | 67.6 | 67.6 | 67.6 | 67.6 |
| 80050006 | Colorado | Arapahoe | Aurora East | 39.63852 | -104.569 | 67.7 | 69 | 73 | 74 | 63.9 | 65.1 | 63.9 | 65.1 | 63.3 | 64.5 | 63.3 | 64.5 |
| 80310002 | Colorado | Denver | DENVER - CAMP | 39.75118 | -104.988 | 67.7 | 69 | 72 | 74 | 64.1 | 65.4 | 64.1 | 65.4 | 63.5 | 64.8 | 63.5 | 64.8 |
| 80310026 | Colorado | Denver | La Casa | 39.77949 | -105.005 | 68.7 | 69 | 75 | 77 | 65.1 | 65.4 | 65.1 | 65.4 | 64.5 | 64.8 | 64.5 | 64.8 |
| 80350004 | Colorado | Douglas | Chatfield State Park | 39.53449 | -105.07 | 77.3 | 78 | 83 | 83 | 72.2 | 72.8 | 72.2 | 72.8 | 70.4 | 71 | 70.4 | 71 |
| 80410013 | Colorado | El Paso | U.S. AIR FORCE ACADEMY | 38.95834 | -104.817 | 68 | 70 | 73 | 74 | 64.6 | 66.5 | 64.6 | 66.5 | 64 | 65.9 | 64 | 65.9 |
| 80410016 | Colorado | El Paso | MANITOU SPRINGS | 38.8531 | -104.901 | 66.7 | 69 | 73 | 74 | | | | | 63.2 | 65.4 | 63.2 | 65.4 |
| 80450012 | Colorado | Garfield | Rifle-Health Dept | 39.54182 | -107.784 | 62 | 63 | 61 | 62 | | | | | | | | |
| 80519991 | Colorado | Gunnison | Gothic | 38.9564 | -106.986 | 64.7 | 65 | 65 | 65 | | | | | | | | |
| 80590005 | Colorado | Jefferson | WELCH | 39.63878 | -105.139 | 73 | 75 | NA | NA | 68.1 | 70 | 68.1 | 70 | 67.5 | 69.3 | 67.5 | 69.3 |
| 80590006 | Colorado | Jefferson | ROCKY FLATS-N | 39.9128 | -105.189 | 77.3 | 78 | 81 | 83 | 72.7 | 73.4 | 72.7 | 73.4 | 72.7 | 73.4 | 72.7 | 73.4 |
| 80590011 | Colorado | Jefferson | NATIONAL RENEWABLE ENERGY LABS - NREL | 39.74372 | -105.178 | 79.3 | 80 | 83 | 84 | 74 | 74.6 | 74 | 74.6 | 73.6 | 74.2 | 73.6 | 74.2 |
| 80590013 | Colorado | Jefferson | Aspen Park | 39.54152 | -105.298 | 70 | 70 | NA | NA | 65.3 | 65.3 | 65.3 | 65.3 | 63.7 | 63.7 | 63.7 | 63.7 |
| 80671004 | Colorado | La Plata | | 37.30389 | -107.484 | 67 | 67 | NA | NA | | | | | | | | |
| 80677001 | Colorado | La Plata | LOCATED IN PINE RIVER VALLEY: THE MOST DENSELY POPULATED AREA. | 37.13678 | -107.629 | 68.7 | 69 | NA | 66 | | | | | | | | |
| 80690007 | Colorado | Larimer | Rocky Mountain NP - Long's Peak | 40.27813 | -105.546 | 69 | 70 | 71 | 72 | 64.7 | 65.7 | 64.7 | 65.7 | 64.1 | 65 | 64.1 | 65 |
| 80690011 | Colorado | Larimer | FORT COLLINS - WEST | 40.59254 | -105.141 | 75.7 | 77 | 77 | 77 | 71.4 | 72.6 | 71.4 | 72.6 | 71.1 | 72.3 | 71.1 | 72.3 |
| 80691004 | Colorado | Larimer | Fort Collins - CSU - S. Mason | 40.57747 | -105.079 | 69 | 70 | 69 | 71 | 65.1 | 66 | 65.1 | 66 | 64.6 | 65.6 | 64.6 | 65.6 |
| 81030005 | Colorado | Rio Blanco | | 40.03889 | -107.848 | 60.3 | 61 | NA | NA | | | | | | | | |
| 81230009 | Colorado | Weld | Greeley - Weld County Tower | 40.38637 | -104.737 | 70 | 70 | 71 | 72 | 66.1 | 66.1 | 66.1 | 66.1 | 65.9 | 65.9 | 65.9 | 65.9 |
| 120013012 | Florida | Alachua | Paynes Prairie Farm | 29.56611 | -82.2661 | 59.3 | 61 | 59 | 57 | | | | | | | | |
| 120030002 | Florida | Baker | OLUSTEE | 30.20111 | -82.4411 | 60 | 61 | 58 | 56 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120050006 | Florida | Bay | ST.ANDREWS STATE PARK: PANAMA CITY BEACH | 30.13043 | -85.7315 | 60.7 | 62 | 58 | 56 | 55.1 | 56.3 | 55.2 | 56.4 | 55.4 | 56.6 | | |
| 120090007 | Florida | Brevard | Melbourne | 28.05361 | -80.6286 | 58.3 | 59 | NA | 56 | | | | | | | | |
| 120094001 | Florida | Brevard | Cocoa Beach | 28.31084 | -80.6153 | 61 | 62 | 58 | 56 | | | | | | | | |
| 120110033 | Florida | Broward | Vista View Park | 26.07354 | -80.3385 | 59 | 59 | 59 | 59 | | | | | 51.6 | 51.6 | 51.6 | 51.6 |
| 120110034 | Florida | Broward | Daniela Banu NCORE | 26.05389 | -80.2569 | 63 | 63 | 57 | 58 | 57 | 57 | 57 | 57 | 56.5 | 56.5 | | |
| 120112003 | Florida | Broward | Pompano Highlands | 26.29203 | -80.0965 | 61 | 62 | 57 | 57 | | | | | | | | |
| 120118002 | Florida | Broward | Dr. Von Mizell-Eula Johnson State Park (prev. John U Lloyd State Park) | 26.08842 | -80.1112 | 62.3 | 63 | 57 | 58 | | | | | | | | |
| 120210004 | Florida | Collier | LAURAL OAKS ELEMENTARY | 26.27008 | -81.711 | 58.7 | 60 | 58 | 53 | | | | | | | | |
| 120230002 | Florida | Columbia | Lake City - Veteran's Domicile | 30.17806 | -82.6192 | 60.3 | 62 | NA | NA | | | | | | | | |
| 120310077 | Florida | Duval | Sheffield | 30.47773 | -81.5873 | 58 | 58 | 60 | 60 | 49.8 | 49.8 | 50.3 | 50.3 | 46.4 | 46.4 | | |
| 120310100 | Florida | Duval | Mayo Clinic | 30.26028 | -81.4536 | 60 | 60 | 59 | 59 | 52.1 | 52.1 | 51.8 | 51.8 | 52.5 | 52.5 | | |
| 120310106 | Florida | Duval | Cisco Drive | 30.37822 | -81.8409 | 61 | 61 | 59 | 58 | 53 | 53 | 53 | 53 | 52.1 | 52.1 | 52.1 | 52.1 |
| 120330004 | Florida | Escambia | Ellyson Industrial Park | 30.52537 | -87.2036 | 64 | 65 | 58 | 55 | 56.9 | 57.8 | 56.3 | 57.2 | 55.8 | 56.7 | 54.9 | 55.8 |
| 120330018 | Florida | Escambia | Pensacola NAS | 30.36805 | -87.271 | 63 | 64 | 59 | 59 | 55.5 | 56.4 | 56.8 | 57.7 | 55.2 | 56.1 | 55 | 55.9 |
| 120350004 | Florida | Flagler | Flagler | 29.48908 | -81.2768 | 59.3 | 60 | NA | 53 | | | | | | | | |
| 120550003 | Florida | Highlands | Archbold Biological Station | 27.18922 | -81.3404 | 60.3 | 61 | NA | 56 | | | | | | | | |
| 120570081 | Florida | Hillsborough | Simmons Park | 27.74003 | -82.4651 | 67.7 | 68 | 64 | 63 | 61.8 | 62.1 | 61.1 | 61.4 | 61.6 | 61.9 | 61.9 | 62.2 |
| 120571035 | Florida | Hillsborough | Davis Island | 27.92836 | -82.4545 | 65.7 | 67 | 58 | 58 | 59.8 | 61 | 59.1 | 60.2 | 59.8 | 61 | 57.1 | 58.2 |
| 120571065 | Florida | Hillsborough | USMC Reserve Center (Gandy) | 27.89252 | -82.5384 | 66.3 | 67 | 66 | 65 | 60.2 | 60.8 | 59.9 | 60.5 | 60.2 | 60.8 | 62.2 | 62.8 |
| 120573002 | Florida | Hillsborough | SYDNEY | 27.96565 | -82.2304 | 66.3 | 67 | 62 | 59 | 59.5 | 60.1 | 59.5 | 60.1 | 57.6 | 58.2 | 57.6 | 58.2 |
| 120590004 | Florida | Holmes | Bonifay | 30.84861 | -85.6039 | 58.7 | 60 | 56 | 54 | | | | | | | | |
| 120619991 | Florida | Indian River | Indian River Lagoon | 27.8492 | -80.4554 | 62 | 63 | 59 | 59 | | | | | | | | |
| 120690002 | Florida | Lake | Clermont | 28.52389 | -81.7233 | 63.7 | 65 | 63 | 59 | 56.4 | 57.6 | 56.4 | 57.6 | 54.4 | 55.6 | | |
| 120712002 | Florida | Lee | Cape Coral - Rotary Park | 26.54821 | -81.9815 | 60.3 | 62 | 59 | 55 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120713002 | Florida | Lee | Bay Oaks Park | 26.44925 | -81.9393 | 60.3 | 62 | NA | NA | | | | | | | | |
| 120730012 | Florida | Leon | Tallahassee Community College | 30.43972 | -84.3464 | 60.7 | 61 | 58 | 55 | 54.1 | 54.4 | 54.1 | 54.4 | | | | |
| 120779991 | Florida | Liberty | Sumatra | 30.1103 | -84.9903 | 56.3 | 57 | 56 | 56 | | | | | | | | |
| 120813002 | Florida | Manatee | Port Manatee | 27.63309 | -82.5459 | 61 | 63 | 59 | 54 | 55.6 | 57.4 | 55.3 | 57.2 | 54 | 55.8 | 54.2 | 56 |
| 120814012 | Florida | Manatee | G.T. BRAY PARK | 27.48087 | -82.6187 | 63 | 64 | 61 | 56 | 56.9 | 57.8 | 56.4 | 57.3 | 55.9 | 56.8 | | |
| 120814013 | Florida | Manatee | 39TH STREET SITE | 27.44976 | -82.522 | 61 | 62 | 59 | 57 | 54.9 | 55.8 | 54.7 | 55.6 | 54.1 | 55 | | |
| 120830003 | Florida | Marion | Ocala YMCA | 29.17053 | -82.1006 | 61.3 | 62 | 62 | 60 | | | | | | | | |
| 120830004 | Florida | Marion | Marion County Sheriff | 29.19275 | -82.1731 | 58.7 | 60 | 58 | 57 | | | | | | | | |
| 120850007 | Florida | Martin | Stuart | 27.17246 | -80.2407 | 61.7 | 63 | 57 | 54 | | | | | | | | |
| 120860027 | Florida | Miami-Dade | Rosenstiel | 25.73288 | -80.1618 | 63 | 64 | 56 | 60 | | | | | 57.6 | 58.5 | 57.7 | 58.6 |
| 120860029 | Florida | Miami-Dade | Perdue | 25.58733 | -80.3259 | 61.5 | 62 | 58 | 60 | | | | | | | | |
| 120910002 | Florida | Okaloosa | Ft. Walton Beach | 30.42653 | -86.6662 | 61 | 62 | 58 | 51 | 54.3 | 55.2 | 53.8 | 54.7 | 53.7 | 54.5 | | |
| 120950008 | Florida | Orange | Winegard Elementary School | 28.45445 | -81.3812 | 63 | 64 | NA | NA | 56.3 | 57.2 | 56.3 | 57.2 | 55 | 55.9 | 55 | 55.9 |
| 120952002 | Florida | Orange | WINTER PARK | 28.59639 | -81.3625 | 63 | 64 | 62 | 62 | 55.6 | 56.5 | 55.6 | 56.5 | 54.9 | 55.7 | 54.9 | 55.7 |
| 120972002 | Florida | Osceola | Osceola County Fire Station | 28.34751 | -81.6365 | 64.3 | 66 | 64 | 59 | 56.3 | 57.8 | 56.3 | 57.8 | 55 | 56.4 | 55 | 56.4 |
| 121010005 | Florida | Pasco | San Antonio | 28.33223 | -82.3056 | 61.3 | 62 | 59 | 56 | | | | | | | | |
| 121012001 | Florida | Pasco | Holiday | 28.19557 | -82.7563 | 62 | 63 | 62 | 59 | 55.7 | 56.6 | 55.5 | 56.4 | 55.4 | 56.3 | | |
| 121030004 | Florida | Pinellas | St. Petersburg College | 27.94669 | -82.7318 | 62.7 | 65 | 64 | 61 | 56.5 | 58.6 | 56.5 | 58.6 | 56.1 | 58.1 | 54.8 | 56.9 |
| 121030018 | Florida | Pinellas | Azalea Park | 27.78587 | -82.7399 | 60.7 | 61 | 61 | 58 | 55.3 | 55.6 | 55.3 | 55.6 | 54.4 | 54.7 | | |
| 121035002 | Florida | Pinellas | John Chesnut Sr. Park - East Lake | 28.0903 | -82.7007 | 59.7 | 61 | 61 | 60 | 53.5 | 54.7 | 53.5 | 54.6 | 53.4 | 54.6 | 52 | 53.1 |
| 121056005 | Florida | Polk | Sikes Elementary School | 27.93975 | -82.0001 | 65.3 | 67 | 62 | 60 | 57.5 | 59 | 57.5 | 59 | | | | |
| 121056006 | Florida | Polk | Baptist Childrens' Home | 28.02889 | -81.9722 | 64.3 | 66 | 62 | 60 | | | | | | | | |
| 121110013 | Florida | St. Lucie | Savannas | 27.38908 | -80.311 | 61.3 | 62 | 58 | 55 | | | | | | | | |
| 121130015 | Florida | Santa Rosa | Woodlawn Beach Middle School | 30.39413 | -87.008 | 62 | 64 | 60 | 57 | 55.4 | 57.2 | 55.3 | 57.1 | 54.2 | 56 | 54.4 | 56.1 |
| 121151005 | Florida | Sarasota | Lido Park | 27.30727 | -82.5704 | 62.7 | 63 | 59 | 57 | 56.2 | 56.4 | | | | | | |
| 121151006 | Florida | Sarasota | Paw Park | 27.35028 | -82.4797 | 63 | 64 | 61 | 58 | 56.4 | 57.3 | 56.5 | 57.4 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 121152002 | Florida | Sarasota | Jackson Road | 27.08919 | -82.3626 | 61 | 61 | 58 | 55 | | | | | | | | |
| 121171002 | Florida | Seminole | Sanford (Seminole Community College) | 28.74611 | -81.3106 | 62.7 | 64 | 61 | 59 | 55.1 | 56.3 | 55.1 | 56.3 | 53.5 | 54.6 | 53.5 | 54.6 |
| 121272001 | Florida | Volusia | Port Orange | 29.10915 | -80.9937 | 59 | 59 | NA | NA | | | | | 51.7 | 51.7 | | |
| 121275002 | Florida | Volusia | DAYTONA BLIND SERVICES | 29.20667 | -81.0525 | 59.7 | 61 | 57 | 56 | | | | | | | | |
| 121290001 | Florida | Wakulla | St. Marks Wildlife Refuge | 30.0925 | -84.1611 | 59 | 59 | 55 | 53 | | | | | | | | |
| 130210012 | Georgia | Bibb | Macon-Forestry | 32.80526 | -83.5435 | 65 | 65 | 61 | 58 | 55.2 | 55.2 | 55.2 | 55.2 | 53.3 | 53.3 | 53.3 | 53.3 |
| 130510021 | Georgia | Chatham | Savannah-E. President | 32.06848 | -81.0494 | 57 | 57 | 57 | 56 | 50.9 | 50.9 | 50.9 | 50.9 | | | | |
| 130550001 | Georgia | Chattooga | Summerville | 34.47453 | -85.4088 | 61 | 62 | 56 | 56 | 52.8 | 53.6 | 52.8 | 53.6 | 52.3 | 53.1 | 52.3 | 53.1 |
| 130590002 | Georgia | Clarke | Athens | 33.91814 | -83.3444 | 64.3 | 65 | 59 | 59 | 55.1 | 55.7 | 55.1 | 55.7 | 55.4 | 56 | 55.4 | 56 |
| 130670003 | Georgia | Cobb | Kennesaw | 34.01544 | -84.6074 | 66.5 | 67 | 61 | 61 | 56.5 | 56.9 | 56.5 | 56.9 | 56.9 | 57.3 | 56.9 | 57.3 |
| 130730001 | Georgia | Columbia | Evans | 33.58204 | -82.1312 | 60 | 61 | 56 | 55 | 52.3 | 53.2 | 52.3 | 53.2 | 51.6 | 52.4 | 51.6 | 52.4 |
| 130770002 | Georgia | Coweta | Newnan | 33.40405 | -84.7457 | 64.5 | 66 | NA | NA | 55.6 | 56.9 | 55.6 | 56.9 | 55.2 | 56.4 | 55.2 | 56.4 |
| 130850001 | Georgia | Dawson | Dawsonville | 34.37623 | -84.0595 | 65 | 65 | 60 | 59 | 54.6 | 54.6 | 54.6 | 54.6 | 53.8 | 53.8 | 53.8 | 53.8 |
| 130890002 | Georgia | DeKalb | South DeKalb | 33.6878 | -84.2905 | 70.3 | 71 | 67 | 64 | 61.6 | 62.2 | 61.6 | 62.2 | 61.6 | 62.2 | 61.6 | 62.2 |
| 130970004 | Georgia | Douglas | Douglasville | 33.74124 | -84.7764 | 68 | 69 | 66 | 63 | 59.5 | 60.4 | 59.5 | 60.4 | 59.7 | 60.5 | 59.7 | 60.5 |
| 131210055 | Georgia | Fulton | United Avenue | 33.72074 | -84.3573 | 74.3 | 75 | 68 | 65 | 66 | 66.7 | 66 | 66.7 | 65.1 | 65.7 | 65.1 | 65.7 |
| 131270006 | Georgia | Glynn | Brunswick | 31.16981 | -81.495 | 56.3 | 57 | 55 | 54 | | | | | 48.6 | 49.2 | | |
| 131350002 | Georgia | Gwinnett | Gwinnett | 33.9632 | -84.0691 | 70.7 | 72 | 66 | 64 | 59.6 | 60.7 | 59.6 | 60.7 | 59.6 | 60.7 | 59.6 | 60.7 |
| 131510002 | Georgia | Henry | McDonough | 33.43395 | -84.1618 | 72 | 74 | 66 | 64 | 62.6 | 64.4 | 62.6 | 64.4 | 61.9 | 63.6 | 61.9 | 63.6 |
| 132130003 | Georgia | Murray | Fort Mountain | 34.78522 | -84.6264 | 65 | 65 | 62 | 62 | 56.2 | 56.2 | 56.2 | 56.2 | 55.1 | 55.1 | 55.1 | 55.1 |
| 132150008 | Georgia | Muscogee | Columbus-Airport | 32.52127 | -84.9446 | 61 | 62 | 59 | 57 | 53.1 | 54 | 53.1 | 54 | 53 | 53.8 | 53 | 53.8 |
| 132230003 | Georgia | Paulding | Yorkville: King Farm | 33.9285 | -85.0453 | 63 | 63 | NA | NA | 53.8 | 53.8 | 53.8 | 53.8 | 52.9 | 52.9 | 52.9 | 52.9 |
| 132319991 | Georgia | Pike | Georgia Station | 33.1787 | -84.4052 | 67.5 | 68 | 61 | 58 | 58.9 | 59.3 | 58.9 | 59.3 | 59 | 59.5 | 59 | 59.5 |
| 132450091 | Georgia | Richmond | Augusta | 33.4339 | -82.0224 | 61.7 | 62 | 62 | 60 | 53.7 | 54 | 53.7 | 54 | 53.3 | 53.6 | 53.3 | 53.6 |
| 132470001 | Georgia | Rockdale | Conyers | 33.58855 | -84.0696 | 71 | 74 | 65 | 62 | 62 | 64.6 | 62 | 64.6 | 61.1 | 63.7 | 61.1 | 63.7 |
| 132611001 | Georgia | Sumter | Leslie | 31.95429 | -84.081 | 60.3 | 61 | 58 | 57 | 53.7 | 54.3 | 53.7 | 54.3 | | | | |
| 170010007 | Illinois | Adams | JOHN WOOD COMMUNITY COLLEGE | 39.91541 | -91.3359 | 62.7 | 63 | 63 | 61 | | | | | | | | |
| 170190007 | Illinois | Champaign | Thomasboro | 40.24491 | -88.1885 | 65.3 | 68 | 65 | 65 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 170191001 | Illinois | Champaign | ISWS CLIMATE STATION | 40.05278 | -88.3725 | 65.7 | 66 | 60 | 59 | | | | | | | | |
| 170230001 | Illinois | Clark | 416 S. State St. Hwy 1-West Union | 39.21086 | -87.6683 | 65 | 66 | 60 | 61 | 58.5 | 59.4 | 58.5 | 59.4 | | | | |
| 170310001 | Illinois | Cook | VILLAGE GARAGE | 41.67099 | -87.7325 | 73 | 77 | 71 | 72 | 70.3 | 74.2 | 70.3 | 74.2 | 69.1 | 72.9 | 69.1 | 72.9 |
| 170310032 | Illinois | Cook | SOUTH WATER FILTRATION PLANT | 41.75583 | -87.5454 | 72.3 | 75 | 75 | 74 | 70.2 | 72.8 | 70.5 | 73.1 | 69.3 | 71.9 | 68.9 | 71.4 |
| 170310076 | Illinois | Cook | COM ED MAINTENANCE BLDG | 41.7514 | -87.7135 | 72 | 75 | NA | 70 | 69.9 | 72.9 | 69.9 | 72.9 | 68.4 | 71.2 | 68.4 | 71.2 |
| 170311003 | Illinois | Cook | TAFT HS | 41.98433 | -87.792 | 68.3 | 69 | 71 | 71 | 66.6 | 67.3 | 65.8 | 66.5 | 65.5 | 66.2 | 64.4 | 65 |
| 170311601 | Illinois | Cook | COOK COUNTY TRAILER | 41.66812 | -87.9906 | 69.3 | 70 | 72 | 73 | 65.9 | 66.6 | 65.9 | 66.6 | 64.2 | 64.9 | 64.2 | 64.9 |
| 170313103 | Illinois | Cook | IEPA TRAILER | 41.96519 | -87.8763 | 62.7 | 64 | 64 | 63 | 60.1 | 61.4 | 60.1 | 61.4 | 58.8 | 60 | 58.8 | 60 |
| 170314002 | Illinois | Cook | COOK COUNTY TRAILER | 41.85524 | -87.7525 | 68.7 | 72 | 70 | 71 | 67.8 | 71 | 66.9 | 70.2 | 66.7 | 69.9 | 65.1 | 68.2 |
| 170314007 | Illinois | Cook | REGIONAL OFFICE BUILDING | 42.06029 | -87.8632 | 72 | 74 | 69 | 70 | 69.3 | 71.3 | 68.8 | 70.7 | 68.2 | 70.1 | 67.1 | 69 |
| 170314201 | Illinois | Cook | NORTHBROOK WATER PLANT | 42.14 | -87.7992 | 73.3 | 77 | 74 | 74 | 70.6 | 74.2 | 70.1 | 73.6 | 69.4 | 72.9 | 68.4 | 71.8 |
| 170317002 | Illinois | Cook | WATER PLANT | 42.06205 | -87.6753 | 74 | 77 | 73 | 74 | 71.4 | 74.3 | 70.6 | 73.5 | 70.7 | 73.6 | 70.3 | 73.2 |
| 170436001 | Illinois | DuPage | MORTON ARBORETUM | 41.81305 | -88.0728 | 69.7 | 71 | 70 | 70 | 66.8 | 68 | 66.8 | 68 | 65.7 | 66.9 | 65.7 | 66.9 |
| 170491001 | Illinois | Effingham | CENTRAL JR HIGH | 39.06716 | -88.5489 | 65.7 | 67 | NA | NA | 59.1 | 60.3 | 59.1 | 60.3 | | | | |
| 170650002 | Illinois | Hamilton | TEN MILE CREEK DNR OFFICE | 38.08216 | -88.6249 | 65.7 | 67 | 65 | 65 | 59.2 | 60.4 | 59.2 | 60.4 | | | | |
| 170831001 | Illinois | Jersey | ILLINI JR HIGH | 39.11054 | -90.3241 | 68 | 68 | NA | NA | 62.1 | 62.1 | 62.1 | 62.1 | 61.7 | 61.7 | 61.7 | 61.7 |
| 170859991 | Illinois | Jo Daviess | Stockton | 42.2869 | -89.9997 | 64.7 | 65 | 62 | 62 | | | | | | | | |
| 170890005 | Illinois | Kane | LARSEN JUNIOR HIGH | 42.04915 | -88.273 | 69.3 | 71 | 70 | 70 | 65.2 | 66.8 | 65.2 | 66.8 | 63.3 | 64.9 | 63.3 | 64.9 |
| 170971007 | Illinois | Lake | CAMP LOGAN TRAILER | 42.46757 | -87.81 | 73.7 | 75 | 73 | 74 | 69.6 | 70.9 | 69.4 | 70.6 | 71.5 | 72.7 | 68.9 | 70.2 |
| 171110001 | Illinois | McHenry | CARY GROVE HS | 42.22144 | -88.2422 | 69.7 | 72 | 71 | 71 | 65.2 | 67.4 | 65.2 | 67.4 | 63.6 | 65.7 | 63.6 | 65.7 |
| 171132003 | Illinois | McLean | ISU HARRIS PHYSICAL PLANT | 40.51874 | -88.9969 | 64.3 | 65 | 65 | 67 | | | | | | | | |
| 171150013 | Illinois | Macon | IEPA TRAILER | 39.86683 | -88.9256 | 66.3 | 67 | 64 | 64 | | | | | | | | |
| 171170002 | Illinois | Macoupin | IEPA TRAILER | 39.39608 | -89.8097 | 65 | 66 | 62 | 62 | 58.7 | 59.6 | 58.7 | 59.6 | | | | |
| 171190008 | Illinois | Madison | CLARA BARTON SCHOOL | 38.89019 | -90.148 | 70 | 71 | NA | NA | 63.9 | 64.8 | 63.9 | 64.8 | 64 | 64.9 | 64 | 64.9 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 171191009 | Illinois | Madison | SOUTHWEST CABLE TV | 38.72657 | -89.96 | 69 | 72 | 67 | 63 | 62.8 | 65.5 | 62.8 | 65.5 | 62.1 | 64.8 | 62.1 | 64.8 |
| 171193007 | Illinois | Madison | WATER PLANT | 38.86067 | -90.1059 | 70.7 | 71 | 69 | 70 | 64.5 | 64.8 | 64.5 | 64.8 | 64.6 | 64.9 | 64.6 | 64.9 |
| 171199991 | Illinois | Madison | Alhambra | 38.869 | -89.6228 | 67.3 | 68 | 64 | 67 | 61.1 | 61.7 | 61.1 | 61.7 | | | | |
| 171430024 | Illinois | Peoria | FIRESTATION | 40.68742 | -89.6069 | 65 | 67 | 63 | 62 | | | | | | | | |
| 171431001 | Illinois | Peoria | PEORIA HEIGHTS HS | 40.7455 | -89.5859 | 66 | 67 | 65 | 65 | | | | | | | | |
| 171570001 | Illinois | Randolph | IEPA TRAILER | 38.17628 | -89.7885 | 66.3 | 67 | 62 | 64 | 60.2 | 60.8 | 60.2 | 60.8 | 60.6 | 61.2 | 60.6 | 61.2 |
| 171613002 | Illinois | Rock Island | ROCK ISLAND ARSENAL | 41.51473 | -90.5174 | 63.3 | 65 | 65 | 63 | | | | | | | | |
| 171630010 | Illinois | Saint Clair | IEPA-RAPS TRAILER | 38.61203 | -90.1605 | 69 | 71 | 65 | 66 | 62.9 | 64.8 | 62.9 | 64.8 | 63 | 64.8 | 63 | 64.8 |
| 171670014 | Illinois | Sangamon | Illinois Building State Fairgrounds | 39.83152 | -89.6409 | 66 | 68 | 62 | 62 | | | | | | | | |
| 171971011 | Illinois | Will | COM ED TRAINING CENTER | 41.22154 | -88.191 | 65.3 | 67 | 64 | 65 | | | | | | | | |
| 172012001 | Illinois | Winnebago | MAPLE ELEMENTARY SCHOOL | 42.33498 | -89.0378 | 67.3 | 68 | 66 | 66 | | | | | | | | |
| 180030002 | Indiana | Allen | Leo High School | 41.22142 | -85.0168 | 64.7 | 67 | 64 | 66 | 59 | 61.1 | 59 | 61.1 | 57.1 | 59.2 | 57.1 | 59.2 |
| 180030004 | Indiana | Allen | Ft. Wayne- Beacon St. | 41.09497 | -85.1018 | 64 | 66 | 61 | NA | 58.3 | 60.1 | 58.3 | 60.1 | 56.5 | 58.3 | 56.5 | 58.3 |
| 180050007 | Indiana | Bartholomew | Hope- Hauser Jr-Sr High School | 39.29432 | -85.7668 | 67.7 | 68 | 63 | 64 | 60.6 | 60.9 | 60.6 | 60.9 | | | | |
| 180110001 | Indiana | Boone | Perry Worth ELEMENTRY SCHOOL: WEST OF WHITESTOWN | 39.99773 | -86.3954 | 67 | 69 | 66 | 67 | 61.4 | 63.2 | 61.4 | 63.2 | 59.3 | 61 | 59.3 | 61 |
| 180150002 | Indiana | Carroll | Flora-Flora Airport | 40.54046 | -86.553 | 63.7 | 64 | 63 | 64 | 57.7 | 57.9 | 57.7 | 57.9 | | | | |
| 180190008 | Indiana | Clark | Charlestown State Park- 1051.8 meters East of SR 62/ Indiana armory | 38.39382 | -85.6641 | 70.3 | 71 | 63 | 63 | 62.8 | 63.4 | 62.8 | 63.4 | 61.4 | 62 | 61.4 | 62 |
| 180350010 | Indiana | Delaware | Albany- Albany Elem. Sch. | 40.30039 | -85.2459 | 62.3 | 66 | 61 | 64 | 55.6 | 58.9 | 55.6 | 58.9 | | | | |
| 180390007 | Indiana | Elkhart | Bristol- Bristol Elem. Sch. | 41.71696 | -85.8247 | 64.3 | 68 | 61 | 62 | 58.5 | 61.9 | 58.5 | 61.9 | 57.4 | 60.7 | 57.4 | 60.7 |
| 180431004 | Indiana | Floyd | New Albany- Green Valley Elem. Sch. | 38.30791 | -85.8343 | 71 | 73 | 64 | 64 | 64.1 | 65.9 | 64.1 | 65.9 | 62.5 | 64.3 | 62.5 | 64.3 |
| 180550001 | Indiana | Greene | Plummer: 2500 S. W- Citizens gas Plummer maintenance facility | 38.98558 | -86.9901 | 66.7 | 67 | 64 | 64 | 58.7 | 59 | 58.7 | 59 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 180570006 | Indiana | Hamilton | Our Lady of Grace- Noblesville | 40.0683 | -85.9925 | 66.3 | 69 | 64 | 64 | 60.3 | 62.7 | 60.3 | 62.7 | 58.1 | 60.5 | 58.1 | 60.5 |
| 180630004 | Indiana | Hendricks | AVON- 255 S. SR 267 (also 255 S. Avon Ave.) Avon: IN | 39.75889 | -86.3986 | 63.3 | 67 | 61 | 62 | 58.5 | 61.9 | 58.5 | 61.9 | 56.6 | 59.9 | 56.6 | 59.9 |
| 180690002 | Indiana | Huntington | Roanoke- Roanoke Elem. School | 40.9596 | -85.3796 | 60.7 | 64 | NA | NA | 55.1 | 58 | 55.1 | 58 | 53.3 | 56.2 | 53.3 | 56.2 |
| 180710001 | Indiana | Jackson | Brownstown- 225 W & 200 N. Water facility | 38.92084 | -86.0805 | 65.7 | 66 | NA | NA | 58.3 | 58.5 | 58.3 | 58.5 | | | | |
| 180810002 | Indiana | Johnson | Indian Creek Elementary School in Trafalgar: DUE SOUTH OF INDIANAPOLIS | 39.41724 | -86.1524 | 61 | 62 | NA | NA | 55 | 55.9 | 55 | 55.9 | 54.4 | 55.3 | 54.4 | 55.3 |
| 180839991 | Indiana | Knox | Vincennes | 38.7408 | -87.4853 | 66.7 | 69 | 65 | 66 | 59.5 | 61.5 | 59.5 | 61.5 | 57.9 | 59.9 | 57.9 | 59.9 |
| 180890022 | Indiana | Lake | Gary-IITRI/ 1219.5 meters east of Tennessee St.- old ammunition bunker | 41.60667 | -87.3047 | 68.3 | 70 | 69 | 71 | 65.2 | 66.8 | 65.4 | 67 | 64.2 | 65.8 | 64.8 | 66.4 |
| 180892008 | Indiana | Lake | HAMMOND CAAP- Hammond- 141st St. | 41.63944 | -87.4936 | 65.5 | 66 | 68 | 69 | 63.2 | 63.6 | 63.1 | 63.6 | 61.9 | 62.4 | 62 | 62.5 |
| 180910010 | Indiana | LaPorte | LAPORTE OZONE SITE AT WATER TREATMENT PLANT | 41.62917 | -86.6844 | 65 | 67 | 63 | 64 | 60.7 | 62.6 | 60.3 | 62.1 | 61.5 | 63.4 | 60.5 | 62.4 |
| 180950010 | Indiana | Madison | SCHOOL LOCATED ON THE SW CORNER OF US 36 AND IND 109 | 40.00251 | -85.6564 | 62.3 | 68 | NA | NA | 56.1 | 61.3 | 56.1 | 61.3 | 54.6 | 59.6 | 54.6 | 59.6 |
| 180970050 | Indiana | Marion | Indpls.- Ft. Harrison | 39.85889 | -86.0214 | 70.3 | 72 | 65 | 65 | 65.2 | 66.7 | 65.2 | 66.7 | 61.9 | 63.4 | 61.9 | 63.4 |
| 180970057 | Indiana | Marion | Indpls- Harding St. | 39.74903 | -86.1863 | 66 | 69 | 66 | 68 | 62.2 | 65 | 62.2 | 65 | 58.7 | 61.4 | 58.7 | 61.4 |
| 180970073 | Indiana | Marion | Indpls.- E. 16th St. | 39.78949 | -86.0609 | 65.5 | 66 | NA | NA | 61.3 | 61.7 | 61.3 | 61.7 | 58 | 58.5 | 58 | 58.5 |
| 180970078 | Indiana | Marion | Indpls- Washington Park/ in parking lot next to police station | 39.81083 | -86.1144 | 68.5 | 69 | 64 | 66 | 64.6 | 65 | 64.6 | 65 | 60.9 | 61.4 | 60.9 | 61.4 |
| 180970087 | Indiana | Marion | Indpls.- I 70 | 39.78793 | -86.1309 | 65.3 | 67 | 59 | 62 | 61.5 | 63.2 | 61.5 | 63.2 | 58.1 | 59.6 | 58.1 | 59.6 |
| 181090005 | Indiana | Morgan | Monrovia- Monrovia HS. | 39.57563 | -86.4779 | 63 | 64 | NA | NA | 56.8 | 57.7 | 56.8 | 57.7 | | | | |
| 181230009 | Indiana | Perry | Leopold- Perry Central HS | 38.11515 | -86.6033 | 66.7 | 67 | 64 | 64 | 58.9 | 59.2 | 58.9 | 59.2 | 57.8 | 58 | 57.8 | 58 |
| 181270024 | Indiana | Porter | Ogden Dunes- Water Treatment Plant | 41.6175 | -87.1992 | 69.7 | 71 | 72 | 73 | 65.9 | 67.1 | 65.3 | 66.6 | 65.8 | 67 | 65.4 | 66.6 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 181270026 | Indiana | Porter | VALPARAISO | 41.51212 | -87.0362 | 69.3 | 73 | 68 | 66 | 64.7 | 68.1 | 64.7 | 68.1 | 64.7 | 68.2 | 64.7 | 68.2 |
| 181290003 | Indiana | Posey | ST. PHILLIPS- St. Phillips road CAAP trailer | 38.00641 | -87.7184 | 66.7 | 67 | 61 | 61 | 59.2 | 59.5 | 59.2 | 59.5 | 57.6 | 57.9 | 57.6 | 57.9 |
| 181410010 | Indiana | St. Joseph | Potato Creek State Park | 41.55167 | -86.3706 | 65 | 68 | 63 | 63 | 59.6 | 62.4 | 59.6 | 62.4 | 58.6 | 61.3 | 58.6 | 61.3 |
| 181410015 | Indiana | St. Joseph | South Bend-Shields Dr. | 41.69666 | -86.2147 | 70 | 72 | 65 | 67 | 64 | 65.8 | 64 | 65.8 | 63 | 64.8 | 63 | 64.8 |
| 181410016 | Indiana | St. Joseph | Granger-Beckley St. | 41.75472 | -86.11 | 67.3 | 69 | 64 | 66 | 61.5 | 63.1 | 61.5 | 63.1 | 60.6 | 62.1 | 60.6 | 62.1 |
| 181450001 | Indiana | Shelby | TRITON Middle SCHOOL: NORTH OF FAIRLAND | 39.61337 | -85.8707 | 64.7 | 68 | 63 | 64 | 59.4 | 62.4 | 59.4 | 62.4 | 57.4 | 60.3 | 57.4 | 60.3 |
| 181630013 | Indiana | Vanderburgh | Inglefield/ Scott School | 38.11389 | -87.5367 | 68.3 | 69 | 62 | 64 | 60.4 | 61.1 | 60.4 | 61.1 | 59 | 59.7 | 59 | 59.7 |
| 181630021 | Indiana | Vanderburgh | Evansville- Buena Vista | 38.01333 | -87.5772 | 69 | 70 | 65 | 66 | 60.9 | 61.8 | 60.9 | 61.8 | 59.5 | 60.3 | 59.5 | 60.3 |
| 181670018 | Indiana | Vigo | TERRE HAUTE CAAP/ McLean High School | 39.48599 | -87.4013 | 66.7 | 68 | 63 | 65 | 59.6 | 60.8 | 59.6 | 60.8 | | | | |
| 181670024 | Indiana | Vigo | Sandcut/ SITE LOCATED BY HOME BEHIND SHED. | 39.55853 | -87.3129 | 64.3 | 67 | 61 | 62 | 57.5 | 59.9 | 57.5 | 59.9 | | | | |
| 181699991 | Indiana | Wabash | Salamonie Reservoir | 40.81604 | -85.6614 | 68.7 | 70 | 64 | 65 | 61.8 | 63 | 61.8 | 63 | | | | |
| 181730008 | Indiana | Warrick | Boonville- Boonville HS | 38.05167 | -87.2781 | 68.7 | 69 | 64 | 66 | 59.9 | 60.2 | 59.9 | 60.2 | 59.2 | 59.4 | 59.2 | 59.4 |
| 181730009 | Indiana | Warrick | Lynnville- Tecumseh HS | 38.1945 | -87.3414 | 66 | 66 | NA | NA | 57.5 | 57.5 | 57.5 | 57.5 | 57.1 | 57.1 | 57.1 | 57.1 |
| 181730011 | Indiana | Warrick | Dayville | 37.95444 | -87.3217 | 67.7 | 68 | 63 | 65 | 59.8 | 60.1 | 59.8 | 60.1 | 58.3 | 58.6 | 58.3 | 58.6 |
| 190170011 | Iowa | Bremer | WAVERLY AIRPORT SITE | 42.74304 | -92.5132 | 61 | 63 | 61 | 60 | | | | | | | | |
| 190450021 | Iowa | Clinton | CLINTON: RAINBOW PARK | 41.875 | -90.1776 | 63 | 64 | 61 | 63 | | | | | | | | |
| 190850007 | Iowa | Harrison | | 41.83226 | -95.9282 | 62.7 | 64 | 62 | 61 | | | | | | | | |
| 190851101 | Iowa | Harrison | PISGAH: HIGHWAY MAINTENANCE | 41.78026 | -95.9484 | 62 | 62 | NA | NA | | | | | | | | |
| 191130028 | Iowa | Linn | KIRKWOOD | 41.91056 | -91.6521 | 61 | 61 | NA | NA | | | | | | | | |
| 191130033 | Iowa | Linn | COGGON ELEMENTARY SCHOOL BLDG. NORTHERN LIMITS OF LINN COUNTY | 42.28101 | -91.5269 | 62.3 | 65 | 62 | 61 | | | | | | | | |
| 191130040 | Iowa | Linn | Public Health | 41.97677 | -91.6877 | 61.7 | 63 | 59 | 60 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 191370002 | Iowa | Montgomery | VIKING LAKE STATE PARK | 40.96911 | -95.045 | 60.3 | 61 | 57 | 57 | | | | | | | | |
| 191471002 | Iowa | Palo Alto | EMMETSBURG: IOWA LAKES COMMUNITY COLL. | 43.1237 | -94.6935 | 61.3 | 62 | 63 | 61 | | | | | | | | |
| 191530030 | Iowa | Polk | CARPENTER | 41.60316 | -93.6431 | 60 | 61 | 59 | 58 | | | | | | | | |
| 191630014 | Iowa | Scott | SCOTT COUNTY PARK | 41.69917 | -90.5219 | 63.3 | 65 | 60 | 60 | | | | | | | | |
| 191630015 | Iowa | Scott | DAVENPORT: JEFFERSON SCH. | 41.53001 | -90.5876 | 61.3 | 63 | 61 | 60 | | | | | | | | |
| 191690011 | Iowa | Story | SLATER CITY HALL | 41.88287 | -93.6878 | 60 | 60 | NA | NA | | | | | | | | |
| 191770006 | Iowa | Van Buren | LAKE SUGEMA STATE PARK II | 40.69508 | -92.0063 | 60 | 61 | 58 | 56 | | | | | | | | |
| 191810022 | Iowa | Warren | GRAVEL ROAD IN LAKE AQUABI STATE PARK | 41.28553 | -93.584 | 58 | 58 | NA | NA | | | | | | | | |
| 200910010 | Kansas | Johnson | HERITAGE PARK | 38.83858 | -94.7464 | 60 | 61 | 57 | 60 | 55.7 | 56.6 | 55.7 | 56.6 | | | | |
| 201030003 | Kansas | Leavenworth | Leavenworth | 39.32739 | -94.951 | 61.3 | 63 | 61 | 61 | 56.5 | 58.1 | 56.5 | 58.1 | 55.5 | 57.1 | 55.5 | 57.1 |
| 201330003 | Kansas | Neosho | CHANUTE | 37.67696 | -95.4759 | 61 | 61 | 59 | 60 | | | | | | | | |
| 201730010 | Kansas | Sedgwick | WICHITA HD | 37.70207 | -97.3148 | 63.7 | 65 | 60 | 64 | | | | | | | | |
| 201730018 | Kansas | Sedgwick | Sedgwick Ozone | 37.89751 | -97.4921 | 64 | 65 | 62 | 64 | | | | | | | | |
| 201770013 | Kansas | Shawnee | KNI | 39.02427 | -95.7113 | 62.3 | 63 | 60 | 59 | | | | | | | | |
| 201910002 | Kansas | Sumner | PECK | 37.47689 | -97.3664 | 63.7 | 64 | 61 | 63 | | | | | | | | |
| 201950001 | Kansas | Trego | CEDAR BLUFF | 38.77008 | -99.7634 | 61.7 | 63 | 60 | 62 | | | | | | | | |
| 202090021 | Kansas | Wyandotte | JFK | 39.11722 | -94.6356 | 63 | 64 | 63 | 65 | 58.8 | 59.7 | 58.8 | 59.7 | 57.9 | 58.8 | 57.9 | 58.8 |
| 210130002 | Kentucky | Bell | MIDDLESBORO | 36.60843 | -83.7369 | 60.7 | 61 | 56 | 56 | 53.7 | 54 | 53.7 | 54 | | | | |
| 210150003 | Kentucky | Boone | EAST BEND | 38.91833 | -84.8526 | 63 | 64 | 61 | NA | 54.7 | 55.6 | 54.7 | 55.6 | 54.2 | 55.1 | 54.2 | 55.1 |
| 210190017 | Kentucky | Boyd | ASHLAND PRIMARY (FIVCO) | 38.45934 | -82.6404 | 65 | 66 | 59 | 59 | 58.6 | 59.5 | 58.6 | 59.5 | 57.5 | 58.4 | 57.5 | 58.4 |
| 210290006 | Kentucky | Bullitt | SHEPHERDSVILLE | 37.98629 | -85.7119 | 65.7 | 66 | 64 | 64 | 59.2 | 59.5 | 59.2 | 59.5 | 58.6 | 58.9 | 58.6 | 58.9 |
| 210373002 | Kentucky | Campbell | NORTHERN KENTUCKY UNIVERSITY (NKU) | 39.02188 | -84.4745 | 68.7 | 70 | 63 | 63 | 60.1 | 61.3 | 60.1 | 61.3 | 59.2 | 60.3 | 59.2 | 60.3 |
| 210430500 | Kentucky | Carter | GRAYSON LAKE | 38.23887 | -82.9881 | 62 | 63 | 55 | 56 | 55.8 | 56.7 | 55.8 | 56.7 | 54.9 | 55.8 | 54.9 | 55.8 |
| 210470006 | Kentucky | Christian | HOPKINSVILLE | 36.91171 | -87.3233 | 61 | 62 | 58 | 59 | 54.4 | 55.3 | 54.4 | 55.3 | | | | |
| 210590005 | Kentucky | Daviess | OWENSBORO PRIMARY | 37.78078 | -87.0753 | 65 | 65 | 64 | 64 | 56.8 | 56.8 | 56.8 | 56.8 | 54.6 | 54.6 | 54.6 | 54.6 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 210610501 | Kentucky | Edmonson | Mammoth Cave NP - Houchin Meadow | 37.13179 | -86.143 | 63.7 | 64 | 59 | 59 | 56.4 | 56.7 | 56.4 | 56.7 | | | | |
| 210670012 | Kentucky | Fayette | LEXINGTON PRIMARY | 38.06503 | -84.4976 | 65.7 | 67 | 60 | 63 | 58.2 | 59.4 | 58.2 | 59.4 | 57.7 | 58.8 | 57.7 | 58.8 |
| 210890007 | Kentucky | Greenup | WORTHINGTON | 38.54814 | -82.7312 | 61.7 | 63 | 54 | 55 | 55.4 | 56.6 | 55.4 | 56.6 | 54.4 | 55.5 | 54.4 | 55.5 |
| 210910012 | Kentucky | Hancock | LEWISPORT | 37.93829 | -86.8972 | 67.5 | 68 | 63 | 65 | 59.1 | 59.5 | 59.1 | 59.5 | 57.2 | 57.6 | 57.2 | 57.6 |
| 210930006 | Kentucky | Hardin | ELIZABETHTOWN | 37.70561 | -85.8526 | 64.7 | 65 | 60 | 61 | 57.1 | 57.4 | 57.1 | 57.4 | 57.1 | 57.4 | 57.1 | 57.4 |
| 211010014 | Kentucky | Henderson | BASKETT | 37.8712 | -87.4638 | 68.3 | 69 | NA | NA | 60.1 | 60.7 | 60.1 | 60.7 | 59.1 | 59.8 | 59.1 | 59.8 |
| 211110027 | Kentucky | Jefferson | Bates | 38.13784 | -85.5765 | 69 | 69 | NA | NA | 62.4 | 62.4 | 62.4 | 62.4 | 61.5 | 61.5 | 61.5 | 61.5 |
| 211110051 | Kentucky | Jefferson | Watson Lane | 38.06091 | -85.898 | 68.3 | 69 | 65 | 65 | 61.9 | 62.5 | 61.9 | 62.5 | 60.3 | 60.9 | 60.3 | 60.9 |
| 211110067 | Kentucky | Jefferson | CANNONS LANE | 38.22876 | -85.6545 | 74.3 | 75 | 69 | 70 | 66.7 | 67.3 | 66.7 | 67.3 | 65.2 | 65.8 | 65.2 | 65.8 |
| 211130001 | Kentucky | Jessamine | NICHOLASVILLE | 37.89147 | -84.5883 | 64 | 65 | 60 | 62 | 56.1 | 56.9 | 56.1 | 56.9 | 55.4 | 56.3 | 55.4 | 56.3 |
| 211390003 | Kentucky | Livingston | SMITHLAND | 37.15539 | -88.394 | 65 | 66 | 62 | 64 | 57.9 | 58.8 | 57.9 | 58.8 | 58.2 | 59.1 | 58.2 | 59.1 |
| 211451024 | Kentucky | McCracken | JACKSON PURCHASE (PADUCAH PRIMARY) | 37.05822 | -88.5725 | 62.7 | 63 | 63 | 65 | 56.4 | 56.7 | 56.4 | 56.7 | 56 | 56.3 | 56 | 56.3 |
| 211759991 | Kentucky | Morgan | Crockett | 37.9214 | -83.0662 | 64 | 64 | 57 | 57 | 57.7 | 57.7 | 57.7 | 57.7 | | | | |
| 211850004 | Kentucky | Oldham | BUCKNER | 38.4002 | -85.4443 | 68.3 | 70 | 63 | 63 | 60.6 | 62.1 | 60.6 | 62.1 | 59.3 | 60.7 | 59.3 | 60.7 |
| 211930003 | Kentucky | Perry | HAZARD | 37.28329 | -83.2093 | 58 | 58 | 56 | 56 | 52.1 | 52.1 | 52.1 | 52.1 | | | | |
| 211950002 | Kentucky | Pike | PIKEVILLE PRIMARY | 37.4826 | -82.5353 | 59.3 | 60 | 54 | 55 | 54 | 54.6 | 54 | 54.6 | | | | |
| 211990003 | Kentucky | Pulaski | SOMERSET | 37.09798 | -84.6115 | 61 | 62 | 57 | 58 | 54.2 | 55.1 | 54.2 | 55.1 | | | | |
| 212130004 | Kentucky | Simpson | FRANKLIN | 36.70861 | -86.5663 | 63.7 | 64 | 59 | 60 | 56.6 | 56.8 | 56.6 | 56.8 | | | | |
| 212219991 | Kentucky | Trigg | Cadiz | 36.7841 | -87.8499 | 62 | 63 | 60 | 59 | 55.4 | 56.2 | 55.4 | 56.2 | | | | |
| 212270009 | Kentucky | Warren | ED SPEAR PARK (SMITHS GROVE) | 37.04926 | -86.2149 | 61.3 | 62 | 57 | 60 | 54.2 | 54.9 | 54.2 | 54.9 | | | | |
| 212299991 | Kentucky | Washington | Mackville | 37.7046 | -85.0485 | 64 | 64 | 60 | 60 | 56.5 | 56.5 | 56.5 | 56.5 | | | | |
| 220050004 | Louisiana | Ascension | Dutchtown | 30.22965 | -90.9656 | 70 | 71 | 64 | 64 | 65.4 | 66.4 | 65.4 | 66.4 | 64.8 | 65.8 | 64.8 | 65.8 |
| 220150008 | Louisiana | Bossier | Shreveport / Airport | 32.53627 | -93.7489 | 65.3 | 66 | 58 | 58 | 58.9 | 59.5 | 58.9 | 59.5 | 56.8 | 57.4 | 56.8 | 57.4 |
| 220170001 | Louisiana | Caddo | Dixie | 32.68336 | -93.8616 | 63.3 | 64 | 59 | 60 | 57.3 | 57.9 | 57.3 | 57.9 | 54.9 | 55.5 | 54.9 | 55.5 |
| 220190002 | Louisiana | Calcasieu | Carlyss | 30.14027 | -93.3684 | 66.3 | 68 | 61 | 61 | 62.3 | 63.9 | 62.3 | 63.9 | | | | |
| 220190009 | Louisiana | Calcasieu | Vinton | 30.2278 | -93.58 | 64 | 64 | 63 | 63 | 59.5 | 59.5 | 59.5 | 59.5 | | | | |
| 220330003 | Louisiana | East Baton Rouge | LSU | 30.41981 | -91.182 | 71 | 72 | 64 | 63 | 65.6 | 66.5 | 65.6 | 66.5 | 64.9 | 65.9 | 64.9 | 65.9 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 220330009 | Louisiana | East Baton Rouge | Capitol | 30.46198 | -91.1792 | 67.3 | 69 | 65 | 65 | 62 | 63.6 | 62 | 63.6 | 61.2 | 62.7 | 61.2 | 62.7 |
| 220470009 | Louisiana | Iberville | Bayou Plaquemine | 30.22126 | -91.3154 | 66 | 66 | 65 | 67 | 61.8 | 61.8 | 61.8 | 61.8 | 61.1 | 61.1 | 61.1 | 61.1 |
| 220511001 | Louisiana | Jefferson | Kenner | 30.04124 | -90.2728 | 66.7 | 68 | 63 | 62 | 61.7 | 62.9 | 62.1 | 63.3 | 62.5 | 63.7 | 62.6 | 63.8 |
| 220550007 | Louisiana | Lafayette | Lafayette / USGS | 30.22611 | -92.0429 | 65 | 66 | 60 | 61 | 59.9 | 60.8 | 59.9 | 60.8 | | | | |
| 220570004 | Louisiana | Lafourche | Thibodaux | 29.7641 | -90.7653 | 63.7 | 65 | 61 | 59 | 58.9 | 60.1 | 58.9 | 60.1 | 58.4 | 59.6 | 58.4 | 59.6 |
| 220630002 | Louisiana | Livingston | French Settlement | 30.31541 | -90.8114 | 68 | 70 | 61 | 62 | 63.3 | 65.2 | 63.3 | 65.2 | 62.4 | 64.2 | 62.4 | 64.2 |
| 220730004 | Louisiana | Ouachita | Monroe / Airport | 32.50996 | -92.0462 | 59 | 59 | 58 | 58 | 54.5 | 54.5 | 54.5 | 54.5 | | | | |
| 220770001 | Louisiana | Pointe Coupee | New Roads | 30.68172 | -91.3662 | 67 | 68 | 66 | 64 | 61.8 | 62.8 | 61.8 | 62.8 | 62 | 62.9 | 62 | 62.9 |
| 220870004 | Louisiana | St. Bernard | Meraux | 29.93961 | -89.9239 | 65.3 | 66 | 59 | 58 | 60 | 60.6 | 60.3 | 61 | 60.3 | 60.9 | 60.6 | 61.2 |
| 220930002 | Louisiana | St. James | Convent | 29.99497 | -90.8174 | 63.3 | 65 | 59 | 59 | 59.2 | 60.7 | 59.2 | 60.7 | 58.6 | 60.2 | 58.6 | 60.2 |
| 220950002 | Louisiana | St. John the Baptist | Garyville | 30.05752 | -90.6193 | 65 | 66 | 60 | 60 | 60.7 | 61.6 | 60.7 | 61.6 | 60.4 | 61.3 | 60.4 | 61.3 |
| 220990001 | Louisiana | St. Martin | St. Martinville | 30.08887 | -91.8696 | 65 | 65 | 61 | 62 | 60 | 60 | 60 | 60 | | | | |
| 221030002 | Louisiana | St. Tammany | Madisonville | 30.42938 | -90.1997 | 66 | 68 | 59 | 60 | 59.4 | 61.2 | 59.7 | 61.5 | 59.9 | 61.7 | | |
| 221210001 | Louisiana | West Baton Rouge | Port Allen | 30.50064 | -91.2136 | 67 | 68 | 65 | 66 | 61.7 | 62.6 | 61.7 | 62.6 | 60.9 | 61.8 | 60.9 | 61.8 |
| 260050003 | Michigan | Allegan | Holland | 42.76779 | -86.1486 | 73.7 | 75 | 75 | 75 | 68.6 | 69.8 | 68.1 | 69.3 | 69.6 | 70.8 | 67.9 | 69.1 |
| 260190003 | Michigan | Benzie | | 44.61694 | -86.1094 | 68.3 | 69 | 64 | 68 | 63.1 | 63.7 | 62.9 | 63.5 | 62.9 | 63.5 | | |
| 260210014 | Michigan | Berrien | Coloma | 42.19779 | -86.3097 | 73.3 | 74 | 71 | 73 | 69 | 69.7 | 67.6 | 68.3 | 68.6 | 69.3 | 66.9 | 67.6 |
| 260270003 | Michigan | Cass | Cassopolis | 41.89557 | -86.0016 | 72 | 74 | 68 | 70 | 65.3 | 67.1 | 65.3 | 67.1 | 64.6 | 66.4 | 64.6 | 66.4 |
| 260330901 | Michigan | Chippewa | NORTH OF EASTERDAY AVENUE | 46.49363 | -84.3642 | 58 | 59 | NA | NA | | | | | | | | |
| 260370001 | Michigan | Clinton | ROSE LAKE: STOLL RD.(8562 E.) | 42.79834 | -84.3938 | 67 | 67 | NA | NA | 60.7 | 60.7 | 60.7 | 60.7 | 59.5 | 59.5 | 59.5 | 59.5 |
| 260490021 | Michigan | Genesee | | 43.04722 | -83.6702 | 67.7 | 68 | 64 | 67 | 61.3 | 61.5 | 61.3 | 61.5 | | | | |
| 260492001 | Michigan | Genesee | Otisville | 43.16834 | -83.4615 | 68 | 69 | 65 | 67 | | | | | | | | |
| 260630007 | Michigan | Huron | RURAL THUMB AREA OZONE SITE | 43.83639 | -82.6429 | 67.7 | 68 | 68 | 70 | | | | | 63.3 | 63.6 | | |
| 260650012 | Michigan | Ingham | | 42.73862 | -84.5346 | 67 | 67 | NA | NA | 60.7 | 60.7 | 60.7 | 60.7 | 59.5 | 59.5 | 59.5 | 59.5 |
| 260770008 | Michigan | Kalamazoo | KALAMAZOO FAIRGROUNDS | 42.27807 | -85.5419 | 69.7 | 71 | 65 | 68 | 63.3 | 64.5 | 63.3 | 64.5 | 61.6 | 62.8 | 61.6 | 62.8 |
| 260810020 | Michigan | Kent | GR-Monroe | 42.98417 | -85.6713 | 69 | 70 | 70 | 72 | 63.3 | 64.3 | 63.3 | 64.3 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 260810022 | Michigan | Kent | APPROXIMATELY 1/4 MILE SOUTH OF 14 MILE RD | 43.17667 | -85.4166 | 67.3 | 68 | 65 | 67 | 61.3 | 61.9 | 61.3 | 61.9 | | | | |
| 260910007 | Michigan | Lenawee | 6792 RAISIN CENTER HWY: LENAWEE CO.RD.COMM.OWNER: TECUMSEH | 41.99557 | -83.9466 | 67 | 68 | 64 | 66 | | | | | | | | |
| 260990009 | Michigan | Macomb | New Haven | 42.73139 | -82.7935 | 71.7 | 72 | 68 | 69 | 65 | 65.3 | 64.9 | 65.1 | 64 | 64.3 | 63.5 | 63.8 |
| 260991003 | Michigan | Macomb | | 42.51334 | -83.006 | 67.3 | 69 | 66 | 68 | 60.9 | 62.4 | 60.9 | 62.4 | 59.7 | 61.3 | 59.7 | 61.3 |
| 261010922 | Michigan | Manistee | | 44.307 | -86.2426 | 67 | 68 | NA | NA | 61.5 | 62.4 | 61.4 | 62.3 | 61.6 | 62.5 | 61.3 | 62.2 |
| 261050007 | Michigan | Mason | LOCATED 550 FT NORTH OF US10 | 43.95333 | -86.2944 | 68.7 | 70 | 64 | 67 | 63.4 | 64.6 | 63.4 | 64.6 | 62.6 | 63.8 | 62.6 | 63.8 |
| 261130001 | Michigan | Missaukee | LOCATED ABOUT 1/4 MILE WEST OF SITE | 44.31056 | -84.8919 | 66.7 | 67 | 63 | 65 | | | | | | | | |
| 261210039 | Michigan | Muskegon | | 43.27806 | -86.3111 | 75 | 76 | 74 | 79 | 70 | 70.9 | 69.3 | 70.2 | 69 | 70 | 68.7 | 69.6 |
| 261250001 | Michigan | Oakland | Oak Park | 42.46306 | -83.1832 | 70.7 | 73 | 69 | 69 | 65 | 67.1 | 65 | 67.1 | 63.3 | 65.3 | 63.3 | 65.3 |
| 261390005 | Michigan | Ottawa | Jenison | 42.89445 | -85.8527 | 69.3 | 70 | 69 | 71 | 63.8 | 64.5 | 63.8 | 64.5 | 63.2 | 63.8 | 63.2 | 63.8 |
| 261470005 | Michigan | St. Clair | Port Huron | 42.95334 | -82.4562 | 72 | 73 | 70 | 69 | 66.7 | 67.6 | 66.3 | 67.2 | 66.8 | 67.7 | 65.7 | 66.6 |
| 261530001 | Michigan | Schoolcraft | Seney | 46.28888 | -85.9502 | 67 | 70 | 64 | 66 | | | | | | | | |
| 261579991 | Michigan | Tuscola | Unionville | 43.6138 | -83.3591 | 65.7 | 66 | 64 | 66 | | | | | | | | |
| 261610008 | Michigan | Washtenaw | TOWNER ST: SOUTH; 2 LANE RESIDENIAL - HOSPITAL | 42.24057 | -83.5996 | 67.7 | 69 | 66 | 68 | 62.8 | 64 | 62.8 | 64 | 61.4 | 62.6 | 61.4 | 62.6 |
| 261619991 | Michigan | Washtenaw | Ann Arbor | 42.41664 | -83.9022 | 69.3 | 71 | 62 | 65 | 63.7 | 65.3 | 63.7 | 65.3 | 62.1 | 63.6 | 62.1 | 63.6 |
| 261630001 | Michigan | Wayne | Allen Park | 42.22862 | -83.2082 | 66.3 | 68 | 67 | 70 | 60.6 | 62.2 | 60.6 | 62.2 | 60.3 | 61.8 | 60.3 | 61.8 |
| 261630019 | Michigan | Wayne | East 7 Mile | 42.43084 | -83.0001 | 73 | 74 | 70 | 71 | 66.1 | 67 | 66.1 | 67 | 65.1 | 66 | 65.1 | 66 |
| 261659991 | Michigan | Wexford | Hoxeyville | 44.18089 | -85.739 | 66.7 | 67 | 64 | 68 | | | | | | | | |
| 270031001 | Minnesota | Anoka | Cedar Creek | 45.40184 | -93.2031 | 60 | 61 | NA | 59 | | | | | | | | |
| 270031002 | Minnesota | Anoka | Anoka County Airport | 45.13768 | -93.2076 | 62.7 | 63 | 64 | 63 | 59.7 | 60 | 59.7 | 60 | 59.9 | 60.2 | 59.9 | 60.2 |
| 270052013 | Minnesota | Becker | FWS Wetland Management District | 46.85181 | -95.8463 | 58.7 | 59 | NA | 60 | | | | | | | | |
| 270177417 | Minnesota | Carlton | Fond du Lac Band | 46.71369 | -92.5117 | 59 | 59 | NA | 55 | | | | | | | | |
| 270353204 | Minnesota | Crow Wing | Brainerd Lakes Regional Airport | 46.39674 | -94.1303 | 59 | 59 | NA | 57 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 270495302 | Minnesota | Goodhue | Stanton Air Field | 44.47375 | -93.0126 | 60.7 | 61 | NA | 60 | | | | | | | | |
| 270530962 | Minnesota | Hennepin | Near Road I-35/I-94 | 44.96524 | -93.2548 | 55.7 | 56 | 53 | 53 | 53.3 | 53.6 | 53.3 | 53.6 | 52.3 | 52.6 | 52.3 | 52.6 |
| 270750005 | Minnesota | Lake | Boundary Waters | 47.94862 | -91.4956 | 55.7 | 56 | NA | 55 | | | | | | | | |
| 270834210 | Minnesota | Lyon | Southwest Minnesota Regional Airport | 44.4438 | -95.8179 | 59.3 | 60 | 62 | 62 | | | | | | | | |
| 270953051 | Minnesota | Mille Lacs | Mille Lacs Band | 46.2053 | -93.7595 | 60 | 60 | 59 | 57 | | | | | 53.4 | 53.4 | | |
| 271095008 | Minnesota | Olmsted | Ben Franklin School | 43.99691 | -92.4504 | 60.7 | 61 | 62 | 63 | | | | | | | | |
| 271370034 | Minnesota | Saint Louis | Voyageurs NP - Sullivan Bay | 48.41252 | -92.8292 | 54.7 | 55 | 56 | 55 | | | | | | | | |
| 271377550 | Minnesota | Saint Louis | U of M - Duluth | 46.81826 | -92.0894 | 53 | 53 | NA | NA | | | | | | | | |
| 271390505 | Minnesota | Scott | B.F. Pearson School | 44.79144 | -93.5125 | 61.3 | 63 | 61 | 60 | | | | | 57.5 | 59.1 | 57.5 | 59.1 |
| 271453052 | Minnesota | Stearns | Talahi School | 45.54984 | -94.1335 | 60 | 61 | 62 | 60 | | | | | | | | |
| 271636016 | Minnesota | Washington | St. Croix Watershed Research Station | 45.168 | -92.7651 | 60 | 61 | NA | 62 | | | | | | | | |
| 271713201 | Minnesota | Wright | St. Michael Elementary School | 45.20916 | -93.6692 | 61.3 | 63 | 63 | 63 | | | | | | | | |
| 280110001 | Mississippi | Bolivar | Cleveland | 33.74606 | -90.723 | 62 | 62 | NA | NA | | | | | | | | |
| 280330002 | Mississippi | DeSoto | Hernando | 34.82166 | -89.9878 | 63.7 | 65 | 64 | 67 | 57.5 | 58.7 | 57.5 | 58.7 | 56.8 | 58 | 56.8 | 58 |
| 280450003 | Mississippi | Hancock | Waveland | 30.30083 | -89.3959 | 61.7 | 63 | 58 | 58 | 54.8 | 56 | 54.4 | 55.6 | 54.8 | 55.9 | 54 | 55.1 |
| 280470008 | Mississippi | Harrison | Gulfport Youth Court | 30.39037 | -89.0498 | 65.3 | 67 | 58 | 60 | 58.1 | 59.6 | 58.4 | 59.9 | 56.5 | 58 | 56.3 | 57.8 |
| 280490020 | Mississippi | Hinds | Jackson NCORE | 32.32911 | -90.1827 | 60.3 | 61 | 55 | 56 | 51.2 | 51.8 | 51.2 | 51.8 | | | | |
| 280490021 | Mississippi | Hinds | Hinds CC | 32.34672 | -90.2257 | 62 | 63 | 57 | 55 | 52.7 | 53.5 | 52.7 | 53.5 | | | | |
| 280590006 | Mississippi | Jackson | Pascagoula | 30.37829 | -88.5339 | 64.7 | 67 | 59 | 61 | 57.9 | 60 | 57.1 | 59.1 | 57.9 | 60 | 56.9 | 58.9 |
| 280750003 | Mississippi | Lauderdale | Meridian | 32.36457 | -88.7315 | 57 | 58 | 54 | 54 | | | | | | | | |
| 280810005 | Mississippi | Lee | TUPELO AIRPORT NEAR OLD NWS OFFICE | 34.26492 | -88.7662 | 58.3 | 59 | 57 | 59 | | | | | | | | |
| 281619991 | Mississippi | Yalobusha | Coffeeville | 34.00275 | -89.7992 | 55.7 | 57 | 55 | 57 | | | | | | | | |
| 290030001 | Missouri | Andrew | Savannah | 39.9544 | -94.849 | 62.7 | 63 | 60 | 61 | | | | | | | | |
| 290190011 | Missouri | Boone | Finger Lakes | 39.07807 | -92.3163 | 63.3 | 64 | 57 | 57 | | | | | | | | |
| 290270002 | Missouri | Callaway | New Bloomfield | 38.70608 | -92.0931 | 62.7 | 64 | 59 | 59 | | | | | | | | |
| 290370003 | Missouri | Cass | Richard Gebaur-South | 38.75961 | -94.5798 | 63 | 63 | 61 | 61 | | | | | | | | |
| 290390001 | Missouri | Cedar | El Dorado Springs | 37.69 | -94.035 | 60.7 | 61 | 57 | 60 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 290470003 | Missouri | Clay | Watkins Mill State Park | 39.40745 | -94.2654 | 66.7 | 69 | 64 | 65 | 61 | 63.1 | 61 | 63.1 | 61 | 63.1 | 61 | 63.1 |
| 290470005 | Missouri | Clay | Liberty | 39.30317 | -94.377 | 66 | 69 | 64 | 66 | 62 | 64.8 | 62 | 64.8 | 61.2 | 64 | 61.2 | 64 |
| 290470006 | Missouri | Clay | Rocky Creek | 39.33191 | -94.5809 | 68.7 | 70 | 66 | 68 | 64.2 | 65.4 | 64.2 | 65.4 | 63.3 | 64.5 | 63.3 | 64.5 |
| 290490001 | Missouri | Clinton | Trimble | 39.53063 | -94.5559 | 67.3 | 68 | 62 | 63 | 61.8 | 62.5 | 61.8 | 62.5 | 60.8 | 61.4 | 60.8 | 61.4 |
| 290770036 | Missouri | Greene | Hillcrest High School | 37.25614 | -93.2999 | 60 | 61 | 59 | 61 | | | | | | | | |
| 290770042 | Missouri | Greene | Fellows Lake | 37.31919 | -93.2044 | 60.3 | 61 | 57 | 59 | | | | | | | | |
| 290970004 | Missouri | Jasper | Alba | 37.2385 | -94.4247 | 60.7 | 61 | 60 | 63 | 54.5 | 54.8 | 54.5 | 54.8 | | | | |
| 290990019 | Missouri | Jefferson | Arnold West | 38.44857 | -90.3987 | 69 | 70 | 68 | 68 | 62.3 | 63.3 | 62.3 | 63.3 | 61.5 | 62.4 | 61.5 | 62.4 |
| 291130003 | Missouri | Lincoln | Foley | 39.04512 | -90.8663 | 65 | 65 | NA | NA | 58.7 | 58.7 | 58.7 | 58.7 | 57.5 | 57.5 | 57.5 | 57.5 |
| 291370001 | Missouri | Monroe | MTSP | 39.47498 | -91.789 | 59.3 | 60 | 55 | 54 | | | | | | | | |
| 291570001 | Missouri | Perry | | 37.70264 | -89.6986 | 67 | 67 | 62 | 64 | 60.1 | 60.1 | 60.1 | 60.1 | | | | |
| 291831002 | Missouri | Saint Charles | West Alton | 38.87255 | -90.2265 | 72.7 | 74 | NA | 69 | 67 | 68.1 | 67 | 68.1 | 66.2 | 67.4 | 66.2 | 67.4 |
| 291831004 | Missouri | Saint Charles | Orchard Farm | 38.8994 | -90.4492 | 71 | 72 | 66 | 65 | 64.8 | 65.8 | 64.8 | 65.8 | 63.6 | 64.5 | 63.6 | 64.5 |
| 291860005 | Missouri | Sainte Genevieve | Bonne Terre | 37.90084 | -90.4239 | 65.3 | 66 | 62 | 63 | 59.9 | 60.6 | 59.9 | 60.6 | 60.4 | 61.1 | 60.4 | 61.1 |
| 291890005 | Missouri | Saint Louis | Pacific | 38.49015 | -90.7051 | 65 | 66 | 64 | 63 | 58.6 | 59.5 | 58.6 | 59.5 | 57.7 | 58.6 | 57.7 | 58.6 |
| 291890014 | Missouri | Saint Louis | Maryland Heights | 38.71085 | -90.4761 | 70 | 71 | 69 | 68 | 63.9 | 64.8 | 63.9 | 64.8 | 62.9 | 63.8 | 62.9 | 63.8 |
| 292130004 | Missouri | Taney | Branson | 36.70773 | -93.222 | 57 | 57 | NA | NA | 51.2 | 51.2 | 51.2 | 51.2 | | | | |
| 295100085 | Missouri | St. Louis City | Blair Street | 38.65643 | -90.1983 | 67.3 | 71 | 65 | 67 | 62.5 | 66 | 62.5 | 66 | 60.6 | 64 | 60.6 | 64 |
| 300710010 | Montana | Phillips | Malta | 48.31751 | -107.862 | 55.3 | 56 | 57 | 55 | | | | | | | | |
| 300750001 | Montana | Powder River | BROADUS | 45.4403 | -105.37 | 58.5 | 60 | NA | 62 | | | | | | | | |
| 300830001 | Montana | Richland | Sidney Oil Field | 47.80339 | -104.486 | 55 | 55 | NA | NA | | | | | | | | |
| 300870001 | Montana | Rosebud | Birney - Tongue river | 45.36615 | -106.49 | 57 | 58 | NA | NA | | | | | | | | |
| 310550019 | Nebraska | Douglas | 4102 Woolworth Ave. on Healthcenter Warehouse | 41.24749 | -95.9731 | 62.7 | 64 | 61 | 61 | | | | | | | | |
| 310550028 | Nebraska | Douglas | | 41.20796 | -95.9459 | 60 | 62 | NA | NA | | | | | | | | |
| 310550053 | Nebraska | Douglas | Whitmore | 41.32251 | -95.9386 | 63.5 | 64 | 60 | 58 | | | | | | | | |
| 311079991 | Nebraska | Knox | Santee Sioux | 42.82915 | -97.8541 | 64 | 65 | 65 | 67 | | | | | | | | |
| 311090016 | Nebraska | Lancaster | | 40.98472 | -96.6775 | 60 | 60 | 56 | 56 | | | | | | | | |
| 350010023 | New Mexico | Bernalillo | DEL NORTE HIGH SCHOOL | 35.1343 | -106.585 | 67.3 | 70 | 68 | 69 | 63.8 | 66.4 | 63.8 | 66.4 | 62.9 | 65.4 | 62.9 | 65.4 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 350010029 | New Mexico | Bernalillo | SOUTH VALLEY | 35.01708 | -106.657 | 65.3 | 66 | 66 | 67 | 61.7 | 62.3 | 61.7 | 62.3 | 60.9 | 61.6 | 60.9 | 61.6 |
| 350011012 | New Mexico | Bernalillo | Foothills | 35.1852 | -106.508 | 66.7 | 69 | 72 | 73 | 64 | 66.2 | 64 | 66.2 | 63.2 | 65.4 | 63.2 | 65.4 |
| 350130008 | New Mexico | Dona Ana | 6O La Union | 31.93066 | -106.631 | 67.3 | 68 | 72 | 76 | | | | | 64.5 | 65.2 | 64.5 | 65.2 |
| 350130020 | New Mexico | Dona Ana | 6ZK Chaparral | 32.04121 | -106.41 | 68.3 | 71 | 70 | 71 | 65.9 | 68.6 | 65.9 | 68.6 | 65.3 | 67.8 | 65.3 | 67.8 |
| 350130021 | New Mexico | Dona Ana | 6ZM Desert View | 31.79622 | -106.584 | 72.7 | 74 | 80 | 81 | | | | | 70 | 71.2 | 70 | 71.2 |
| 350130022 | New Mexico | Dona Ana | 6ZN Santa Teresa | 31.78789 | -106.683 | 71.3 | 74 | 75 | 75 | | | | | | | | |
| 350130023 | New Mexico | Dona Ana | 6ZQ Solano | 32.31759 | -106.768 | 66 | 67 | 70 | 66 | | | | | | | | |
| 350151005 | New Mexico | Eddy | 5ZR ON BLM LAND BORDERING RESIDENTIAL AREA OUTSIDE CARLSBAD CITY LIM | 32.38012 | -104.263 | 69.7 | 74 | 77 | 77 | | | | | | | | |
| 350153001 | New Mexico | Eddy | Carlsbad Caverns NP - Maintenance Area | 32.1783 | -104.441 | 71 | 71 | NA | NA | | | | | | | | |
| 350250008 | New Mexico | Lea | 5ZS Hobbs Jefferson | 32.72666 | -103.123 | 67.7 | 70 | 66 | 66 | | | | | | | | |
| 350390026 | New Mexico | Rio Arriba | 3CRD Coyote Ranger District | 36.18774 | -106.698 | 65.3 | 67 | 64 | 64 | 61.9 | 63.5 | 61.9 | 63.5 | 61.8 | 63.4 | 61.8 | 63.4 |
| 350431001 | New Mexico | Sandoval | | 35.29948 | -106.549 | 65.7 | 68 | 68 | 70 | 62.8 | 65 | 62.8 | 65 | 62.2 | 64.3 | 62.2 | 64.3 |
| 350490021 | New Mexico | Santa Fe | | 35.61975 | -106.08 | 64 | 66 | 66 | 67 | 61 | 62.9 | 61 | 62.9 | 60.9 | 62.8 | 60.9 | 62.8 |
| 350610008 | New Mexico | Valencia | | 34.8147 | -106.74 | 65.3 | 67 | 66 | 66 | 62 | 63.6 | 62 | 63.6 | 61.4 | 63 | 61.4 | 63 |
| 370030005 | North Carolina | Alexander | Taylorsville Liledoun | 35.9138 | -81.191 | 64.3 | 65 | 58 | 58 | 56.3 | 56.9 | 56.3 | 56.9 | | | | |
| 370110002 | North Carolina | Avery | Linville Falls | 35.97235 | -81.9331 | 61.7 | 62 | 57 | 57 | 54.7 | 55 | 54.7 | 55 | | | | |
| 370119991 | North Carolina | Avery | Cranberry | 36.1058 | -82.0454 | 64 | 64 | 59 | 59 | 56.8 | 56.8 | 56.8 | 56.8 | | | | |
| 370210030 | North Carolina | Buncombe | Bent Creek | 35.5001 | -82.5999 | 62 | 63 | 58 | 58 | 54.7 | 55.6 | 54.7 | 55.6 | | | | |
| 370270003 | North Carolina | Caldwell | Lenoir (city) | 35.9359 | -81.5306 | 64 | 64 | 57 | 57 | 55.7 | 55.7 | 55.7 | 55.7 | | | | |
| 370330001 | North Carolina | Caswell | Cherry Grove | 36.30703 | -79.4674 | 62 | 63 | 56 | 57 | 53.8 | 54.7 | 53.8 | 54.7 | | | | |
| 370510008 | North Carolina | Cumberland | Wade | 35.15869 | -78.728 | 62 | 63 | 59 | NA | 55.1 | 56 | 55.1 | 56 | | | | |
| 370510010 | North Carolina | Cumberland | Honeycutt School | 35.0023 | -78.9917 | 63.3 | 64 | 60 | 63 | 56.2 | 56.8 | 56.2 | 56.8 | | | | |
| 370630015 | North Carolina | Durham | Durham Armory | 36.03296 | -78.904 | 61.7 | 62 | 58 | 58 | 53 | 53.3 | 53 | 53.3 | 52.4 | 52.7 | 52.4 | 52.7 |
| 370650099 | North Carolina | Edgecombe | Leggett | 35.98828 | -77.5843 | 62 | 62 | 59 | 59 | 54 | 54 | 54 | 54 | | | | |
| 370670022 | North Carolina | Forsyth | Hattie Avenue | 36.11069 | -80.2264 | 66.7 | 67 | 64 | 63 | 58 | 58.3 | 58 | 58.3 | 57.1 | 57.4 | 57.1 | 57.4 |
| 370670030 | North Carolina | Forsyth | Clemmons Middle | 36.026 | -80.342 | 67.3 | 68 | 59 | 59 | 58.4 | 59 | 58.4 | 59 | 57.5 | 58.1 | 57.5 | 58.1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 370671008 | North Carolina | Forsyth | Union Cross | 36.05097 | -80.1437 | 66.3 | 67 | 60 | 59 | 57.6 | 58.2 | 57.6 | 58.2 | 56.5 | 57.1 | 56.5 | 57.1 |
| 370750001 | North Carolina | Graham | Joanna Bald | 35.25793 | -83.7956 | 63.5 | 64 | 62 | 62 | 56.1 | 56.5 | 56.1 | 56.5 | | | | |
| 370770001 | North Carolina | Granville | Butner | 36.14111 | -78.7681 | 64.3 | 65 | 57 | 57 | 56.1 | 56.7 | 56.1 | 56.7 | | | | |
| 370810013 | North Carolina | Guilford | Mendenhall School | 36.10901 | -79.8023 | 65.3 | 66 | 62 | 62 | 56.4 | 57 | 56.4 | 57 | 55.7 | 56.3 | 55.7 | 56.3 |
| 370870008 | North Carolina | Haywood | Waynesville School | 35.50716 | -82.9634 | 61.3 | 62 | 58 | 59 | 54.5 | 55.1 | 54.5 | 55.1 | | | | |
| 370870035 | North Carolina | Haywood | Frying Pan Mountain | 35.37917 | -82.7925 | 64.3 | 66 | 61 | 61 | 57 | 58.5 | 57 | 58.5 | | | | |
| 370870036 | North Carolina | Haywood | Purchase Knob | 35.58714 | -83.0742 | 64.3 | 65 | 61 | 62 | 57.2 | 57.9 | 57.2 | 57.9 | | | | |
| 371010002 | North Carolina | Johnston | West Johnston Co. | 35.59095 | -78.4622 | 63.7 | 65 | 60 | 60 | 55.5 | 56.7 | 55.5 | 56.7 | 53.6 | 54.7 | 53.6 | 54.7 |
| 371050002 | North Carolina | Lee | Blackstone | 35.4325 | -79.2887 | 61.5 | 62 | NA | NA | 53.7 | 54.2 | 53.7 | 54.2 | | | | |
| 371070004 | North Carolina | Lenoir | Lenoir Co. Comm. Coll. | 35.23146 | -77.5688 | 62.7 | 63 | 60 | 61 | | | | | | | | |
| 371090004 | North Carolina | Lincoln | Crouse | 35.43856 | -81.2768 | 66.3 | 67 | 61 | 61 | 58 | 58.6 | 58 | 58.6 | 57.7 | 58.3 | 57.7 | 58.3 |
| 371139991 | North Carolina | Macon | Coweeta | 35.0608 | -83.4306 | 61.3 | 62 | 55 | 55 | 53.6 | 54.2 | 53.6 | 54.2 | | | | |
| 371170001 | North Carolina | Martin | Jamesville School | 35.81066 | -76.9062 | 60 | 60 | 56 | 54 | | | | | | | | |
| 371190041 | North Carolina | Mecklenburg | Garinger High School | 35.2401 | -80.7857 | 68.7 | 69 | 66 | 64 | 61.3 | 61.5 | 61.3 | 61.5 | 60.5 | 60.8 | 60.5 | 60.8 |
| 371190046 | North Carolina | Mecklenburg | University Meadows | 35.31416 | -80.7135 | 70 | 70 | 66 | 64 | 61.3 | 61.3 | 61.3 | 61.3 | 61.1 | 61.1 | 61.1 | 61.1 |
| 371239991 | North Carolina | Montgomery | Candor | 35.2632 | -79.8365 | 61 | 61 | 57 | 58 | 53.3 | 53.3 | 53.3 | 53.3 | | | | |
| 371290002 | North Carolina | New Hanover | Castle Hayne | 34.36417 | -77.8386 | 59 | 60 | 58 | 58 | | | | | 50.2 | 51.1 | | |
| 371450003 | North Carolina | Person | Bushy Fork | 36.30697 | -79.092 | 62 | 63 | 59 | 57 | 54.9 | 55.8 | 54.9 | 55.8 | | | | |
| 371470006 | North Carolina | Pitt | Pitt Agri. Center | 35.64128 | -77.3601 | 62.7 | 64 | 59 | 59 | | | | | | | | |
| 371570099 | North Carolina | Rockingham | Bethany sch. | 36.30889 | -79.8592 | 65.3 | 66 | 60 | 60 | 57.3 | 58 | 57.3 | 58 | 56.7 | 57.4 | 56.7 | 57.4 |
| 371590021 | North Carolina | Rowan | Rockwell | 35.55187 | -80.395 | 63.7 | 65 | 62 | 61 | 55.2 | 56.4 | 55.2 | 56.4 | 55.1 | 56.2 | 55.1 | 56.2 |
| 371730002 | North Carolina | Swain | Bryson City | 35.43477 | -83.4421 | 60 | 60 | 56 | 57 | 53.2 | 53.2 | 53.2 | 53.2 | | | | |
| 371730007 | North Carolina | Swain | | 35.49871 | -83.3102 | 59 | 61 | 58 | NA | 52.2 | 54 | 52.2 | 54 | | | | |
| 371790003 | North Carolina | Union | Monroe School | 34.97404 | -80.5406 | 67.7 | 68 | 62 | 61 | 60.7 | 61 | 60.7 | 61 | 60 | 60.2 | 60 | 60.2 |
| 371830014 | North Carolina | Wake | Millbrook School | 35.85611 | -78.5742 | 65.7 | 66 | 60 | 60 | 57.2 | 57.4 | 57.2 | 57.4 | 55.7 | 55.9 | 55.7 | 55.9 |
| 371990004 | North Carolina | Yancey | Mt. Mitchell | 35.76541 | -82.2649 | 65 | 65 | 62 | 62 | 57.5 | 57.5 | 57.5 | 57.5 | | | | |
| 380070002 | North Dakota | Billings | PAINTED CANYON | 46.8943 | -103.379 | 59 | 60 | 60 | 58 | | | | | | | | |
| 380130004 | North Dakota | Burke | LOSTWOOD NWR | 48.64193 | -102.402 | 58.3 | 59 | 56 | 56 | | | | | | | | |
| 380171004 | North Dakota | Cass | FARGO NW | 46.93375 | -96.8554 | 58 | 59 | 60 | 58 | | | | | | | | |
| 380250003 | North Dakota | Dunn | DUNN CENTER | 47.3132 | -102.527 | 58 | 58 | NA | NA | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 380530002 | North Dakota | McKenzie | TRNP-NU | 47.5812 | -103.3 | 57.7 | 58 | 58 | 56 | | | | | | | | |
| 380570004 | North Dakota | Mercer | BEULAH NORTH | 47.29861 | -101.767 | 57 | 58 | 58 | 57 | | | | | | | | |
| 380650002 | North Dakota | Oliver | HANNOVER | 47.18583 | -101.428 | 59.3 | 60 | 60 | 58 | | | | | | | | |
| 381050003 | North Dakota | Williams | Williston | 48.15278 | -103.64 | 57 | 58 | NA | NA | | | | | | | | |
| 390030009 | Ohio | Allen | Lima | 40.77094 | -84.0539 | 67.7 | 70 | 64 | 65 | 61 | 63.1 | 61 | 63.1 | 59.3 | 61.3 | 59.3 | 61.3 |
| 390071001 | Ohio | Ashtabula | Conneaut | 41.9597 | -80.5728 | 70 | 70 | 65 | 67 | 63.5 | 63.5 | 62.5 | 62.5 | 63 | 63 | 61 | 61 |
| 390170004 | Ohio | Butler | HAMILTON | 39.38338 | -84.5444 | 72 | 72 | NA | NA | 64 | 64 | 64 | 64 | 61.9 | 61.9 | 61.9 | 61.9 |
| 390170018 | Ohio | Butler | Middletown Airport | 39.52944 | -84.3935 | 71.3 | 73 | 67 | 67 | 63.3 | 64.8 | 63.3 | 64.8 | 61.2 | 62.7 | 61.2 | 62.7 |
| 390179991 | Ohio | Butler | Oxford | 39.5327 | -84.7286 | 69.3 | 70 | 64 | 64 | 61.4 | 62 | 61.4 | 62 | 59.9 | 60.5 | 59.9 | 60.5 |
| 390230001 | Ohio | Clark | Springfield Well Fd | 40.00103 | -83.8046 | 69.3 | 70 | 63 | 64 | 61.8 | 62.4 | 61.8 | 62.4 | 59.6 | 60.2 | 59.6 | 60.2 |
| 390230003 | Ohio | Clark | Mud Run | 39.85567 | -83.9977 | 68.3 | 69 | 65 | 65 | 61.3 | 61.9 | 61.3 | 61.9 | 59 | 59.6 | 59 | 59.6 |
| 390250022 | Ohio | Clermont | Batavia | 39.0828 | -84.1441 | 70 | 70 | 66 | 64 | 60.6 | 60.6 | 60.6 | 60.6 | 58.5 | 58.5 | 58.5 | 58.5 |
| 390271002 | Ohio | Clinton | Wilmington | 39.43004 | -83.7885 | 69.7 | 70 | 63 | 63 | 60.5 | 60.8 | 60.5 | 60.8 | 59.3 | 59.5 | 59.3 | 59.5 |
| 390350034 | Ohio | Cuyahoga | District 6 | 41.55523 | -81.5753 | 69 | 70 | 70 | 72 | 62.1 | 63 | 62.4 | 63.3 | 66.8 | 67.7 | 62.2 | 63.1 |
| 390350060 | Ohio | Cuyahoga | GT Craig NCore | 41.49212 | -81.6784 | 62.7 | 64 | 63 | 62 | 55.9 | 57 | 55.5 | 56.7 | 62.2 | 63.4 | 55 | 56.1 |
| 390350064 | Ohio | Cuyahoga | Berea BOE | 41.36186 | -81.8646 | 65.3 | 66 | 66 | 66 | 59.5 | 60.2 | 59.3 | 60 | 64.5 | 65.2 | 57.3 | 57.9 |
| 390355002 | Ohio | Cuyahoga | Mayfield | 41.53707 | -81.4588 | 69.3 | 71 | 68 | 67 | 62.3 | 63.8 | 61.4 | 62.9 | 63.2 | 64.7 | 60.5 | 62 |
| 390410002 | Ohio | Delaware | Delaware | 40.35669 | -83.064 | 65.3 | 67 | 62 | 61 | 57.4 | 58.9 | 57.4 | 58.9 | 55.7 | 57.2 | 55.7 | 57.2 |
| 390479991 | Ohio | Fayette | Deer Creek | 39.6359 | -83.2605 | 66.7 | 68 | 61 | 58 | 59.4 | 60.6 | 59.4 | 60.6 | 57.3 | 58.5 | 57.3 | 58.5 |
| 390490029 | Ohio | Franklin | New Albany | 40.08451 | -82.8156 | 70.3 | 71 | 66 | 66 | 63.3 | 64 | 63.3 | 64 | 60.3 | 60.9 | 60.3 | 60.9 |
| 390490037 | Ohio | Franklin | FRANKLIN_PK | 39.96523 | -82.9555 | 65.5 | 66 | NA | NA | 59.3 | 59.8 | 59.3 | 59.8 | 56.5 | 56.9 | 56.5 | 56.9 |
| 390490081 | Ohio | Franklin | Maple Canyon | 40.0877 | -82.9598 | 66.3 | 67 | 62 | 62 | 60 | 60.7 | 60 | 60.7 | 57 | 57.6 | 57 | 57.6 |
| 390550004 | Ohio | Geauga | Notre Dame | 41.51505 | -81.2499 | 71.3 | 72 | 66 | 65 | 62.7 | 63.4 | 62.7 | 63.4 | 61.3 | 61.9 | 61.3 | 61.9 |
| 390570006 | Ohio | Greene | Xenia | 39.66575 | -83.9427 | 67.3 | 68 | 62 | 63 | 59.4 | 60 | 59.4 | 60 | 57.5 | 58.1 | 57.5 | 58.1 |
| 390610006 | Ohio | Hamilton | Sycamore | 39.2787 | -84.3663 | 73.3 | 75 | 70 | 69 | 65.1 | 66.6 | 65.1 | 66.6 | 62.9 | 64.3 | 62.9 | 64.3 |
| 390610010 | Ohio | Hamilton | Colerain | 39.21487 | -84.6909 | 71.3 | 72 | 67 | 67 | 63.1 | 63.7 | 63.1 | 63.7 | 61 | 61.6 | 61 | 61.6 |
| 390610040 | Ohio | Hamilton | Taft NCore | 39.12886 | -84.504 | 71.3 | 72 | 69 | 68 | 63.3 | 63.9 | 63.3 | 63.9 | 61.3 | 61.9 | 61.3 | 61.9 |
| 390810017 | Ohio | Jefferson | Stuebenville | 40.36644 | -80.6156 | 63 | 65 | 60 | 62 | 56.5 | 58.3 | 56.5 | 58.3 | 55.7 | 57.4 | 55.7 | 57.4 |
| 390830002 | Ohio | Knox | CENTERBURG | 40.31003 | -82.6917 | 66.5 | 67 | NA | NA | 57.6 | 58.1 | 57.6 | 58.1 | 56.2 | 56.7 | 56.2 | 56.7 |
| 390850003 | Ohio | Lake | Eastlake | 41.67301 | -81.4225 | 73.7 | 74 | 72 | 74 | 65.8 | 66.1 | 66.1 | 66.3 | 67.4 | 67.7 | 66.8 | 67.1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 390850007 | Ohio | Lake | Painesville | 41.72681 | -81.2422 | 69 | 70 | 66 | 64 | 62.4 | 63.3 | 62.3 | 63.2 | 63.6 | 64.5 | 64.2 | 65.1 |
| 390870011 | Ohio | Lawrence | Wilgus | 38.62901 | -82.4589 | 63.7 | 64 | 56 | 57 | 57.1 | 57.4 | 57.1 | 57.4 | 56.9 | 57.2 | 56.9 | 57.2 |
| 390870012 | Ohio | Lawrence | ODOT Ironton | 38.50808 | -82.6592 | 66 | 67 | 58 | 58 | 59.3 | 60.2 | 59.3 | 60.2 | 58.2 | 59.1 | 58.2 | 59.1 |
| 390890005 | Ohio | Licking | Heath | 40.02604 | -82.433 | 65.7 | 67 | 59 | 60 | 57.3 | 58.4 | 57.3 | 58.4 | 55.5 | 56.6 | 55.5 | 56.6 |
| 390930018 | Ohio | Lorain | Sheffield | 41.42088 | -82.0957 | 65.7 | 67 | 58 | 60 | 59.3 | 60.5 | 59.1 | 60.3 | 60.3 | 61.5 | 57.6 | 58.8 |
| 390950024 | Ohio | Lucas | Erie | 41.64407 | -83.5462 | 67.5 | 69 | 64 | 67 | 61.4 | 62.8 | 62.1 | 63.5 | 59.7 | 61 | 60.1 | 61.5 |
| 390950027 | Ohio | Lucas | Waterville | 41.4942 | -83.7189 | 64.7 | 66 | 63 | 64 | 59.4 | 60.6 | 59.4 | 60.6 | 58.3 | 59.5 | 58.3 | 59.5 |
| 390970007 | Ohio | Madison | London | 39.78819 | -83.4761 | 67.3 | 68 | 61 | 61 | 59.6 | 60.2 | 59.6 | 60.2 | 58.4 | 59 | 58.4 | 59 |
| 390990013 | Ohio | Mahoning | Oakhill | 41.09619 | -80.6589 | 59.7 | 63 | 64 | NA | 52.4 | 55.3 | 52.4 | 55.3 | 51.3 | 54.2 | 51.3 | 54.2 |
| 391030004 | Ohio | Medina | Chippewa | 41.0604 | -81.9239 | 64.3 | 65 | 61 | 65 | 57.1 | 57.8 | 57.1 | 57.8 | 56.2 | 56.8 | 56.2 | 56.8 |
| 391090005 | Ohio | Miami | Miami East HS | 40.08502 | -84.1138 | 67.7 | 68 | 61 | 63 | 59.8 | 60 | 59.8 | 60 | 58.4 | 58.7 | 58.4 | 58.7 |
| 391130037 | Ohio | Montgomery | Eastwood | 39.78564 | -84.1344 | 70.3 | 71 | 67 | 68 | 62.5 | 63.1 | 62.5 | 63.1 | 60.7 | 61.3 | 60.7 | 61.3 |
| 391219991 | Ohio | Noble | Quaker City | 39.9428 | -81.3373 | 64.7 | 66 | 61 | 61 | 57.8 | 58.9 | 57.8 | 58.9 | | | | |
| 391331001 | Ohio | Portage | Lake Rockwell | 41.18247 | -81.3305 | 62 | 63 | 62 | 67 | 55.2 | 56.1 | 55.2 | 56.1 | 53.5 | 54.4 | 53.5 | 54.4 |
| 391351001 | Ohio | Preble | Preble NCore | 39.83562 | -84.7205 | 67 | 67 | 63 | 64 | 59.5 | 59.5 | 59.5 | 59.5 | 58.4 | 58.4 | 58.4 | 58.4 |
| 391510016 | Ohio | Stark | Malone Univ | 40.82812 | -81.3785 | 68.3 | 69 | 65 | 65 | 60.3 | 60.9 | 60.3 | 60.9 | 59.8 | 60.4 | 59.8 | 60.4 |
| 391510022 | Ohio | Stark | Brewster | 40.71278 | -81.5983 | 65 | 66 | 61 | 62 | 57.2 | 58.1 | 57.2 | 58.1 | | | | |
| 391514005 | Ohio | Stark | Alliance | 40.93133 | -81.1235 | 68.3 | 70 | 64 | 65 | 60.5 | 62 | 60.5 | 62 | 59.8 | 61.3 | 59.8 | 61.3 |
| 391530020 | Ohio | Summit | Patterson Park | 41.10649 | -81.5035 | 63.3 | 65 | 64 | NA | 56.1 | 57.6 | 56.1 | 57.6 | 55.2 | 56.6 | 55.2 | 56.6 |
| 391550011 | Ohio | Trumbull | TCSE | 41.24045 | -80.6627 | 68.3 | 69 | 65 | 65 | 59.9 | 60.5 | 59.9 | 60.5 | 58.8 | 59.4 | 58.8 | 59.4 |
| 391550013 | Ohio | Trumbull | Kinsman Maintenance | 41.4546 | -80.5896 | 66 | 66 | 64 | 65 | 58.5 | 58.5 | 58.5 | 58.5 | 57.1 | 57.1 | 57.1 | 57.1 |
| 391650007 | Ohio | Warren | Lebanon | 39.42689 | -84.2008 | 71.7 | 72 | 70 | 69 | 63.7 | 63.9 | 63.7 | 63.9 | 61.7 | 61.9 | 61.7 | 61.9 |
| 391670004 | Ohio | Washington | Marietta WTP | 39.43212 | -81.4604 | 64.3 | 65 | 60 | 60 | 57.4 | 58 | 57.4 | 58 | 57.1 | 57.7 | 57.1 | 57.7 |
| 391730003 | Ohio | Wood | Bowling Green | 41.37769 | -83.6111 | 64.3 | 66 | 62 | 63 | 57.9 | 59.4 | 57.9 | 59.4 | 57.2 | 58.7 | 57.2 | 58.7 |
| 400019009 | Oklahoma | Adair | STILWELL | 35.75074 | -94.6697 | 59.7 | 61 | NA | 61 | 53.1 | 54.3 | 53.1 | 54.3 | | | | |
| 400170101 | Oklahoma | Canadian | OKC WEST-(YUKON) | 35.47922 | -97.7515 | 66.3 | 69 | 65 | 67 | | | | | 58.1 | 60.5 | 58.1 | 60.5 |
| 400219002 | Oklahoma | Cherokee | TAHLEQUAH SHELTER | 35.85408 | -94.986 | 59.5 | 60 | NA | NA | 54.4 | 54.9 | 54.4 | 54.9 | | | | |
| 400270049 | Oklahoma | Cleveland | MOORE WATER TOWER | 35.32011 | -97.4841 | 66.7 | 68 | 64 | 66 | | | | | | | | |
| 400310651 | Oklahoma | Comanche | LAWTON NORTH | 34.63298 | -98.4288 | 65 | 66 | 65 | 66 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400370144 | Oklahoma | Creek | MANNFORD | 36.10548 | -96.3612 | 64 | 65 | 63 | 65 | 57.8 | 58.7 | 57.8 | 58.7 | 57.6 | 58.5 | 57.6 | 58.5 |
| 400430860 | Oklahoma | Dewey | SEILING MUNICIPAL AIRPORT | 36.15841 | -98.932 | 66 | 68 | 61 | 64 | | | | | | | | |
| 400719010 | Oklahoma | Kay | NEWKIRK IMPROVE | 36.95622 | -97.0314 | 62 | 63 | NA | NA | | | | | | | | |
| 400871073 | Oklahoma | McClain | GOLDSBY | 35.15965 | -97.4738 | 66.3 | 67 | NA | NA | | | | | | | | |
| 400979014 | Oklahoma | Mayes | CHEROKEE HEIGHTS | 36.22841 | -95.2499 | 62 | 62 | 59 | 61 | 56.2 | 56.2 | 56.2 | 56.2 | 54.8 | 54.8 | 54.8 | 54.8 |
| 401090033 | Oklahoma | Oklahoma | OKC CENTRAL-OSDH | 35.47704 | -97.4943 | 67.3 | 68 | NA | NA | 61.9 | 62.5 | 61.9 | 62.5 | 60 | 60.6 | 60 | 60.6 |
| 401090096 | Oklahoma | Oklahoma | CHOCTAW | 35.4778 | -97.303 | 66.3 | 67 | 65 | 67 | 61.3 | 61.9 | 61.3 | 61.9 | | | | |
| 401091037 | Oklahoma | Oklahoma | OKC NORTH | 35.61413 | -97.4751 | 69 | 70 | 68 | 70 | 62.7 | 63.6 | 62.7 | 63.6 | 61.6 | 62.5 | 61.6 | 62.5 |
| 401159004 | Oklahoma | Ottawa | QUAPAW SHELTER | 36.92222 | -94.8389 | 55.7 | 57 | NA | NA | 50.2 | 51.4 | 50.2 | 51.4 | | | | |
| 401210415 | Oklahoma | Pittsburg | McALESTER MUNICIPAL AIRPORT | 34.88561 | -95.7844 | 61 | 63 | 62 | 62 | | | | | | | | |
| 401359021 | Oklahoma | Sequoyah | | 35.40814 | -94.5244 | 59.3 | 60 | 57 | 58 | 53 | 53.6 | 53 | 53.6 | | | | |
| 401430174 | Oklahoma | Tulsa | TULSA SOUTH | 35.95371 | -96.005 | 65 | 65 | 62 | 64 | 60.4 | 60.4 | 60.4 | 60.4 | 59.5 | 59.5 | 59.5 | 59.5 |
| 401430178 | Oklahoma | Tulsa | TULSA EAST | 36.1338 | -95.7645 | 64 | 65 | 64 | 66 | 59.7 | 60.6 | 59.7 | 60.6 | 58.5 | 59.4 | 58.5 | 59.4 |
| 401431127 | Oklahoma | Tulsa | NORTH TULSA - FIRE STATION#24 | 36.2049 | -95.9765 | 65 | 65 | 61 | 65 | 59.7 | 59.7 | 59.7 | 59.7 | 59.5 | 59.5 | 59.5 | 59.5 |
| 450010001 | South Carolina | Abbeville | DUE WEST | 34.32532 | -82.3864 | 58 | 58 | NA | NA | 50.9 | 50.9 | 50.9 | 50.9 | | | | |
| 450030003 | South Carolina | Aiken | JACKSON MIDDLE SCHOOL | 33.34223 | -81.7887 | 60.3 | 62 | 60 | 58 | 52.9 | 54.4 | 52.9 | 54.4 | | | | |
| 450070005 | South Carolina | Anderson | Big Creek | 34.62324 | -82.5321 | 58.7 | 60 | NA | NA | 51.4 | 52.5 | 51.4 | 52.5 | 50.6 | 51.7 | 50.6 | 51.7 |
| 450150002 | South Carolina | Berkeley | BUSHY PARK PUMP STATION | 32.98725 | -79.9367 | 57.3 | 58 | NA | NA | 50.8 | 51.5 | 50.8 | 51.5 | | | | |
| 450190046 | South Carolina | Charleston | CAPE ROMAIN | 32.94102 | -79.6572 | 59 | 61 | NA | 57 | 52.6 | 54.4 | 52.5 | 54.3 | | | | |
| 450250001 | South Carolina | Chesterfield | CHESTERFIELD | 34.61537 | -80.1988 | 60 | 60 | 60 | 59 | 53.3 | 53.3 | 53.3 | 53.3 | | | | |
| 450290002 | South Carolina | Colleton | ASHTON | 33.00787 | -80.965 | 56.3 | 57 | NA | NA | | | | | | | | |
| 450310003 | South Carolina | Darlington | Pee Dee Experimental Station | 34.2857 | -79.7449 | 61 | 62 | 58 | 57 | 52.9 | 53.7 | 52.9 | 53.7 | | | | |
| 450370001 | South Carolina | Edgefield | TRENTON | 33.73996 | -81.8536 | 59.7 | 61 | 60 | 58 | 51.8 | 53 | 51.8 | 53 | | | | |
| 450450016 | South Carolina | Greenville | Hillcrest Middle School | 34.75185 | -82.2567 | 63.3 | 65 | 64 | 64 | 55.5 | 57 | 55.5 | 57 | 54.6 | 56.1 | 54.6 | 56.1 |
| 450730001 | South Carolina | Oconee | LONG CREEK | 34.80526 | -83.2377 | 63 | 63 | NA | NA | 54.8 | 54.8 | 54.8 | 54.8 | | | | |
| 450770002 | South Carolina | Pickens | CLEMSON CMS | 34.65361 | -82.8387 | 62.7 | 63 | NA | NA | 54.9 | 55.1 | 54.9 | 55.1 | 54.4 | 54.7 | 54.4 | 54.7 |
| 450770003 | South Carolina | Pickens | Wolf Creek | 34.85154 | -82.7446 | 61 | 62 | NA | NA | 53.1 | 53.9 | 53.1 | 53.9 | 52.9 | 53.8 | 52.9 | 53.8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 450790007 | South Carolina | Richland | PARKLANE | 34.09396 | -80.9623 | 60 | 61 | 60 | 58 | 52.1 | 53 | 52.1 | 53 | 50.8 | 51.7 | 50.8 | 51.7 |
| 450790021 | South Carolina | Richland | CONGAREE BLUFF | 33.81468 | -80.7811 | 55 | 55 | 55 | 55 | 48.6 | 48.6 | 48.6 | 48.6 | | | | |
| 450791001 | South Carolina | Richland | SANDHILL EXPERIMENTAL STATION | 34.13126 | -80.8683 | 64.3 | 65 | 62 | 61 | 55.8 | 56.5 | 55.8 | 56.5 | 54.5 | 55.1 | 54.5 | 55.1 |
| 450830009 | South Carolina | Spartanburg | NORTH SPARTANBURG FIRE STATION #2 | 34.98871 | -82.0758 | 66 | 67 | 65 | 63 | 57.2 | 58.1 | 57.2 | 58.1 | 57 | 57.8 | 57 | 57.8 |
| 450910008 | South Carolina | York | YORK (LANDFILL) | 34.977 | -81.207 | 61.3 | 63 | 62 | 59 | 54 | 55.5 | 54 | 55.5 | 53.8 | 55.2 | 53.8 | 55.2 |
| 450918801 | South Carolina | York | | 34.9127 | -80.8745 | 64 | 64 | 62 | NA | 57.3 | 57.3 | 57.3 | 57.3 | 56.3 | 56.3 | 56.3 | 56.3 |
| 460110003 | South Dakota | Brookings | Research Farm | 44.3486 | -96.8073 | 62 | 63 | 68 | 66 | | | | | | | | |
| 460330132 | South Dakota | Custer | Wind Cave NP - Visitor Center | 43.55764 | -103.484 | 60.3 | 62 | 61 | 63 | | | | | | | | |
| 460710001 | South Dakota | Jackson | SOUTH OF BADLANDS NP HEADQUARTERS | 43.74561 | -101.941 | 60.7 | 63 | 57 | 60 | | | | | | | | |
| 460930001 | South Dakota | Meade | BLACK HAWK ELEMENTARY SCHOOL GROUNDS | 44.15564 | -103.316 | 53.3 | 57 | 63 | 64 | | | | | | | | |
| 460990008 | South Dakota | Minnehaha | SD School for the Deaf | 43.54792 | -96.7008 | 65 | 67 | NA | NA | | | | | | | | |
| 461270001 | South Dakota | Union | Union County #1 Jensen | 42.75152 | -96.7072 | 62.3 | 64 | 64 | NA | | | | | | | | |
| 470010101 | Tennessee | Anderson | Freel's Bend O3 and SO2 monitoring | 35.96497 | -84.2232 | 63.7 | 64 | 60 | 58 | 55.7 | 55.9 | 55.7 | 55.9 | 54.2 | 54.4 | 54.2 | 54.4 |
| 470090101 | Tennessee | Blount | Great Smoky Mountains NP - Look Rock | 35.63348 | -83.9416 | 67 | 67 | 62 | 63 | 58.6 | 58.6 | 58.6 | 58.6 | 58.4 | 58.4 | 58.4 | 58.4 |
| 470090102 | Tennessee | Blount | Great Smoky Mountains NP - Cade's Cove | 35.60306 | -83.7836 | 61 | 62 | 56 | 58 | 53.3 | 54.2 | 53.3 | 54.2 | | | | |
| 470259991 | Tennessee | Claiborne | Speedwell | 36.46983 | -83.8265 | 62.7 | 63 | 57 | 56 | 55.2 | 55.4 | 55.2 | 55.4 | | | | |
| 470370011 | Tennessee | Davidson | East Health | 36.20506 | -86.7447 | 66 | 66 | 63 | 64 | 57.8 | 57.8 | 57.8 | 57.8 | 56.9 | 56.9 | 56.9 | 56.9 |
| 470370026 | Tennessee | Davidson | Percy Priest Dam | 36.1508 | -86.6233 | 66 | 67 | 62 | 63 | 57.6 | 58.5 | 57.6 | 58.5 | 56.9 | 57.7 | 56.9 | 57.7 |
| 470419991 | Tennessee | DeKalb | Edgar Evans | 36.0388 | -85.7331 | 61.3 | 62 | 57 | 57 | 53.7 | 54.3 | 53.7 | 54.3 | | | | |
| 470651011 | Tennessee | Hamilton | Soddy-Daisy High School | 35.23348 | -85.1816 | 64.7 | 65 | 60 | 61 | 56.3 | 56.6 | 56.3 | 56.6 | 55.7 | 56 | 55.7 | 56 |
| 470654003 | Tennessee | Hamilton | Eastside Utility | 35.10264 | -85.1622 | 67 | 68 | 61 | 63 | 57.9 | 58.7 | 57.9 | 58.7 | 57.1 | 58 | 57.1 | 58 |
| 470890002 | Tennessee | Jefferson | New Market ozone monitor | 36.10563 | -83.6021 | 67 | 68 | 63 | 61 | 58.9 | 59.8 | 58.9 | 59.8 | 58.3 | 59.2 | 58.3 | 59.2 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 470930021 | Tennessee | Knox | East Knox Elementary School | 36.08551 | -83.7648 | 64.3 | 65 | 59 | 58 | 56.7 | 57.3 | 56.7 | 57.3 | 56 | 56.6 | 56 | 56.6 |
| 470931020 | Tennessee | Knox | Spring Hill Elementary School | 36.01919 | -83.8738 | 66.7 | 67 | 57 | 57 | 58.4 | 58.7 | 58.4 | 58.7 | 57.9 | 58.2 | 57.9 | 58.2 |
| 471050109 | Tennessee | Loudon | Loudon Middle School ozone monitor | 35.7211 | -84.343 | 68 | 69 | 62 | 60 | 59.3 | 60.2 | 59.3 | 60.2 | 58.2 | 59.1 | 58.2 | 59.1 |
| 471550101 | Tennessee | Sevier | Great Smoky Mountains NP - Cove Mountain | 35.69676 | -83.6096 | 67.3 | 68 | 60 | 61 | 58.9 | 59.6 | 58.9 | 59.6 | | | | |
| 471570021 | Tennessee | Shelby | Frayser Ozone Monitor | 35.2175 | -90.0197 | 66.7 | 67 | 65 | 65 | 60.7 | 61 | 60.7 | 61 | 60.1 | 60.4 | 60.1 | 60.4 |
| 471570075 | Tennessee | Shelby | Memphis NCORE site | 35.1517 | -89.8502 | 67.3 | 69 | 66 | 69 | 61.4 | 62.9 | 61.4 | 62.9 | 60.9 | 62.5 | 60.9 | 62.5 |
| 471571004 | Tennessee | Shelby | Edmund Orgill Park Ozone | 35.37815 | -89.8345 | 65.7 | 66 | 61 | 64 | 59 | 59.3 | 59 | 59.3 | 58.4 | 58.7 | 58.4 | 58.7 |
| 471632002 | Tennessee | Sullivan | Blountville Ozone Monitor | 36.54137 | -82.4246 | 66 | 66 | 61 | 60 | 58.1 | 58.1 | 58.1 | 58.1 | 58.2 | 58.2 | 58.2 | 58.2 |
| 471632003 | Tennessee | Sullivan | Kingsport ozone monitor | 36.58211 | -82.4857 | 64.7 | 65 | 60 | 59 | 56.8 | 57.1 | 56.8 | 57.1 | 57.1 | 57.3 | 57.1 | 57.3 |
| 471650007 | Tennessee | Sumner | Hendersonville Ozone Site at Old Hickory Dam | 36.29756 | -86.6531 | 66.3 | 67 | 65 | 64 | 57.6 | 58.2 | 57.6 | 58.2 | 56 | 56.6 | 56 | 56.6 |
| 471870106 | Tennessee | Williamson | FAIRVIEW MIDDLE SCHOOL ozone monitor | 35.94977 | -87.1382 | 60.3 | 61 | 58 | 61 | 52.2 | 52.8 | 52.2 | 52.8 | 51.6 | 52.2 | 51.6 | 52.2 |
| 471890103 | Tennessee | Wilson | Cedars of Lebanon Ozone Monitor | 36.0609 | -86.2863 | 63.5 | 64 | 59 | 60 | 54.7 | 55.1 | 54.7 | 55.1 | 54 | 54.4 | 54 | 54.4 |
| 480271045 | Texas | Bell | Temple Georgia | 31.12242 | -97.4311 | 68 | 69 | 64 | 66 | | | | | | | | |
| 480271047 | Texas | Bell | Killeen Skylark Field | 31.088 | -97.6797 | 67.3 | 68 | 66 | 67 | | | | | | | | |
| 480290032 | Texas | Bexar | San Antonio Northwest | 29.51509 | -98.6202 | 73 | 74 | 71 | 71 | 68 | 68.9 | 68 | 68.9 | 67.1 | 68 | 67.1 | 68 |
| 480290052 | Texas | Bexar | Camp Bullis | 29.63206 | -98.5649 | 72.3 | 73 | 73 | 75 | 68.4 | 69.1 | 68.4 | 69.1 | 66.8 | 67.4 | 66.8 | 67.4 |
| 480290059 | Texas | Bexar | Calaveras Lake | 29.27538 | -98.3117 | 65 | 66 | 65 | 67 | 60.9 | 61.9 | 60.9 | 61.9 | | | | |
| 480391004 | Texas | Brazoria | Manvel Croix Park | 29.52044 | -95.3925 | 74.7 | 77 | 75 | 73 | 71.5 | 73.7 | 71.5 | 73.7 | 69.1 | 71.3 | 69.1 | 71.3 |
| 480391016 | Texas | Brazoria | Lake Jackson | 29.04376 | -95.4729 | 65 | 66 | 65 | 68 | 60 | 61 | 60 | 61 | | | | |
| 480430101 | Texas | Brewster | Big Bend NP - K-Bar Ranch Road | 29.30265 | -103.178 | 62.3 | 63 | 61 | 61 | | | | | | | | |
| 480610006 | Texas | Cameron | Brownsville | 25.89252 | -97.4938 | 56.5 | 57 | NA | NA | | | | | | | | |
| 480611023 | Texas | Cameron | Harlingen Teege | 26.20034 | -97.7127 | 57 | 57 | 56 | 55 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 480850005 | Texas | Collin | Frisco | 33.1324 | -96.7864 | 74.3 | 75 | 75 | 74 | 67.1 | 67.7 | 67.1 | 67.7 | 65.9 | 66.5 | 65.9 | 66.5 |
| 481130069 | Texas | Dallas | Dallas Hinton | 32.82006 | -96.8601 | 73 | 74 | 67 | 67 | 66.1 | 67 | 66.1 | 67 | 64.9 | 65.8 | 64.9 | 65.8 |
| 481130075 | Texas | Dallas | Dallas North #2 | 32.91921 | -96.8085 | 73.7 | 75 | 71 | 71 | 66.9 | 68.1 | 66.9 | 68.1 | 65.5 | 66.7 | 65.5 | 66.7 |
| 481130087 | Texas | Dallas | Dallas Redbird Airport Executive | 32.67645 | -96.8721 | 64.7 | 66 | 68 | 71 | 58.5 | 59.7 | 58.5 | 59.7 | 58.3 | 59.5 | 58.3 | 59.5 |
| 481210034 | Texas | Denton | Denton Airport South | 33.21907 | -97.1963 | 78 | 80 | 74 | 76 | 71.2 | 73 | 71.2 | 73 | 70.2 | 72 | 70.2 | 72 |
| 481211032 | Texas | Denton | Pilot Point | 33.41065 | -96.9446 | 74 | 76 | 76 | 77 | 67.6 | 69.5 | 67.6 | 69.5 | 66.2 | 68 | 66.2 | 68 |
| 481390016 | Texas | Ellis | Midlothian OFW | 32.48208 | -97.0269 | 64.3 | 65 | 62 | 62 | 58 | 58.7 | 58 | 58.7 | 57.4 | 58 | 57.4 | 58 |
| 481391044 | Texas | Ellis | Italy | 32.17542 | -96.8702 | 63.7 | 65 | 61 | 63 | | | | | | | | |
| 481410029 | Texas | El Paso | Ivanhoe | 31.78577 | -106.324 | 63.7 | 66 | 67 | 65 | 62.3 | 64.5 | 62.3 | 64.5 | 61.9 | 64.2 | 61.9 | 64.2 |
| 481410037 | Texas | El Paso | El Paso UTEP | 31.76829 | -106.501 | 71.3 | 73 | 75 | NA | 69.6 | 71.3 | 69.6 | 71.3 | 69 | 70.7 | 69 | 70.7 |
| 481410044 | Texas | El Paso | El Paso Chamizal | 31.76569 | -106.455 | 69 | 71 | 71 | 69 | 67.4 | 69.3 | 67.4 | 69.3 | 66.8 | 68.7 | 66.8 | 68.7 |
| 481410055 | Texas | El Paso | Ascarate Park SE | 31.74678 | -106.403 | 66 | 69 | NA | 64 | 64.4 | 67.4 | 64.4 | 67.4 | 63.9 | 66.8 | 63.9 | 66.8 |
| 481410057 | Texas | El Paso | Socorro Hueco | 31.6675 | -106.288 | 65.3 | 66 | 70 | 73 | | | | | 63.2 | 63.9 | 63.2 | 63.9 |
| 481410058 | Texas | El Paso | Skyline Park | 31.89391 | -106.426 | 70 | 72 | 70 | 70 | 68.1 | 70 | 68.1 | 70 | 67.5 | 69.4 | 67.5 | 69.4 |
| 481671034 | Texas | Galveston | Galveston 99th Street | 29.25447 | -94.8613 | 75.7 | 77 | 72 | 70 | 71.8 | 73 | 71.9 | 73.1 | 71.5 | 72.7 | 71.3 | 72.5 |
| 481830001 | Texas | Gregg | Longview | 32.37868 | -94.7118 | 65.3 | 66 | 62 | 61 | 58.8 | 59.4 | 58.8 | 59.4 | 58.2 | 58.8 | 58.2 | 58.8 |
| 482010024 | Texas | Harris | Houston Aldine | 29.90104 | -95.3261 | 79.3 | 81 | 74 | 69 | 76.5 | 78.1 | 76.5 | 78.1 | 74.3 | 75.9 | 74.3 | 75.9 |
| 482010026 | Texas | Harris | Channelview | 29.80271 | -95.1255 | 68.3 | 69 | 65 | 64 | 65 | 65.7 | 65 | 65.7 | 64.7 | 65.3 | 65.1 | 65.8 |
| 482010029 | Texas | Harris | Northwest Harris County | 30.03952 | -95.674 | 71.3 | 73 | 71 | 70 | 66.4 | 68 | 66.4 | 68 | 64.4 | 65.9 | 64.4 | 65.9 |
| 482010046 | Texas | Harris | Houston North Wayside | 29.82809 | -95.2841 | 67 | 69 | 64 | 62 | 64.6 | 66.5 | 64.6 | 66.5 | 62.7 | 64.6 | 62.7 | 64.6 |
| 482010047 | Texas | Harris | Lang | 29.83417 | -95.4892 | 73.7 | 76 | 71 | 70 | 70.6 | 72.8 | 70.6 | 72.8 | 68 | 70.1 | 68 | 70.1 |
| 482010051 | Texas | Harris | Houston Croquet | 29.62389 | -95.4742 | 70 | 71 | 74 | 73 | 66.5 | 67.4 | 66.5 | 67.4 | 64.2 | 65.1 | 64.2 | 65.1 |
| 482010055 | Texas | Harris | Houston Bayland Park | 29.69573 | -95.4992 | 76 | 77 | 77 | 78 | 72.2 | 73.1 | 72.2 | 73.1 | 69.7 | 70.6 | 69.7 | 70.6 |
| 482010062 | Texas | Harris | Houston Monroe | 29.62556 | -95.2672 | 63 | 65 | 67 | 63 | 61.4 | 63.3 | 61.4 | 63.3 | 59.6 | 61.5 | 59.6 | 61.5 |
| 482010066 | Texas | Harris | Houston Westhollow | 29.72333 | -95.6358 | 75 | 76 | 70 | 70 | 70.5 | 71.4 | 70.5 | 71.4 | 68 | 68.9 | 68 | 68.9 |
| 482010416 | Texas | Harris | Park Place | 29.68639 | -95.2947 | 72.3 | 74 | 73 | 73 | 69.7 | 71.4 | 69.7 | 71.4 | 67.6 | 69.2 | 67.6 | 69.2 |
| 482011015 | Texas | Harris | Lynchburg Ferry | 29.75889 | -95.0794 | 65 | 65 | 64 | 63 | 61.9 | 61.9 | 61.9 | 61.9 | 61.6 | 61.6 | 62 | 62 |
| 482011017 | Texas | Harris | Baytown Garth | 29.82332 | -94.9838 | 71 | 73 | 68 | 69 | 67.7 | 69.6 | 67.7 | 69.6 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 482011034 | Texas | Harris | Houston East | 29.768 | -95.2206 | 73.7 | 75 | 71 | 72 | 71 | 72.3 | 71 | 72.3 | 69.9 | 71.1 | 69.9 | 71.1 |
| 482011035 | Texas | Harris | Clinton | 29.73373 | -95.2576 | 71.3 | 75 | 71 | 72 | 68.7 | 72.3 | 68.7 | 72.3 | 67.6 | 71.1 | 67.6 | 71.1 |
| 482011039 | Texas | Harris | Houston Deer Park #2 | 29.67003 | -95.1285 | 68.7 | 71 | 74 | 71 | 65.7 | 67.9 | 65.7 | 67.9 | 65.2 | 67.4 | 65.6 | 67.8 |
| 482011050 | Texas | Harris | Seabrook Friendship Park | 29.58305 | -95.0155 | 70.7 | 71 | 62 | 61 | 67 | 67.3 | 67.2 | 67.4 | 66.7 | 67 | 67 | 67.3 |
| 482030002 | Texas | Harrison | Karnack | 32.66899 | -94.1675 | 61.3 | 62 | 59 | 61 | 55.8 | 56.4 | 55.8 | 56.4 | | | | |
| 482150043 | Texas | Hidalgo | Mission | 26.22621 | -98.2911 | 55 | 55 | 56 | 60 | | | | | | | | |
| 482210001 | Texas | Hood | Granbury | 32.4423 | -97.8035 | 67.3 | 69 | 64 | 69 | | | | | | | | |
| 482311006 | Texas | Hunt | Greenville | 33.15309 | -96.1156 | 62.3 | 65 | 62 | 63 | 55.7 | 58.1 | 55.7 | 58.1 | | | | |
| 482450009 | Texas | Jefferson | Beaumont Downtown | 30.03642 | -94.0711 | 64.7 | 65 | 65 | 63 | 61 | 61.3 | 61 | 61.3 | | | | |
| 482450011 | Texas | Jefferson | Port Arthur West | 29.89752 | -93.9911 | 66.7 | 67 | 62 | 60 | 63.3 | 63.6 | 62.9 | 63.2 | 65.2 | 65.5 | | |
| 482450022 | Texas | Jefferson | Hamshire | 29.86396 | -94.3178 | 67 | 68 | 63 | 62 | 62.6 | 63.6 | 62.6 | 63.6 | | | | |
| 482450101 | Texas | Jefferson | SETRPC 40 Sabine Pass | 29.72793 | -93.8941 | 65.7 | 67 | NA | 61 | 61.6 | 62.8 | | | 62.1 | 63.4 | | |
| 482450102 | Texas | Jefferson | SETRPC 43 Jefferson Co Airport | 29.9425 | -94.0006 | 63 | 65 | 66 | 63 | 60.2 | 62.1 | 59.9 | 61.8 | 61.4 | 63.3 | 60.1 | 62 |
| 482451035 | Texas | Jefferson | Nederland High School | 29.97893 | -94.0109 | 66.7 | 68 | 61 | 62 | 63.7 | 65 | 63.4 | 64.7 | 65 | 66.3 | 63.6 | 64.8 |
| 482510003 | Texas | Johnson | Cleburne Airport | 32.3536 | -97.4367 | 73.7 | 76 | 71 | 74 | | | | | | | | |
| 482570005 | Texas | Kaufman | Kaufman | 32.56497 | -96.3177 | 61 | 61 | 64 | 66 | | | | | | | | |
| 483091037 | Texas | McLennan | Waco Mazanec | 31.65307 | -97.0707 | 63 | 63 | 64 | 64 | | | | | | | | |
| 483390078 | Texas | Montgomery | Conroe Relocated | 30.3503 | -95.4251 | 73.7 | 75 | 73 | 72 | 68.5 | 69.7 | 68.5 | 69.7 | 68.4 | 69.6 | 68.4 | 69.6 |
| 483491051 | Texas | Navarro | Corsicana Airport | 32.03193 | -96.3991 | 62.7 | 64 | 63 | 65 | | | | | | | | |
| 483550025 | Texas | Nueces | Corpus Christi West | 27.76534 | -97.4343 | 62.3 | 64 | 62 | 62 | | | | | | | | |
| 483550026 | Texas | Nueces | Corpus Christi Tuloso | 27.83241 | -97.5554 | 61.3 | 63 | 62 | 61 | | | | | | | | |
| 483611001 | Texas | Orange | West Orange | 30.08526 | -93.7613 | 61.7 | 64 | 62 | 61 | 58.3 | 60.5 | 58.4 | 60.6 | 60.7 | 62.9 | | |
| 483670081 | Texas | Parker | Parker County | 32.86877 | -97.9059 | 70.7 | 73 | 67 | 69 | | | | | | | | |
| 483739991 | Texas | Polk | Alabama-Coushatta | 30.7017 | -94.6742 | 60.3 | 61 | 57 | 57 | | | | | | | | |
| 483819991 | Texas | Randall | Palo Duro | 34.8803 | -101.665 | 65.7 | 68 | 66 | 67 | | | | | | | | |
| 483970001 | Texas | Rockwall | Rockwall Heath | 32.93652 | -96.4592 | 66 | 66 | 63 | 63 | 60.4 | 60.4 | 60.4 | 60.4 | | | | |
| 484230007 | Texas | Smith | Tyler Airport Relocated | 32.34401 | -95.4158 | 64.7 | 65 | 64 | 65 | 58.2 | 58.4 | 58.2 | 58.4 | | | | |
| 484390075 | Texas | Tarrant | Eagle Mountain Lake | 32.98789 | -97.4772 | 71 | 72 | 75 | 76 | 64.7 | 65.6 | 64.7 | 65.6 | 64.2 | 65.1 | 64.2 | 65.1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 484391002 | Texas | Tarrant | Fort Worth Northwest | 32.80582 | -97.3566 | 72.3 | 74 | 72 | 77 | 65.7 | 67.2 | 65.7 | 67.2 | 65 | 66.5 | 65 | 66.5 |
| 484392003 | Texas | Tarrant | Keller | 32.92247 | -97.2821 | 73.3 | 74 | 72 | 72 | 67.2 | 67.9 | 67.2 | 67.9 | 66.4 | 67 | 66.4 | 67 |
| 484393009 | Texas | Tarrant | Grapevine Fairway | 32.98426 | -97.0637 | 75.3 | 76 | 74 | 76 | 68.8 | 69.4 | 68.8 | 69.4 | 68.3 | 68.9 | 68.3 | 68.9 |
| 484393011 | Texas | Tarrant | Arlington Municipal Airport | 32.65636 | -97.0886 | 67 | 69 | NA | 72 | 60.6 | 62.4 | 60.6 | 62.4 | 60.3 | 62.1 | 60.3 | 62.1 |
| 484530014 | Texas | Travis | Austin Northwest | 30.35444 | -97.7603 | 67.7 | 69 | NA | NA | 62.2 | 63.4 | 62.2 | 63.4 | 62.1 | 63.3 | 62.1 | 63.3 |
| 484530020 | Texas | Travis | Austin Audubon Society | 30.48317 | -97.8723 | 66.3 | 67 | 63 | 64 | 61.2 | 61.8 | 61.2 | 61.8 | 60.7 | 61.3 | 60.7 | 61.3 |
| 484690003 | Texas | Victoria | Victoria | 28.83617 | -97.0055 | 65 | 65 | 61 | 60 | | | | | | | | |
| 484790016 | Texas | Webb | Laredo Vidaurri | 27.51746 | -99.5152 | 54 | 54 | NA | NA | | | | | | | | |
| 540030003 | West Virginia | Berkeley | MARTINSBURG BALL FIELD | 39.44811 | -77.9638 | 62 | 63 | 57 | 56 | 55.3 | 56.2 | 55.3 | 56.2 | | | | |
| 540110006 | West Virginia | Cabell | HENDERSON CENTER/MARSHALL UNIVERSITY - MOVED FROM WATER CO. 5/98 | 38.42413 | -82.4259 | 64 | 64 | NA | NA | 57.6 | 57.6 | 57.6 | 57.6 | 56.7 | 56.7 | 56.7 | 56.7 |
| 540219991 | West Virginia | Gilmer | Cedar Creek | 38.8795 | -80.8477 | 58 | 59 | 54 | 53 | 54.1 | 55.1 | 54.1 | 55.1 | 52.9 | 53.8 | 52.9 | 53.8 |
| 540250003 | West Virginia | Greenbrier | SAM BLACK CHURCH - DOH GARAGE - GREENBRIER COUNTY | 37.90853 | -80.6326 | 59.7 | 60 | 56 | 54 | 54.7 | 55 | 54.7 | 55 | | | | |
| 540290009 | West Virginia | Hancock | | 40.42737 | -80.5923 | 65.5 | 66 | NA | 64 | 58.1 | 58.5 | 58.1 | 58.5 | 57 | 57.4 | 57 | 57.4 |
| 540390020 | West Virginia | Kanawha | | 38.34626 | -81.6212 | 67 | 67 | NA | 61 | 61.1 | 61.1 | 61.1 | 61.1 | 61.3 | 61.3 | 61.3 | 61.3 |
| 540610003 | West Virginia | Monongalia | | 39.64937 | -79.9209 | 62.3 | 64 | 61 | 60 | 57.8 | 59.4 | 57.8 | 59.4 | 57.7 | 59.3 | 57.7 | 59.3 |
| 540690010 | West Virginia | Ohio | | 40.11488 | -80.701 | 67 | 68 | 61 | 60 | 60.4 | 61.3 | 60.4 | 61.3 | 60.2 | 61.1 | 60.2 | 61.1 |
| 540939991 | West Virginia | Tucker | Parsons | 39.0905 | -79.6617 | 61.7 | 62 | 56 | 58 | 56.6 | 56.8 | 56.6 | 56.8 | | | | |
| 541071002 | West Virginia | Wood | Neale Elementary School | 39.32353 | -81.5524 | 65 | 68 | NA | 59 | 58 | 60.7 | 58 | 60.7 | 57.9 | 60.5 | 57.9 | 60.5 |
| 550030010 | Wisconsin | Ashland | BAD RIVER TRIBAL SCHOOL - ODANAH | 46.60225 | -90.6561 | 58.3 | 59 | 58 | 57 | | | | | | | | |
| 550090026 | Wisconsin | Brown | GREEN BAY - UW | 44.53098 | -87.908 | 65.3 | 66 | 62 | 64 | | | | | | | | |
| 550210015 | Wisconsin | Columbia | COLUMBUS | 43.3156 | -89.1089 | 66 | 67 | 64 | 66 | | | | | | | | |
| 550250041 | Wisconsin | Dane | MADISON EAST | 43.10084 | -89.3573 | 65 | 65 | 64 | 65 | | | | | | | | |
| 550270001 | Wisconsin | Dodge | HORICON WILDLIFE AREA | 43.46611 | -88.6211 | 66.3 | 68 | 65 | 66 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 550290004 | Wisconsin | Door | NEWPORT PARK | 45.2384 | -86.994 | 72.7 | 73 | 70 | 73 | 66.6 | 66.9 | 66.7 | 67 | 66.4 | 66.7 | 66.2 | 66.4 |
| 550350014 | Wisconsin | Eau Claire | EAU CLAIRE - DOT SIGN SHOP | 44.7614 | -91.143 | 62 | 64 | 62 | 62 | | | | | | | | |
| 550390006 | Wisconsin | Fond du Lac | FOND DU LAC | 43.6874 | -88.422 | 64.7 | 66 | 62 | 64 | | | | | | | | |
| 550410007 | Wisconsin | Forest | POTAWATOMI | 45.565 | -88.8086 | 62.7 | 63 | 59 | 59 | | | | | | | | |
| 550550009 | Wisconsin | Jefferson | JEFFERSON - LAATSCH | 43.0034 | -88.8283 | 68 | 69 | 66 | 66 | | | | | | | | |
| 550590019 | Wisconsin | Kenosha | CHIWAUKEE PRAIRIE STATELINE | 42.50472 | -87.8093 | 78 | 79 | 74 | 75 | 73.5 | 74.4 | 73.5 | 74.4 | 74.5 | 75.5 | 76.1 | 77.1 |
| 550590025 | Wisconsin | Kenosha | KENOSHA - WATER TOWER | 42.5958 | -87.8858 | 73.7 | 77 | 72 | 73 | 69.8 | 72.9 | 68.7 | 71.8 | 71 | 74.2 | 67.2 | 70.2 |
| 550610002 | Wisconsin | Kewaunee | KEWAUNEE | 44.44312 | -87.5052 | 69.3 | 70 | 64 | 67 | 64.3 | 65 | 63.8 | 64.5 | 63.7 | 64.3 | 63.6 | 64.2 |
| 550630012 | Wisconsin | La Crosse | LACROSSE - DOT BUILDING | 43.7775 | -91.2269 | 62 | 62 | 60 | 59 | | | | | | | | |
| 550710007 | Wisconsin | Manitowoc | MANITOWOC - WDLND DUNES | 44.13862 | -87.6161 | 73 | 74 | 68 | 73 | 67.8 | 68.7 | 67.1 | 68 | 67.5 | 68.4 | 67.4 | 68.3 |
| 550730012 | Wisconsin | Marathon | LAKE DUBAY | 44.70735 | -89.7718 | 64 | 65 | 58 | 57 | | | | | | | | |
| 550790010 | Wisconsin | Milwaukee | MILWAUKEE - SIXTEENTH ST. HEALTH CENTER | 43.01667 | -87.9333 | 65.3 | 67 | 61 | NA | 61.2 | 62.8 | 61.1 | 62.7 | 62.9 | 64.5 | 60 | 61.6 |
| 550790026 | Wisconsin | Milwaukee | MILWAUKEE - SER DNR HDQRS | 43.06098 | -87.9135 | 68 | 69 | NA | NA | 63.7 | 64.6 | 64.1 | 65 | 64.8 | 65.7 | 66.2 | 67.2 |
| 550790085 | Wisconsin | Milwaukee | BAYSIDE | 43.1818 | -87.901 | 71.7 | 73 | 70 | 73 | 67.4 | 68.6 | 67.8 | 69.1 | 67.8 | 69.1 | 70.2 | 71.4 |
| 550870009 | Wisconsin | Outagamie | APPLETON - AAL | 44.30738 | -88.3952 | 65.7 | 67 | 62 | 64 | | | | | | | | |
| 550890008 | Wisconsin | Ozaukee | GRAFTON | 43.343 | -87.92 | 71.3 | 72 | 71 | 72 | 66.9 | 67.6 | 66.5 | 67.1 | 68.7 | 69.4 | 65.5 | 66.1 |
| 550890009 | Wisconsin | Ozaukee | HARRINGTON BEACH PARK | 43.4981 | -87.81 | 73.3 | 74 | 70 | 71 | 69.3 | 69.9 | 68.6 | 69.3 | 69.1 | 69.8 | 68.2 | 68.8 |
| 551010020 | Wisconsin | Racine | RACINE - PAYNE AND DOLAN | 42.77368 | -87.7963 | 76 | 78 | 73 | 75 | 71.4 | 73.3 | 72 | 73.9 | 72.1 | 74 | 73.6 | 75.5 |
| 551050030 | Wisconsin | Rock | BELOIT - CONVERSE | 42.51831 | -89.0635 | 67.7 | 69 | 65 | 67 | | | | | | | | |
| 551110007 | Wisconsin | Sauk | DEVILS LAKE PARK | 43.4351 | -89.6797 | 63.7 | 64 | 63 | 63 | | | | | | | | |
| 551170006 | Wisconsin | Sheboygan | SHEBOYGAN - KOHLER ANDRAE | 43.66742 | -87.7162 | 80 | 81 | 72 | 75 | 75 | 75.9 | 74.5 | 75.4 | 74.8 | 75.8 | 73.5 | 74.4 |
| 551170009 | Wisconsin | Sheboygan | SHEBOYGAN - HAVEN | 43.8156 | -87.7922 | 70 | 71 | 65 | 69 | 65.1 | 66 | 64.7 | 65.6 | 65.3 | 66.2 | 64.3 | 65.2 |
| 551199991 | Wisconsin | Taylor | Perkinstown | 45.2066 | -90.5969 | 61 | 62 | 59 | 58 | | | | | | | | |
| 551250001 | Wisconsin | Vilas | TROUT LAKE | 46.0519 | -89.654 | 61.3 | 62 | 58 | 58 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 551270005 | Wisconsin | Walworth | LAKE GENEVA | 42.58001 | -88.499 | 69 | 70 | NA | NA | | | | | | | | |
| 551330027 | Wisconsin | Waukesha | WAUKESHA - CLEVELAND AVE | 43.02008 | -88.2151 | 65.7 | 66 | 65 | 68 | 61.2 | 61.5 | 61.2 | 61.5 | 60.6 | 60.9 | 60.6 | 60.9 |
| 560019991 | Wyoming | Albany | Centennial | 41.3642 | -106.24 | 64.7 | 66 | 67 | 68 | | | | | | | | |
| 560050123 | Wyoming | Campbell | Thunder Basin | 44.6522 | -105.29 | 59.7 | 61 | 64 | 66 | | | | | | | | |
| 560050456 | Wyoming | Campbell | Campbell County | 44.14696 | -105.53 | 61.5 | 63 | NA | NA | | | | | | | | |
| 560070100 | Wyoming | Carbon | Atlantic Rim Sun Dog | 41.38694 | -107.617 | 60.7 | 62 | NA | NA | | | | | | | | |
| 560090008 | Wyoming | Converse | Tallgrass Energy Partners - Gaseous | 42.79637 | -105.362 | 59 | 59 | NA | NA | | | | | | | | |
| 560090010 | Wyoming | Converse | Converse County Long-Term | 43.10128 | -105.499 | 62 | 63 | 66 | 66 | | | | | | | | |
| 560130232 | Wyoming | Fremont | Spring Creek | 43.08167 | -107.549 | 61.7 | 62 | 64 | NA | | | | | | | | |
| 560210100 | Wyoming | Laramie | Cheyenne NCore | 41.18223 | -104.778 | 63.3 | 64 | 64 | 65 | | | | | | | | |
| 560250100 | Wyoming | Natrona | Casper Gaseous | 42.82231 | -106.365 | 61.3 | 63 | 65 | 65 | | | | | | | | |
| 560252601 | Wyoming | Natrona | | 42.8608 | -106.236 | 58 | 59 | 64 | NA | | | | | | | | |
| 560370200 | Wyoming | Sweetwater | Wamsutter | 41.67767 | -108.025 | 52.7 | 55 | 65 | 63 | | | | | 49.8 | 51.9 | 49.8 | 51.9 |
| 560450003 | Wyoming | Weston | | 43.87306 | -104.192 | 60.5 | 61 | 64 | 64 | | | | | | | | |

*Table D1. Top 21 OTR ozone monitors showing the 2016 (2014-2018) base observed design value (DVB) compared to the 2019-2021 and 2020-2022 preliminary monitored DVs and 2026 modeling future predicted design values (DVFs) for 3x3 and 3x3 No Water 1 methodology for CMAQ (green header) and CAMx (blue header) using the V2/V3 inventory.*

| | | | Monitored DVs | | | | Modeled DVs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2026 CMAQ v5.3.3 | | | | 2026 CAMx v7.20 | | | |
| | | | 2014-2018 DVB | | 2019-2021 DV | 2020-2022 DV | 3x3 | | 3x3 no water 1 | | 3x3 | | 3x3 no water 1 | |
| Site ID | State | County | AVG | MAX | | Prelim | AVG | MAX | AVG | MAX | AVG | MAX | AVG | MAX |
| 90013007 | CT | Fairfield | 82 | 83 | 81 | 81 | 73.4 | 74.3 | 73.2 | 74.1 | 74 | 74.9 | 73.8 | 74.7 |
| 90019003 | CT | Fairfield | 82.7 | 83 | 80 | 80 | 75.6 | 75.9 | 74.6 | 74.8 | 75.5 | 75.8 | 74.2 | 74.5 |
| 90099002 | CT | New Haven | 79.7 | 82 | 82 | 79 | 71.2 | 73.2 | 69.5 | 71.5 | 70.8 | 72.8 | 71.3 | 73.3 |
| 420170012 | PA | Bucks | 79.3 | 81 | 71 | 72 | 68.7 | 70.2 | 68.7 | 70.2 | 70.3 | 71.8 | 70.3 | 71.8 |
| 90010017 | CT | Fairfield | 79.3 | 80 | 79 | 77 | 73.8 | 74.5 | 73 | 73.7 | 75.3 | 76 | 72.2 | 72.8 |
| 90079007 | CT | Middlesex | 78.7 | 79 | 74 | 73 | 68 | 68.2 | 68 | 68.2 | 69 | 69.2 | 69 | 69.2 |
| 90011123 | CT | Fairfield | 77 | 78 | 70 | 71 | 67.9 | 68.8 | 67.9 | 68.8 | 68.1 | 69 | 68.1 | 69 |
| 421010024 | PA | Philadelphia | 77.7 | 78 | 71 | 70 | 67.6 | 67.8 | 67.6 | 67.8 | 69.1 | 69.4 | 69.1 | 69.4 |
| 90090027 | CT | New Haven | 75.7 | 77 | 72 | 70 | 68.2 | 69.4 | 67 | 68.2 | 67.8 | 68.9 | 67.5 | 68.6 |
| 340070002 | NJ | Camden | 75.3 | 77 | 66 | 64 | 65.9 | 67.4 | 65.9 | 67.4 | 67 | 68.5 | 67 | 68.5 |
| 361030002 | NY | Suffolk | 74 | 76 | 73 | 74 | 68.3 | 70.2 | 66.4 | 68.2 | 67.4 | 69.2 | 67.4 | 69.2 |
| 90110124 | CT | New London | 74.3 | 76 | 73 | 72 | 67.4 | 69 | 70.9 | 72.5 | 66.3 | 67.8 | 66.5 | 68 |
| 361030004 | NY | Suffolk | 74.3 | 76 | 69 | 68 | 65.9 | 67.4 | 65.7 | 67.2 | 66.8 | 68.4 | 66.4 | 67.9 |
| 421010048 | PA | Philadelphia | 75.3 | 76 | 70 | 68 | 65.6 | 66.2 | 65.6 | 66.2 | 66.9 | 67.5 | 66.9 | 67.5 |
| 240251001 | MD | Harford | 74 | 75 | 72 | 68 | 63.9 | 64.8 | 62.3 | 63.2 | 63.8 | 64.7 | 63.4 | 64.2 |
| 340030006 | NJ | Bergen | 74.3 | 75 | 71 | 68 | 67.5 | 68.1 | 67.5 | 68.1 | 67.6 | 68.2 | 67.6 | 68.2 |
| 340230011 | NJ | Middlesex | 74.7 | 75 | 68 | 68 | 65.5 | 65.8 | 65.5 | 65.8 | 65.3 | 65.6 | 65.3 | 65.6 |
| 361192004 | NY | Westchester | 74 | 75 | 69 | 68 | 68.9 | 69.8 | 67.6 | 68.5 | 68.9 | 69.8 | 66.2 | 67.1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360810124 | NY | Queens | 72.3 | 74 | 71 | 70 | 65.8 | 67.4 | 65.1 | 66.6 | 67.9 | 69.5 | 67.2 | 68.7 |
| 90031003 | CT | Hartford | 71.7 | 74 | 67 | 68 | 60.9 | 62.9 | 60.9 | 62.9 | 62.3 | 64.3 | 62.3 | 64.3 |
| 240031003 | MD | Anne Arundel | 74 | 74 | 70 | 66 | 63.6 | 63.6 | 62.8 | 62.8 | 63.8 | 63.8 | 63.1 | 63.1 |

*Table D2. All monitors in the domain showing the 2016 (2014-2018) base observed design value (DVB) compared to the 2019-2021 and 2020-2022 preliminary monitored DVs and 2026 modeling future predicted design values (DVFs) for 3x3 and 3x3 No Water 1 methodology for CMAQ (green header) and CAMx (blue header) using the V2/V3 inventory. See Table D1 for DVFs at Top 21 OTR monitors.*

| | | | | | | 2014-2018 DVB | | 2019-2021 DV | 2020-2022 DV | CAMx V7.20 | | | | CMAQ v5.3.3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 3x3 | | 3x3 no water 1 | | 3x3 | | 3x3 no water 1 | |
| **Site ID** | **State** | **County** | **Site name** | **Lat** | **Lon** | **AVG** | **MAX** | | **Prelim** | **AVG** | **MAX** | **AVG** | **MAX** | **AVG** | **MAX** | **AVG** | **MAX** |
| 90010017 | Connecticut | Fairfield | Greenwich Point Park - Greenwich | 41.00466 | -73.5851 | 79.3 | 80 | 79 | 77 | 75.3 | 76 | 72.2 | 72.8 | 73.8 | 74.5 | 73 | 73.7 |
| 90011123 | Connecticut | Fairfield | Western Conn State Univ - Danbury | 41.39917 | -73.4431 | 77 | 78 | 70 | 71 | 68.1 | 69 | 68.1 | 69 | 67.9 | 68.8 | 67.9 | 68.8 |
| 90013007 | Connecticut | Fairfield | Lighthouse - Stratford | 41.1525 | -73.1031 | 82 | 83 | 81 | 81 | 74 | 74.9 | 73.8 | 74.7 | 73.4 | 74.3 | 73.2 | 74.1 |
| 90019003 | Connecticut | Fairfield | Sherwood Island State Park - Westport | 41.11833 | -73.3367 | 82.7 | 83 | 80 | 80 | 75.5 | 75.8 | 74.2 | 74.5 | 75.6 | 75.9 | 74.6 | 74.8 |
| 90031003 | Connecticut | Hartford | McAuliffe Park | 41.78472 | -72.6317 | 71.7 | 74 | 67 | 68 | 62.3 | 64.3 | 62.3 | 64.3 | 60.9 | 62.9 | 60.9 | 62.9 |
| 90050005 | Connecticut | Litchfield | Mohawk Mt-Cornwall | 41.82134 | -73.2973 | 71.3 | 72 | 64 | 67 | 61.9 | 62.5 | 61.9 | 62.5 | 61.9 | 62.5 | 61.9 | 62.5 |
| 90079007 | Connecticut | Middlesex | Connecticut Valley Hospital - Middletown | 41.55 | -72.626 | 78.7 | 79 | 74 | 73 | 69 | 69.2 | 69 | 69.2 | 68 | 68.2 | 68 | 68.2 |
| 90090027 | Connecticut | New Haven | Criscuolo Park-New Haven | 41.3014 | -72.9029 | 75.7 | 77 | 72 | 70 | 67.8 | 68.9 | 67.5 | 68.6 | 68.2 | 69.4 | 67 | 68.2 |
| 90099002 | Connecticut | New Haven | Hammonasset State Park - Madison | 41.25679 | -72.5533 | 79.7 | 82 | 82 | 79 | 70.8 | 72.8 | 71.3 | 73.3 | 71.2 | 73.2 | 69.5 | 71.5 |
| 90110124 | Connecticut | New London | Fort Griswold Park - Groton | 41.35362 | -72.0788 | 74.3 | 76 | 73 | 72 | 66.3 | 67.8 | 66.5 | 68 | 67.4 | 69 | 70.9 | 72.5 |
| 90131001 | Connecticut | Tolland | | 41.97639 | -72.3881 | 71.7 | 73 | 67 | 66 | 62 | 63.1 | 62 | 63.1 | 60.7 | 61.8 | 60.7 | 61.8 |
| 90159991 | Connecticut | Windham | Abington | 41.84046 | -72.0104 | 69.7 | 71 | 65 | 64 | 60.2 | 61.3 | 60.2 | 61.3 | 59.1 | 60.2 | 59.1 | 60.2 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100010002 | Delaware | Kent | PROPERTY OF KILLENS POND STATE PARK; BEHIND FARM BUILDINGS | 38.98667 | -75.5568 | 66.3 | 67 | NA | 63 | 55.8 | 56.4 | 56.4 | 57 | 56.9 | 57.5 | 56.6 | 57.2 |
| 100031007 | Delaware | New Castle | Lums Pond | 39.5513 | -75.732 | 68 | 69 | NA | NA | 58 | 58.9 | 58 | 58.9 | 57.5 | 58.3 | 57.5 | 58.3 |
| 100031010 | Delaware | New Castle | BCSP | 39.81722 | -75.5639 | 73.7 | 74 | NA | 62 | 64 | 64.3 | 64 | 64.3 | 64.1 | 64.4 | 64.1 | 64.4 |
| 100031013 | Delaware | New Castle | BELLEVUE STATE PARK: FIELD IN SE PORTION OF PARK | 39.77389 | -75.4964 | 71 | 72 | NA | 63 | 61.3 | 62.2 | 61.3 | 62.2 | 61.6 | 62.5 | 61.6 | 62.5 |
| 100032004 | Delaware | New Castle | MLK CORNER OF MLK BLVD AND JUSTISON ST | 39.73944 | -75.5581 | 71.3 | 72 | NA | NA | 61.6 | 62.2 | 61.6 | 62.2 | 61.8 | 62.5 | 61.8 | 62.5 |
| 100051002 | Delaware | Sussex | Seaford Shipley State Service Center | 38.6539 | -75.6106 | 65.3 | 66 | NA | 61 | 55.5 | 56.1 | 55.5 | 56.1 | | | | |
| 100051003 | Delaware | Sussex | Lewes SPM SITE: NEAR UD ACID RAIN/MERCURY COLLECTORS | 38.7791 | -75.1632 | 67.7 | 69 | NA | NA | 58 | 59.1 | 59 | 60.1 | 53.5 | 54.5 | | |
| 110010041 | District Of Columbia | District of Columbia | RIVER TERRACE | 38.89557 | -76.9581 | 57 | 57 | 60 | 59 | 49.1 | 49.1 | 49.1 | 49.1 | 47.9 | 47.9 | 47.9 | 47.9 |
| 110010043 | District Of Columbia | District of Columbia | MCMILLAN NCore-PAMS | 38.92185 | -77.0132 | 71 | 72 | 68 | 67 | 61.1 | 62 | 61.1 | 62 | 59.6 | 60.5 | 59.6 | 60.5 |
| 110010050 | District Of Columbia | District of Columbia | Takoma Rec Center | 38.97009 | -77.0167 | 70 | 70 | 66 | 61 | 60 | 60 | 60 | 60 | 58.6 | 58.6 | 58.6 | 58.6 |
| 230010014 | Maine | Androscoggin | DURHAM FIRE STATION | 43.97462 | -70.1246 | 59.3 | 60 | 53 | 56 | 51 | 51.6 | 50.5 | 51.1 | 51.7 | 52.3 | | |
| 230039991 | Maine | Aroostook | Ashland | 46.6041 | -68.4135 | 52 | 52 | 52 | 50 | | | | | | | | |
| 230052003 | Maine | Cumberland | CETL - Cape Elizabeth Two Lights (State Park) | 43.56104 | -70.2073 | 64.7 | 65 | 62 | 62 | 55.8 | 56 | 56 | 56.3 | 57.6 | 57.9 | | |
| 230090102 | Maine | Hancock | TOP OF CADILLAC MTN (FENCED ENCLOSURE) | 44.3517 | -68.227 | 69 | 71 | 67 | 67 | 59.5 | 61.2 | | | | | | |
| 230090103 | Maine | Hancock | MCFARLAND HILL Air Pollutant Research Site | 44.37705 | -68.2609 | 63 | 64 | 60 | 61 | | | | | 54.1 | 55 | | |
| 230112005 | Maine | Kennebec | Gardiner: Pray Street School (GPSS) | 44.23062 | -69.785 | 61.3 | 63 | NA | NA | 52.3 | 53.7 | 52.3 | 53.7 | | | | |
| 230130004 | Maine | Knox | Marshall Point Lighthouse | 43.91796 | -69.2606 | 63.3 | 64 | 60 | 59 | 54.6 | 55.2 | 54.1 | 54.7 | 54 | 54.6 | | |
| 230194008 | Maine | Penobscot | WLBZ TV Transmitter Building - Summit of Rider Bluff | 44.73598 | -68.6708 | 58.3 | 60 | 57 | 59 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 230290019 | Maine | Washington | Harbor Masters Office; Jonesport Public Landing | 44.53191 | -67.5959 | 59.3 | 61 | 55 | 55 | 51.4 | 52.8 | | | | | | |
| 230310038 | Maine | York | WBFD - West Buxton (Hollis) Fire Department | 43.65676 | -70.6291 | 58.7 | 59 | NA | NA | | | | | | | | |
| 230310040 | Maine | York | SBP - Shapleigh Ball Park | 43.58889 | -70.8773 | 61.3 | 62 | 56 | 57 | | | | | | | | |
| 230312002 | Maine | York | KPW - Kennebunkport Parson's Way | 43.34317 | -70.471 | 66.5 | 67 | 64 | 64 | 57.9 | 58.4 | 57.5 | 58 | 58.2 | 58.6 | | |
| 240031003 | Maryland | Anne Arundel | GLEN BURNIE | 39.16953 | -76.6279 | 74 | 74 | 70 | 66 | 63.8 | 63.8 | 63.1 | 63.1 | 63.6 | 63.6 | 62.8 | 62.8 |
| 240051007 | Maryland | Baltimore | Padonia | 39.46048 | -76.6335 | 72 | 72 | 69 | 68 | 61.8 | 61.8 | 61.8 | 61.8 | 60.7 | 60.7 | 60.7 | 60.7 |
| 240053001 | Maryland | Baltimore | Essex | 39.31083 | -76.4744 | 72.7 | 73 | 70 | 68 | 63.1 | 63.4 | 62.3 | 62.6 | 62.6 | 62.8 | 61.5 | 61.7 |
| 240090011 | Maryland | Calvert | Calvert | 38.53672 | -76.6172 | 67.7 | 69 | 58 | 58 | 58.3 | 59.4 | 56.9 | 58 | 57.6 | 58.7 | 55.1 | 56.2 |
| 240130001 | Maryland | Carroll | South Carroll | 39.44429 | -77.0423 | 68.3 | 69 | 64 | 64 | 58.1 | 58.7 | 58.1 | 58.7 | 56.8 | 57.4 | 56.8 | 57.4 |
| 240150003 | Maryland | Cecil | Fair Hill Natural Resource Management Area | 39.70144 | -75.8601 | 74 | 74 | 67 | 65 | 62.8 | 62.8 | 62.8 | 62.8 | 62.8 | 62.8 | 62.8 | 62.8 |
| 240170010 | Maryland | Charles | Southern Maryland | 38.50855 | -76.8119 | 69.3 | 70 | 59 | 59 | 58.9 | 59.5 | 58.9 | 59.5 | 57.9 | 58.5 | 57.9 | 58.5 |
| 240190004 | Maryland | Dorchester | Horn Point | 38.58753 | -76.141 | 64.7 | 66 | 64 | 63 | 55.3 | 56.4 | 54.9 | 56 | 55.8 | 56.9 | 55.2 | 56.3 |
| 240199991 | Maryland | Dorchester | Blackwater NWR | 38.44497 | -76.1113 | 65.7 | 66 | 62 | 61 | 56.6 | 56.8 | 55.3 | 55.6 | 57.2 | 57.5 | 56.3 | 56.5 |
| 240210037 | Maryland | Frederick | Frederick Airport | 39.42276 | -77.3752 | 68 | 69 | 65 | 63 | 57.7 | 58.5 | 57.7 | 58.5 | 56.8 | 57.6 | 56.8 | 57.6 |
| 240230002 | Maryland | Garrett | Piney Run | 39.70595 | -79.012 | 65.3 | 66 | 58 | 58 | 58.1 | 58.7 | 58.1 | 58.7 | | | | |
| 240251001 | Maryland | Harford | Edgewood | 39.41019 | -76.2969 | 74 | 75 | 72 | 68 | 63.8 | 64.7 | 63.4 | 64.2 | 63.9 | 64.8 | 62.3 | 63.2 |
| 240259001 | Maryland | Harford | Aldino | 39.56333 | -76.2039 | 73 | 73 | 68 | 67 | 62 | 62 | 62.1 | 62.1 | 62.1 | 62.1 | 61 | 61 |
| 240290002 | Maryland | Kent | Millington | 39.30502 | -75.7973 | 69.3 | 70 | 64 | 64 | 59.2 | 59.8 | 59.2 | 59.8 | 58.4 | 59 | 58.4 | 59 |
| 240313001 | Maryland | Montgomery | Rockville | 39.11431 | -77.1069 | 67.7 | 68 | 63 | 63 | 58.4 | 58.6 | 58.4 | 58.6 | 56.7 | 57 | 56.7 | 57 |
| 240330030 | Maryland | Prince George's | HU-Beltsville | 39.05528 | -76.8783 | 69.3 | 70 | 67 | 64 | 59.3 | 59.9 | 59.3 | 59.9 | 57.9 | 58.5 | 57.9 | 58.5 |
| 240338003 | Maryland | Prince George's | PG Equestrian Center | 38.81194 | -76.7442 | 70.7 | 71 | 65 | 64 | 60.4 | 60.6 | 60.4 | 60.6 | 59.3 | 59.6 | 59.3 | 59.6 |
| 240339991 | Maryland | Prince George's | Beltsville | 39.0284 | -76.8171 | 69.3 | 71 | 70 | 67 | 59 | 60.4 | 59 | 60.4 | 57.8 | 59.2 | 57.8 | 59.2 |
| 240430009 | Maryland | Washington | Hagerstown | 39.56418 | -77.7202 | 66.7 | 67 | 60 | 61 | 58.1 | 58.3 | 58.1 | 58.3 | 57.1 | 57.4 | 57.1 | 57.4 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 245100054 | Maryland | Baltimore (City) | Furley | 39.32881 | -76.5531 | 68.3 | 70 | NA | NA | 59.4 | 60.8 | 58.4 | 59.8 | 58.7 | 60.2 | 57.7 | 59.1 |
| 250010002 | Massachusetts | Barnstable | TRURO NATIONAL SEASHORE | 41.9758 | -70.0236 | 69 | 69 | 64 | 64 | 60.1 | 60.1 | 59.8 | 59.8 | 58.9 | 58.9 | 58.4 | 58.4 |
| 250051004 | Massachusetts | Bristol | FALL RIVER | 41.68571 | -71.1692 | 71.7 | 74 | NA | 65 | 63.5 | 65.5 | 63.3 | 65.3 | 65.2 | 67.3 | 62 | 64 |
| 250051006 | Massachusetts | Bristol | FAIRHAVEN2 | 41.64538 | -70.8975 | 67.3 | 69 | 63 | 62 | 59.5 | 61 | 59.7 | 61.2 | 58.5 | 60 | 58.2 | 59.7 |
| 250070001 | Massachusetts | Dukes | 1 HERRING CREEK RD: AQUINNAH (WAMPANOAG TRIBAL SITE) | 41.33047 | -70.7852 | 70 | 70 | 65 | 62 | 61.5 | 61.5 | 61.5 | 61.5 | 60.3 | 60.3 | 61.5 | 61.5 |
| 250092006 | Massachusetts | Essex | LYNN WATER TREATMENT PLANT | 42.47464 | -70.9708 | 66.3 | 68 | 62 | 64 | 59.3 | 60.8 | 58.3 | 59.7 | 61.1 | 62.7 | 58.1 | 59.6 |
| 250094005 | Massachusetts | Essex | NEWBURYPORT HARBOR ST PARKING LOT | 42.81441 | -70.8178 | 64.5 | 65 | NA | NA | 56.4 | 56.8 | 55.7 | 56.1 | 56.8 | 57.2 | | |
| 250095005 | Massachusetts | Essex | CONSENTINO SCHOOL. | 42.77084 | -71.1023 | 62.7 | 64 | 58 | 60 | 54.4 | 55.5 | 54.4 | 55.5 | 53.9 | 55 | 53.9 | 55 |
| 250112005 | Massachusetts | Franklin | Greenfield 16 Barr Ave | 42.60582 | -72.5967 | 64.7 | 66 | 55 | 56 | 55.9 | 57.1 | 55.9 | 57.1 | | | | |
| 250130008 | Massachusetts | Hampden | WESTOVER AFB | 42.19438 | -72.5551 | 70 | 71 | 63 | 64 | 60.2 | 61 | 60.2 | 61 | 59.5 | 60.3 | 59.5 | 60.3 |
| 250154002 | Massachusetts | Hampshire | QUABBIN RES | 42.29849 | -72.3341 | 69 | 70 | NA | 62 | 59 | 59.8 | 59 | 59.8 | 57.9 | 58.7 | 57.9 | 58.7 |
| 250170009 | Massachusetts | Middlesex | USEPA REGION 1 LAB | 42.62668 | -71.3621 | 64 | 65 | 58 | 60 | 54.6 | 55.5 | 54.6 | 55.5 | 54.4 | 55.3 | 54.4 | 55.3 |
| 250213003 | Massachusetts | Norfolk | BLUE HILL OBSERVATORY | 42.21177 | -71.114 | 69 | 70 | 56 | 58 | 59.8 | 60.7 | 59.5 | 60.3 | 61.7 | 62.6 | 59.2 | 60.1 |
| 250230005 | Massachusetts | Plymouth | Brockton Buckley | 42.06511 | -71.0121 | 67 | 69 | 60 | 61 | 57.6 | 59.3 | 57.6 | 59.3 | 56.7 | 58.4 | 56.7 | 58.4 |
| 250250042 | Massachusetts | Suffolk | DUDLEY SQUARE ROXBURY | 42.3295 | -71.0826 | 60.3 | 64 | 59 | 61 | 53.3 | 56.6 | 52.2 | 55.4 | 54.2 | 57.5 | 51.3 | 54.5 |
| 250270015 | Massachusetts | Worcester | WORCESTER AIRPORT | 42.27432 | -71.8755 | 65 | 66 | 62 | 62 | 55.7 | 56.6 | 55.7 | 56.6 | 54.6 | 55.4 | 54.6 | 55.4 |
| 250270024 | Massachusetts | Worcester | UXBRIDGE | 42.0997 | -71.6194 | 66.3 | 69 | 60 | 59 | 57.1 | 59.5 | 57.1 | 59.5 | 56.5 | 58.8 | 56.5 | 58.8 |
| 330012004 | New Hampshire | Belknap | FIELD OFFICE ON THE GROUNDS OF THE FORMER STATE PRISON | 43.56612 | -71.4963 | 58.7 | 59 | 53 | 55 | 50.4 | 50.7 | | | 51.2 | 51.4 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 330050007 | New Hampshire | Cheshire | WATER STREET | 42.93052 | -72.2723 | 62.3 | 63 | 54 | 56 | 53.3 | 53.9 | 53.3 | 53.9 | | | | |
| 330074001 | New Hampshire | Coos | | 44.27009 | -71.3038 | 67.3 | 68 | NA | 58 | | | | | | | | |
| 330074002 | New Hampshire | Coos | CAMP DODGE: GREENS GRANT | 44.30813 | -71.2176 | 58.3 | 59 | 53 | 55 | | | | | | | | |
| 330090010 | New Hampshire | Grafton | LEBANON AIRPORT ROAD | 43.62961 | -72.3095 | 57.7 | 59 | 52 | 53 | | | | | | | | |
| 330099991 | New Hampshire | Grafton | Woodstock | 43.94452 | -71.7008 | 54.7 | 56 | 51 | 52 | | | | | | | | |
| 330111011 | New Hampshire | Hillsborough | GILSON ROAD | 42.71865 | -71.5224 | 63 | 64 | 56 | 58 | 53.8 | 54.7 | 53.8 | 54.7 | | | | |
| 330115001 | New Hampshire | Hillsborough | MILLER STATE PARK | 42.86183 | -71.8786 | 67 | 68 | 59 | 60 | 57.1 | 58 | 57.1 | 58 | | | | |
| 330131007 | New Hampshire | Merrimack | HAZEN DRIVE | 43.2185 | -71.5145 | 62 | 63 | 56 | 57 | 53.2 | 54.1 | 53.2 | 54.1 | | | | |
| 330150014 | New Hampshire | Rockingham | PORTSMOUTH - PEIRCE ISLAND | 43.07537 | -70.748 | 63.3 | 65 | 54 | 59 | 55.3 | 56.8 | 54.8 | 56.2 | 55.7 | 57.2 | | |
| 330150016 | New Hampshire | Rockingham | SEACOAST SCIENCE CENTER | 43.04527 | -70.714 | 66.7 | 67 | 62 | 65 | 58.3 | 58.5 | 57.7 | 58 | 58.7 | 59 | | |
| 330150018 | New Hampshire | Rockingham | MOOSEHILL SCHOOL | 42.86253 | -71.3801 | 65.3 | 66 | 57 | 58 | 55.9 | 56.5 | 55.9 | 56.5 | | | | |
| 340010006 | New Jersey | Atlantic | Brigantine | 39.46487 | -74.4487 | 63.7 | 64 | 59 | 59 | 56.5 | 56.7 | 55.9 | 56.1 | 57.4 | 57.7 | 55.4 | 55.7 |
| 340030006 | New Jersey | Bergen | Leonia | 40.87044 | -73.992 | 74.3 | 75 | 71 | 68 | 67.6 | 68.2 | 67.6 | 68.2 | 67.5 | 68.1 | 67.5 | 68.1 |
| 340070002 | New Jersey | Camden | Camden Spruce Street | 39.93456 | -75.1252 | 75.3 | 77 | 66 | 64 | 67 | 68.5 | 67 | 68.5 | 65.9 | 67.4 | 65.9 | 67.4 |
| 340071001 | New Jersey | Camden | Ancora State Hospital | 39.68425 | -74.8615 | 67.3 | 68 | 62 | 61 | 59.1 | 59.8 | 59.1 | 59.8 | 57.9 | 58.5 | 57.9 | 58.5 |
| 340110007 | New Jersey | Cumberland | Millville | 39.42227 | -75.0252 | 65.7 | 67 | 65 | 63 | 57.3 | 58.5 | 57.3 | 58.5 | 56.9 | 58 | 56.9 | 58 |
| 340130003 | New Jersey | Essex | Newark Firehouse | 40.72099 | -74.1929 | 68.3 | 70 | 65 | 64 | 60.9 | 62.4 | 60.9 | 62.4 | 60.7 | 62.2 | 60.7 | 62.2 |
| 340150002 | New Jersey | Gloucester | Clarksboro | 39.80034 | -75.2121 | 73.7 | 74 | 66 | 66 | 64.9 | 65.2 | 64.9 | 65.2 | 64.5 | 64.7 | 64.5 | 64.7 |
| 340170006 | New Jersey | Hudson | Bayonne | 40.67025 | -74.1261 | 71 | 72 | 66 | 66 | 64.1 | 65 | 64.1 | 65 | 65.2 | 66.1 | 64.7 | 65.6 |
| 340190001 | New Jersey | Hunterdon | Flemington | 40.51526 | -74.8067 | 71.3 | 72 | 63 | 62 | 62.7 | 63.3 | 62.7 | 63.3 | 61.9 | 62.6 | 61.9 | 62.6 |
| 340210005 | New Jersey | Mercer | Rider University | 40.28309 | -74.7426 | 71.3 | 72 | 69 | 69 | 63.3 | 63.9 | 63.3 | 63.9 | 62 | 62.6 | 62 | 62.6 |
| 340219991 | New Jersey | Mercer | Wash. Crossing | 40.3125 | -74.8729 | 73.3 | 74 | 66 | 65 | 65.2 | 65.8 | 65.2 | 65.8 | 64.1 | 64.8 | 64.1 | 64.8 |
| 340230011 | New Jersey | Middlesex | Rutgers University | 40.46218 | -74.4294 | 74.7 | 75 | 68 | 68 | 65.3 | 65.6 | 65.3 | 65.6 | 65.5 | 65.8 | 65.5 | 65.8 |
| 340250005 | New Jersey | Monmouth | Monmouth University | 40.27765 | -74.0051 | 67.3 | 69 | 66 | 67 | 59 | 60.4 | 59 | 60.4 | 57.6 | 59.1 | 57.9 | 59.4 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 340273001 | New Jersey | Morris | Chester | 40.78763 | -74.6763 | 69 | 70 | 62 | 62 | 60.3 | 61.1 | 60.3 | 61.1 | 59.8 | 60.6 | 59.8 | 60.6 |
| 340290006 | New Jersey | Ocean | Colliers Mills | 40.06483 | -74.4441 | 72.7 | 73 | 66 | 66 | 64.2 | 64.5 | 64.2 | 64.5 | 63.3 | 63.5 | 63.3 | 63.5 |
| 340315001 | New Jersey | Passaic | Ramapo | 41.05862 | -74.2555 | 67.7 | 68 | 62 | 60 | 59.3 | 59.6 | 59.3 | 59.6 | 59.2 | 59.5 | 59.2 | 59.5 |
| 340410007 | New Jersey | Warren | Columbia | 40.92458 | -75.0678 | 64.3 | 65 | 58 | 58 | 54.9 | 55.5 | 54.9 | 55.5 | 53.6 | 54.2 | 53.6 | 54.2 |
| 360010012 | New York | Albany | LOUDONVILLE | 42.68075 | -73.7573 | 64 | 64 | 57 | 57 | 56.3 | 56.3 | 56.3 | 56.3 | | | | |
| 360050110 | New York | Bronx | IS 52 | 40.816 | -73.902 | 67.7 | 69 | 68 | 66 | 64.1 | 65.4 | 61.8 | 63 | 61.6 | 62.8 | 62.2 | 63.4 |
| 360050133 | New York | Bronx | PFIZER LAB SITE | 40.8679 | -73.8781 | 70.7 | 72 | 70 | 69 | 67.6 | 68.9 | 64.7 | 65.9 | 64.6 | 65.8 | 64.8 | 66 |
| 360130006 | New York | Chautauqu a | DUNKIRK | 42.49963 | -79.3188 | 68 | 68 | 65 | 67 | 60.6 | 60.6 | 60.2 | 60.2 | 60.2 | 60.2 | | |
| 360270007 | New York | Dutchess | MILLBROOK | 41.78555 | -73.7414 | 67 | 68 | 60 | 61 | 58.5 | 59.3 | 58.5 | 59.3 | 58.7 | 59.6 | 58.7 | 59.6 |
| 360290002 | New York | Erie | AMHERST | 42.99328 | -78.7715 | 69.3 | 70 | 65 | 66 | 61.6 | 62.2 | 61.4 | 62.1 | 61.4 | 62 | 61.3 | 61.9 |
| 360310002 | New York | Essex | WHITEFACE SUMMIT | 44.36608 | -73.9031 | 64 | 66 | 62 | 60 | | | | | | | | |
| 360310003 | New York | Essex | WHITEFACE BASE | 44.39308 | -73.8589 | 64.7 | 65 | 59 | 58 | | | | | | | | |
| 360319991 | New York | Essex | Huntington Wildlife Forest | 43.9731 | -74.2232 | 57 | 58 | 52 | 52 | | | | | | | | |
| 360337003 | New York | Franklin | Y001 | 44.98058 | -74.695 | 58 | 58 | NA | NA | | | | | | | | |
| 360410005 | New York | Hamilton | PISECO LAKE | 43.44957 | -74.5163 | 61.3 | 62 | 56 | 56 | | | | | | | | |
| 360430005 | New York | Herkimer | NICKS LAKE | 43.68578 | -74.9854 | 63 | 63 | NA | NA | | | | | | | | |
| 360450002 | New York | Jefferson | PERCH RIVER | 44.08747 | -75.9732 | 63 | 63 | 61 | 62 | | | | | 55.6 | 55.6 | | |
| 360551007 | New York | Monroe | ROCHESTER 2 | 43.14618 | -77.5482 | 65.7 | 68 | 62 | 65 | 58.9 | 60.9 | 58.9 | 60.9 | 58.1 | 60.1 | 58.1 | 60.1 |
| 360610135 | New York | New York | CCNY | 40.81976 | -73.9483 | 70.3 | 72 | 70 | 70 | 66.6 | 68.2 | 64.2 | 65.8 | 64 | 65.6 | 64.6 | 66.2 |
| 360631006 | New York | Niagara | MIDDLEPORT | 43.22386 | -78.4789 | 66.3 | 67 | 63 | 66 | 59.2 | 59.9 | 59.2 | 59.9 | 60.7 | 61.3 | 59 | 59.7 |
| 360671015 | New York | Onondaga | EAST SYRACUSE | 43.05235 | -76.0592 | 64.3 | 65 | 61 | 60 | | | | | | | | |
| 360715001 | New York | Orange | VALLEY CENTRAL HIGH SCHOOL | 41.52375 | -74.2153 | 64.3 | 66 | 58 | 57 | 56.5 | 58 | 56.5 | 58 | 55.4 | 56.8 | 55.4 | 56.8 |
| 360750003 | New York | Oswego | FULTON | 43.28428 | -76.4632 | 61 | 63 | 59 | 59 | 55.1 | 56.9 | | | 54.5 | 56.3 | | |
| 360790005 | New York | Putnam | MT NINHAM | 41.45589 | -73.7098 | 69 | 70 | 61 | 61 | 61.2 | 62.1 | 61.2 | 62.1 | 61.2 | 62 | 61.2 | 62 |
| 360810124 | New York | Queens | QUEENS COLLEGE 2 | 40.73614 | -73.8215 | 72.3 | 74 | 71 | 70 | 67.9 | 69.5 | 67.2 | 68.7 | 65.8 | 67.4 | 65.1 | 66.6 |
| 360850067 | New York | Richmond | SUSAN WAGNER HS | 40.59664 | -74.1253 | 76 | 76 | NA | NA | 68.9 | 68.9 | 69.2 | 69.2 | 69.7 | 69.7 | 69.3 | 69.3 |
| 360870005 | New York | Rockland | Rockland County | 41.18208 | -74.0282 | 71.3 | 72 | 63 | 62 | 63.8 | 64.4 | 63.8 | 64.4 | 63.5 | 64.1 | 63.5 | 64.1 |
| 360910004 | New York | Saratoga | STILLWATER | 43.01209 | -73.6489 | 63 | 64 | 56 | 58 | 55.3 | 56.1 | 55.3 | 56.1 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 361010003 | New York | Steuben | PINNACLE STATE PARK | 42.09142 | -77.2098 | 59.7 | 61 | 55 | 56 | | | | | | | | |
| 361030002 | New York | Suffolk | BABYLON | 40.74529 | -73.4192 | 74 | 76 | 73 | 74 | 67.4 | 69.2 | 67.4 | 69.2 | 68.3 | 70.2 | 66.4 | 68.2 |
| 361030004 | New York | Suffolk | RIVERHEAD | 40.96078 | -72.7124 | 74.3 | 76 | 69 | 68 | 66.8 | 68.4 | 66.4 | 67.9 | 65.9 | 67.4 | 65.7 | 67.2 |
| 361030009 | New York | Suffolk | HOLTSVILLE | 40.82799 | -73.0575 | 71 | 73 | 70 | 70 | 64.2 | 66 | 63.6 | 65.4 | 63.8 | 65.6 | 63.1 | 64.9 |
| 361099991 | New York | Tompkins | Connecticut Hill | 42.4006 | -76.6538 | 62.7 | 63 | 58 | 59 | | | | | | | | |
| 361173001 | New York | Wayne | WILLIAMSON | 43.23086 | -77.1714 | 65 | 67 | 61 | 61 | 58.6 | 60.5 | 57.9 | 59.6 | 58.2 | 60 | 57.7 | 59.5 |
| 361192004 | New York | Westchester | WHITE PLAINS | 41.05192 | -73.7637 | 74 | 75 | 69 | 68 | 68.9 | 69.8 | 66.2 | 67.1 | 68.9 | 69.8 | 67.6 | 68.5 |
| 420010001 | Pennsylvania | Adams | NARSTO SITE ARENDTSVILLE | 39.92002 | -77.3097 | 66.5 | 67 | 62 | 61 | 58.3 | 58.7 | 58.3 | 58.7 | 57.9 | 58.4 | 57.9 | 58.4 |
| 420019991 | Pennsylvania | Adams | Arendtsville | 39.9231 | -77.3078 | 66.3 | 67 | 61 | 62 | 58.1 | 58.7 | 58.1 | 58.7 | 57.8 | 58.4 | 57.8 | 58.4 |
| 420030008 | Pennsylvania | Allegheny | Lawrenceville | 40.46542 | -79.9608 | 68 | 69 | 64 | 63 | 60.9 | 61.8 | 60.9 | 61.8 | 58.9 | 59.8 | 58.9 | 59.8 |
| 420030067 | Pennsylvania | Allegheny | South Fayette | 40.37564 | -80.1699 | 69.7 | 71 | 66 | 66 | 62.2 | 63.3 | 62.2 | 63.3 | 59.7 | 60.8 | 59.7 | 60.8 |
| 420031008 | Pennsylvania | Allegheny | Harrison | 40.61749 | -79.7277 | 69 | 70 | 65 | 67 | 61.1 | 61.9 | 61.1 | 61.9 | 59.1 | 60 | 59.1 | 60 |
| 420050001 | Pennsylvania | Armstrong | LAT/LON IS CENTER OF TRAILER | 40.81418 | -79.5648 | 69 | 70 | 64 | 66 | 59.6 | 60.5 | 59.6 | 60.5 | 58.8 | 59.6 | 58.8 | 59.6 |
| 420070002 | Pennsylvania | Beaver | | 40.56252 | -80.5039 | 68.7 | 70 | 64 | 64 | 58.5 | 59.6 | 58.5 | 59.6 | 56.8 | 57.8 | 56.8 | 57.8 |
| 420070005 | Pennsylvania | Beaver | DRIVEWAY TO BAKEY RESIDENCE | 40.68472 | -80.3597 | 67.3 | 68 | 63 | 64 | 56.3 | 56.9 | 56.3 | 56.9 | 53.4 | 53.9 | 53.4 | 53.9 |
| 420070014 | Pennsylvania | Beaver | | 40.7478 | -80.3164 | 65.7 | 67 | 63 | 64 | 55.2 | 56.3 | 55.2 | 56.3 | 52.1 | 53.1 | 52.1 | 53.1 |
| 420110006 | Pennsylvania | Berks | Kutztown | 40.51408 | -75.7897 | 65.7 | 66 | 59 | 60 | 57.2 | 57.5 | 57.2 | 57.5 | 56.5 | 56.8 | 56.5 | 56.8 |
| 420110011 | Pennsylvania | Berks | Reading Airport | 40.38335 | -75.9686 | 70 | 70 | NA | 67 | 61.2 | 61.2 | 61.2 | 61.2 | 59.8 | 59.8 | 59.8 | 59.8 |
| 420130801 | Pennsylvania | Blair | | 40.53528 | -78.3708 | 63.5 | 64 | NA | NA | 55.1 | 55.6 | 55.1 | 55.6 | | | | |
| 420150011 | Pennsylvania | Bradford | Towanda | 41.70523 | -76.5127 | 57.3 | 59 | 56 | 58 | 50.1 | 51.6 | 50.1 | 51.6 | | | | |
| 420170012 | Pennsylvania | Bucks | A420170012LAT/LONG POINT IS OF SAMPLING INLET | 40.10722 | -74.8822 | 79.3 | 81 | 71 | 72 | 70.3 | 71.8 | 70.3 | 71.8 | 68.7 | 70.2 | 68.7 | 70.2 |
| 420210011 | Pennsylvania | Cambria | | 40.30972 | -78.915 | 62.3 | 63 | 59 | 62 | 54.4 | 55 | 54.4 | 55 | 52.5 | 53.1 | 52.5 | 53.1 |
| 420270100 | Pennsylvania | Centre | LAT/LON=POINT SW CORNER OF TRAILER | 40.81139 | -77.877 | 62.3 | 63 | 55 | 56 | 54.3 | 54.9 | 54.3 | 54.9 | | | | |
| 420279991 | Pennsylvania | Centre | Penn State | 40.7208 | -77.9319 | 64.7 | 65 | 61 | 61 | 56.3 | 56.6 | 56.3 | 56.6 | | | | |
| 420290100 | Pennsylvania | Chester | CHESTER COUNTY TRANSPORT SITE INTO PHILADELPHIA | 39.83446 | -75.7682 | 72.7 | 73 | NA | 60 | 62.2 | 62.5 | 62.2 | 62.5 | 62.3 | 62.5 | 62.3 | 62.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 420334000 | Pennsylvania | Clearfield | MOSHANNON STATE FOREST | 41.1175 | -78.5262 | 64.7 | 66 | 53 | 54 | 56.9 | 58 | 56.9 | 58 | | | | |
| 420430401 | Pennsylvania | Dauphin | A420430401LAT/LON POINT IS AT CORNER OF TRAILER | 40.24699 | -76.847 | 65.3 | 66 | 62 | 61 | 56.1 | 56.7 | 56.1 | 56.7 | 55.8 | 56.4 | 55.8 | 56.4 |
| 420431100 | Pennsylvania | Dauphin | A420431100LAT/LON POINT IS AT CORNER OF TRAILER | 40.27222 | -76.6814 | 66 | 67 | 60 | 60 | 56.6 | 57.4 | 56.6 | 57.4 | 56 | 56.9 | 56 | 56.9 |
| 420450002 | Pennsylvania | Delaware | A420450002LAT/LON POINT IS OF CORNER OF TRAILER | 39.83556 | -75.3725 | 71.3 | 72 | 66 | 65 | 62.1 | 62.7 | 62.1 | 62.7 | 62.2 | 62.8 | 62.2 | 62.8 |
| 420479991 | Pennsylvania | Elk | Kane Exp. Forest | 41.59812 | -78.7679 | 65.7 | 66 | 57 | 58 | 58.5 | 58.8 | 58.5 | 58.8 | | | | |
| 420490003 | Pennsylvania | Erie | | 42.14175 | -80.0386 | 65 | 66 | 60 | 59 | 57.9 | 58.8 | 57.3 | 58.2 | 58.3 | 59.2 | 55.9 | 56.8 |
| 420550001 | Pennsylvania | Franklin | HIGH ELEVATION OZONE SITE | 39.96111 | -77.4756 | 59.3 | 60 | 56 | 56 | 52.2 | 52.8 | 52.2 | 52.8 | 51.2 | 51.8 | 51.2 | 51.8 |
| 420590002 | Pennsylvania | Greene | 75 KM SSW OF PITTSBURGH RURAL SITE ON A KNOLL WITHIN A LARGE CLEARIN | 39.80933 | -80.2657 | 67 | 68 | NA | 61 | 60.3 | 61.2 | 60.3 | 61.2 | 60 | 60.9 | 60 | 60.9 |
| 420630004 | Pennsylvania | Indiana | | 40.56333 | -78.92 | 69.7 | 70 | 65 | 63 | 61.3 | 61.5 | 61.3 | 61.5 | 59.2 | 59.5 | 59.2 | 59.5 |
| 420690101 | Pennsylvania | Lackawanna | A420690101LAT/LON POINT IS AT CORNER OF TRAILER | 41.47912 | -75.5782 | 66 | 67 | 58 | 60 | 57.5 | 58.4 | 57.5 | 58.4 | | | | |
| 420692006 | Pennsylvania | Lackawanna | A420692006LAT/LON POINT IS AT CORNER OF TRAILER | 41.44278 | -75.6231 | 62.5 | 64 | 58 | 55 | 54.5 | 55.8 | 54.5 | 55.8 | | | | |
| 420710007 | Pennsylvania | Lancaster | A420710007LAT/LON POINT AT CORNER OF TRAILER | 40.04667 | -76.2833 | 69.3 | 70 | 64 | 62 | 59.1 | 59.7 | 59.1 | 59.7 | 58.8 | 59.4 | 58.8 | 59.4 |
| 420710012 | Pennsylvania | Lancaster | Lancaster DW | 40.04383 | -76.1124 | 65 | 66 | 63 | 61 | 56.8 | 57.6 | 56.8 | 57.6 | 55.6 | 56.4 | 55.6 | 56.4 |
| 420730015 | Pennsylvania | Lawrence | | 40.99585 | -80.3464 | 66.3 | 68 | 59 | 61 | 56.3 | 57.7 | 56.3 | 57.7 | 55.2 | 56.7 | 55.2 | 56.7 |
| 420750100 | Pennsylvania | Lebanon | Lebanon | 40.33733 | -76.3834 | 69 | 70 | NA | NA | 59.4 | 60.3 | 59.4 | 60.3 | 58.7 | 59.6 | 58.7 | 59.6 |
| 420770004 | Pennsylvania | Lehigh | A420770004LAT/LONG POINT IS OF SAMPLING INLET | 40.61194 | -75.4325 | 69.7 | 70 | 63 | 61 | 60.8 | 61.1 | 60.8 | 61.1 | 59.6 | 59.9 | 59.6 | 59.9 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 420791101 | Pennsylvania | Luzerne | A420791101LAT/LON POINT IS AT CORNER OF TRAILER | 41.26556 | -75.8464 | 64 | 64 | NA | 58 | 55.2 | 55.2 | 55.2 | 55.2 | | | | |
| 420810100 | Pennsylvania | Lycoming | MONTOURSVILLE | 41.2508 | -76.9238 | 63.7 | 64 | 57 | 57 | 55.5 | 55.8 | 55.5 | 55.8 | | | | |
| 420850100 | Pennsylvania | Mercer | | 41.21501 | -80.4848 | 68.7 | 69 | 63 | 65 | 59 | 59.3 | 59 | 59.3 | 58.1 | 58.4 | 58.1 | 58.4 |
| 420859991 | Pennsylvania | Mercer | M.K. Goddard | 41.4271 | -80.1451 | 65.3 | 66 | 62 | 62 | 56.6 | 57.2 | 56.6 | 57.2 | 55.5 | 56.1 | 55.5 | 56.1 |
| 420890002 | Pennsylvania | Monroe | SWIFTWATER | 41.08306 | -75.3233 | 66.7 | 68 | NA | NA | 57.6 | 58.8 | 57.6 | 58.8 | 56.7 | 57.8 | 56.7 | 57.8 |
| 420910013 | Pennsylvania | Montgomery | A420910013LAT/LON POINT IS OF CORNER OF TRAILER | 40.11222 | -75.3092 | 71.3 | 72 | NA | 67 | 63.3 | 63.9 | 63.3 | 63.9 | 62.7 | 63.4 | 62.7 | 63.4 |
| 420950025 | Pennsylvania | Northampton | LAT/LON POINT IS CENTER OF TRAILER | 40.62806 | -75.3411 | 70 | 71 | 64 | 64 | 61 | 61.9 | 61 | 61.9 | 59.4 | 60.2 | 59.4 | 60.2 |
| 420958000 | Pennsylvania | Northampton | COMBINED EASTON SITE (420950100) AND EASTON H2S SPECIAL STUDY SITES | 40.69222 | -75.2372 | 69 | 69 | NA | NA | 59.5 | 59.5 | 59.5 | 59.5 | 58.3 | 58.3 | 58.3 | 58.3 |
| 421010004 | Pennsylvania | Philadelphia | Air Management Services Laboratory (AMS LAB) | 40.00889 | -75.0978 | 61 | 61 | 66 | 64 | 54.1 | 54.1 | 54.1 | 54.1 | 53.1 | 53.1 | 53.1 | 53.1 |
| 421010024 | Pennsylvania | Philadelphia | North East Airport (NEA) | 40.07639 | -75.0119 | 77.7 | 78 | 71 | 70 | 69.1 | 69.4 | 69.1 | 69.4 | 67.6 | 67.8 | 67.6 | 67.8 |
| 421010048 | Pennsylvania | Philadelphia | North East Waste (NEW) | 39.99139 | -75.0808 | 75.3 | 76 | 70 | 68 | 66.9 | 67.5 | 66.9 | 67.5 | 65.6 | 66.2 | 65.6 | 66.2 |
| 421119991 | Pennsylvania | Somerset | Laurel Hill | 39.9878 | -79.2515 | 65 | 65 | 59 | 59 | 57.8 | 57.8 | 57.8 | 57.8 | 57.5 | 57.5 | 57.5 | 57.5 |
| 421174000 | Pennsylvania | Tioga | PENN STATE OZONE MONITORING SITE | 41.64472 | -76.9392 | 63.7 | 64 | 57 | 59 | | | | | | | | |
| 421250005 | Pennsylvania | Washington | | 40.14667 | -79.9022 | 67 | 68 | 62 | 63 | 60.2 | 61.1 | 60.2 | 61.1 | 60.1 | 61 | 60.1 | 61 |
| 421250200 | Pennsylvania | Washington | | 40.17056 | -80.2614 | 65 | 65 | NA | NA | 57.5 | 57.5 | 57.5 | 57.5 | 56.9 | 56.9 | 56.9 | 56.9 |
| 421255001 | Pennsylvania | Washington | | 40.44528 | -80.4208 | 68 | 68 | 53 | 55 | 58.9 | 58.9 | 58.9 | 58.9 | 57.4 | 57.4 | 57.4 | 57.4 |
| 421290008 | Pennsylvania | Westmoreland | LAT/LON POINT IS TRAILER | 40.30469 | -79.5057 | 67 | 68 | 55 | 51 | 59.9 | 60.8 | 59.9 | 60.8 | 59 | 59.8 | 59 | 59.8 |
| 421330008 | Pennsylvania | York | A421330008LAT/LON POINT AT CORNER OF TRAILER | 39.96528 | -76.6994 | 65.7 | 66 | 60 | 60 | 56.5 | 56.7 | 56.5 | 56.7 | 54.4 | 54.7 | 54.4 | 54.7 |
| 421330011 | Pennsylvania | York | York DW | 39.86097 | -76.4621 | 69 | 70 | NA | NA | 58.6 | 59.4 | 58.6 | 59.4 | 57.7 | 58.6 | 57.7 | 58.6 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 440030002 | Rhode Island | Kent | AJ | 41.61524 | -71.72 | 71.3 | 73 | 65 | 64 | 62.8 | 64.3 | 62.8 | 64.3 | 61.8 | 63.2 | 61.8 | 63.2 |
| 440071010 | Rhode Island | Providence | FRANCIS SCHOOL East Providence | 41.84104 | -71.361 | 69.7 | 73 | 65 | 65 | 61.2 | 64.1 | 60.7 | 63.5 | 63.3 | 66.4 | 59.7 | 62.5 |
| 440090007 | Rhode Island | Washington | US-EPA Laboratory | 41.49511 | -71.4237 | 69.3 | 71 | 67 | 66 | 62.1 | 63.7 | 60.8 | 62.3 | 61.7 | 63.2 | 60.2 | 61.6 |
| 500030004 | Vermont | Bennington | Morse Airport - State of Vermont Property | 42.88759 | -73.2498 | 64.3 | 65 | 57 | 57 | 56.4 | 57 | 56.4 | 57 | | | | |
| 500070007 | Vermont | Chittenden | PROCTOR MAPLE RESEARCH CTR | 44.52839 | -72.8688 | 61 | 62 | 57 | 58 | | | | | | | | |
| 500210002 | Vermont | Rutland | State of Vermont District Court Parking Lot | 43.60806 | -72.9828 | 63 | 63 | 53 | 54 | | | | | | | | |
| 510030001 | Virginia | Albemarle | Albemarle High School | 38.07657 | -78.504 | 60.5 | 61 | 57 | 57 | 52.7 | 53.1 | 52.7 | 53.1 | | | | |
| 510130020 | Virginia | Arlington | Aurora Hills Visitors Center | 38.8577 | -77.0592 | 71 | 72 | 66 | 64 | 61.1 | 62 | 61.1 | 62 | 59.7 | 60.5 | 59.7 | 60.5 |
| 510330001 | Virginia | Caroline | USGS Geomagnetic Center: Corbin | 38.20087 | -77.3774 | 61 | 61 | 59 | 58 | 51.3 | 51.3 | 51.3 | 51.3 | 50.4 | 50.4 | 50.4 | 50.4 |
| 510360002 | Virginia | Charles | Shirley Plantation | 37.34438 | -77.2593 | 62.3 | 63 | 58 | 57 | 51.3 | 51.9 | 51.3 | 51.9 | 51.4 | 52 | 51.4 | 52 |
| 510410004 | Virginia | Chesterfield | VDOT Chesterfield Residency Shop | 37.35748 | -77.5936 | 61.3 | 62 | 58 | 58 | 50.3 | 50.8 | 50.3 | 50.8 | 50.1 | 50.6 | 50.1 | 50.6 |
| 510590030 | Virginia | Fairfax | Lee District Park | 38.77335 | -77.1047 | 70 | 71 | 65 | 62 | 59.3 | 60.1 | 59.3 | 60.1 | 58.6 | 59.4 | 58.6 | 59.4 |
| 510610002 | Virginia | Fauquier | Chester Phelps Wildlife Management Area: Sumerduck | 38.47367 | -77.7677 | 58.7 | 59 | 54 | 55 | 50.2 | 50.4 | 50.2 | 50.4 | 50.5 | 50.8 | 50.5 | 50.8 |
| 510690010 | Virginia | Frederick | Rest | 39.28102 | -78.0816 | 61.3 | 62 | 55 | 55 | 53.8 | 54.4 | 53.8 | 54.4 | | | | |
| 510719991 | Virginia | Giles | Horton Station | 37.3297 | -80.5578 | 62 | 62 | NA | NA | 53.9 | 53.9 | 53.9 | 53.9 | | | | |
| 510850003 | Virginia | Hanover | Turner Property: Old Church | 37.60613 | -77.2188 | 63.3 | 65 | 58 | 58 | 51.8 | 53.2 | 51.8 | 53.2 | 51.2 | 52.6 | 51.2 | 52.6 |
| 510870014 | Virginia | Henrico | MathScience Innovation Center | 37.55652 | -77.4003 | 65.5 | 66 | 60 | 59 | 53.1 | 53.5 | 53.1 | 53.5 | 53.3 | 53.7 | 53.3 | 53.7 |
| 511071005 | Virginia | Loudoun | Broad Run High School: Ashburn | 39.02473 | -77.4893 | 67 | 68 | 62 | 62 | 57.5 | 58.4 | 57.5 | 58.4 | 56.5 | 57.4 | 56.5 | 57.4 |
| 511130003 | Virginia | Madison | Shenandoah NP - Big Meadows | 38.5231 | -78.4347 | 63 | 63 | 57 | 58 | 54.8 | 54.8 | 54.8 | 54.8 | | | | |
| 511479991 | Virginia | Prince Edward | Prince Edward | 37.1655 | -78.3069 | 59.3 | 60 | 56 | 55 | 48.1 | 48.7 | 48.1 | 48.7 | | | | |
| 511530009 | Virginia | Prince William | James S. Long Park | 38.85287 | -77.6346 | 65.3 | 66 | 59 | 59 | 56.6 | 57.2 | 56.6 | 57.2 | 56.4 | 57 | 56.4 | 57 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 511611004 | Virginia | Roanoke | East Vinton Elementary School | 37.28342 | -79.8845 | 61.3 | 62 | 57 | 57 | 52.9 | 53.5 | 52.9 | 53.5 | | | | |
| 511630003 | Virginia | Rockbridge | Natural Bridge Ranger Station | 37.62668 | -79.5126 | 58 | 59 | 54 | 53 | 50.3 | 51.2 | 50.3 | 51.2 | | | | |
| 511650003 | Virginia | Rockingha m | ROCKINGHAM CO. VDOT | 38.47753 | -78.8195 | 60 | 60 | 56 | 57 | 52.5 | 52.5 | 52.5 | 52.5 | | | | |
| 511790001 | Virginia | Stafford | Widewater Elementary School | 38.48123 | -77.3704 | 62.3 | 63 | 59 | 58 | 52.7 | 53.3 | 52.5 | 53.1 | 51.9 | 52.5 | 52.4 | 53 |
| 511970002 | Virginia | Wythe | Rural Retreat Sewage Treatment Plant | 36.89117 | -81.2542 | 60.7 | 61 | 56 | 57 | 53.2 | 53.4 | 53.2 | 53.4 | | | | |
| 516500008 | Virginia | Hampton City | NASA Langley Research Center | 37.10373 | -76.387 | 64.3 | 65 | 58 | 58 | 54.3 | 54.9 | 53.6 | 54.2 | 53.7 | 54.3 | 52.3 | 52.8 |
| 518000004 | Virginia | Suffolk City | Tidewater Community College | 36.90118 | -76.4381 | 61 | 62 | 56 | 55 | 52.6 | 53.5 | 52.6 | 53.5 | 53.9 | 54.8 | 52.3 | 53.1 |
| 518000005 | Virginia | Suffolk City | VA Tech Agricultural Research Station: Holland | 36.66525 | -76.7308 | 59.7 | 61 | 56 | 56 | 51.6 | 52.7 | 51.6 | 52.7 | | | | |
| 10030010 | Alabama | Baldwin | FAIRHOPE: Alabama | 30.49748 | -87.8803 | 63.7 | 65 | 58 | 58 | 55.5 | 56.6 | 55.2 | 56.3 | 54.5 | 55.6 | 54.3 | 55.5 |
| 10331002 | Alabama | Colbert | MUSCLE SHOALS | 34.76262 | -87.6381 | 58.7 | 59 | NA | NA | 50.4 | 50.6 | 50.4 | 50.6 | | | | |
| 10499991 | Alabama | DeKalb | Sand Mountain | 34.289 | -85.9701 | 62.3 | 63 | 59 | 58 | 54.2 | 54.8 | 54.2 | 54.8 | | | | |
| 10550011 | Alabama | Etowah | SOUTHSIDE | 33.90404 | -86.0539 | 61.7 | 63 | 58 | 57 | 54.1 | 55.2 | 54.1 | 55.2 | | | | |
| 10690004 | Alabama | Houston | DOTHAN | 31.18893 | -85.4231 | 58.3 | 59 | NA | NA | | | | | | | | |
| 10730023 | Alabama | Jefferson | North Birmingham | 33.55306 | -86.815 | 66.3 | 68 | 65 | 63 | 54.3 | 55.7 | 54.3 | 55.7 | 53.6 | 55 | 53.6 | 55 |
| 10731003 | Alabama | Jefferson | Fairfield | 33.48556 | -86.915 | 65.7 | 66 | 66 | 63 | 53.8 | 54.1 | 53.8 | 54.1 | 54 | 54.2 | 54 | 54.2 |
| 10731005 | Alabama | Jefferson | McAdory | 33.33111 | -87.0036 | 65 | 65 | 65 | 62 | 53.7 | 53.7 | 53.7 | 53.7 | 52.7 | 52.7 | 52.7 | 52.7 |
| 10731010 | Alabama | Jefferson | Leeds | 33.54528 | -86.5492 | 64.3 | 66 | NA | 61 | 53.1 | 54.5 | 53.1 | 54.5 | 52.1 | 53.5 | 52.1 | 53.5 |
| 10732006 | Alabama | Jefferson | Hoover | 33.38639 | -86.8167 | 66 | 66 | NA | NA | 53.4 | 53.4 | 53.4 | 53.4 | 52.9 | 52.9 | 52.9 | 52.9 |
| 10735003 | Alabama | Jefferson | Corner | 33.80167 | -86.9425 | 63.5 | 64 | 60 | 59 | 54.1 | 54.5 | 54.1 | 54.5 | 54 | 54.4 | 54 | 54.4 |
| 10736002 | Alabama | Jefferson | Tarrant Elementary School | 33.57833 | -86.7739 | 67.7 | 68 | 62 | 60 | 55.4 | 55.7 | 55.4 | 55.7 | 55.9 | 56.2 | 55.9 | 56.2 |
| 10890014 | Alabama | Madison | HUNTSVILLE OLD AIRPORT | 34.68776 | -86.5864 | 64 | 64 | 60 | 61 | 53.8 | 53.8 | 53.8 | 53.8 | | | | |
| 10890022 | Alabama | Madison | HUNTSVILLE CAPSHAW ROAD | 34.77273 | -86.7562 | 62 | 62 | 59 | 58 | 52.6 | 52.6 | 52.6 | 52.6 | | | | |
| 10970003 | Alabama | Mobile | CHICKASAW | 30.77018 | -88.0878 | 63 | 64 | 56 | 57 | 54.3 | 55.2 | 54.3 | 55.2 | 53.9 | 54.7 | 53.9 | 54.7 |
| 10972005 | Alabama | Mobile | BAY ROAD | 30.47431 | -88.141 | 63.7 | 65 | NA | NA | 55.9 | 57 | 56.4 | 57.6 | 56.3 | 57.5 | 55.9 | 57 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11011002 | Alabama | Montgomery | MOMS: ADEM | 32.41281 | -86.2634 | 61 | 62 | 58 | 58 | 51.4 | 52.2 | 51.4 | 52.2 | 50.5 | 51.3 | 50.5 | 51.3 |
| 11030011 | Alabama | Morgan | DECATUR: Alabama | 34.53072 | -86.9675 | 63.7 | 64 | 60 | 60 | 54.7 | 55 | 54.7 | 55 | 55 | 55.2 | 55 | 55.2 |
| 11130002 | Alabama | Russell | LADONIA: PHENIX CITY | 32.46735 | -85.0834 | 62 | 62 | NA | NA | 52.2 | 52.2 | 52.2 | 52.2 | 52 | 52 | 52 | 52 |
| 11170004 | Alabama | Shelby | HELENA | 33.31714 | -86.8258 | 66.7 | 67 | 63 | 61 | 54.9 | 55.1 | 54.9 | 55.1 | 53.9 | 54.2 | 53.9 | 54.2 |
| 11190003 | Alabama | Sumter | Ward: Sumter Co. | 32.36261 | -88.278 | 57 | 57 | 54 | 53 | 51.5 | 51.5 | 51.5 | 51.5 | | | | |
| 11250010 | Alabama | Tuscaloosa | DUNCANVILLE: TUSCALOOSA | 33.08977 | -87.4597 | 60 | 60 | 55 | NA | 50.6 | 50.6 | 50.6 | 50.6 | 49.9 | 49.9 | 49.9 | 49.9 |
| 50199991 | Arkansas | Clark | Caddo Valley | 34.1795 | -93.0988 | 57.7 | 58 | 56 | 57 | 49.5 | 49.7 | 49.5 | 49.7 | | | | |
| 50350005 | Arkansas | Crittenden | MARION | 35.19729 | -90.1931 | 67 | 68 | 68 | 70 | 59.9 | 60.8 | 59.9 | 60.8 | 59 | 59.9 | 59 | 59.9 |
| 51010002 | Arkansas | Newton | DEER | 35.83273 | -93.2083 | 58 | 59 | 58 | 60 | | | | | | | | |
| 51130003 | Arkansas | Polk | EAGLE MOUNTAIN | 34.45451 | -94.1435 | 61.7 | 62 | 61 | 61 | 55.9 | 56.1 | 55.9 | 56.1 | | | | |
| 51190007 | Arkansas | Pulaski | PARR | 34.75619 | -92.2813 | 62.3 | 64 | 60 | 62 | 53.6 | 55.1 | 53.6 | 55.1 | 53 | 54.4 | 53 | 54.4 |
| 51191002 | Arkansas | Pulaski | NLR AIRPORT | 34.83572 | -92.2606 | 63.7 | 64 | 63 | 63 | 54.5 | 54.7 | 54.5 | 54.7 | 53.2 | 53.5 | 53.2 | 53.5 |
| 51430005 | Arkansas | Washington | SPRINGDALE | 36.1797 | -94.1168 | 59.7 | 60 | 60 | 62 | 51.6 | 51.8 | 51.6 | 51.8 | | | | |
| 51430006 | Arkansas | Washington | Fayetteville Airport | 36.0117 | -94.1674 | 59.7 | 60 | 59 | 61 | | | | | | | | |
| 80013001 | Colorado | Adams | Welby | 39.83812 | -104.95 | 67 | 67 | 72 | 77 | 62.8 | 62.8 | 62.8 | 62.8 | 62.1 | 62.1 | 62.1 | 62.1 |
| 80050002 | Colorado | Arapahoe | HIGHLAND RESERVOIR | 39.56789 | -104.957 | 73 | 73 | 80 | 80 | 68.1 | 68.1 | 68.1 | 68.1 | 66.7 | 66.7 | 66.7 | 66.7 |
| 80050006 | Colorado | Arapahoe | Aurora East | 39.63852 | -104.569 | 67.7 | 69 | 73 | 74 | 63.4 | 64.6 | 63.4 | 64.6 | 62.7 | 63.9 | 62.7 | 63.9 |
| 80310002 | Colorado | Denver | DENVER - CAMP | 39.75118 | -104.988 | 67.7 | 69 | 72 | 74 | 63.5 | 64.7 | 63.5 | 64.7 | 62.7 | 63.9 | 62.7 | 63.9 |
| 80310026 | Colorado | Denver | La Casa | 39.77949 | -105.005 | 68.7 | 69 | 75 | 77 | 64.4 | 64.7 | 64.4 | 64.7 | 63.7 | 63.9 | 63.7 | 63.9 |
| 80350004 | Colorado | Douglas | Chatfield State Park | 39.53449 | -105.07 | 77.3 | 78 | 83 | 83 | 71.3 | 71.9 | 71.3 | 71.9 | 69.2 | 69.8 | 69.2 | 69.8 |
| 80410013 | Colorado | El Paso | U.S. AIR FORCE ACADEMY | 38.95834 | -104.817 | 68 | 70 | 73 | 74 | 64.2 | 66.1 | 64.2 | 66.1 | 63.5 | 65.4 | 63.5 | 65.4 |
| 80410016 | Colorado | El Paso | MANITOU SPRINGS | 38.8531 | -104.901 | 66.7 | 69 | 73 | 74 | | | | | 62.9 | 65.1 | 62.9 | 65.1 |
| 80450012 | Colorado | Garfield | Rifle-Health Dept | 39.54182 | -107.784 | 62 | 63 | 61 | 62 | | | | | | | | |
| 80519991 | Colorado | Gunnison | Gothic | 38.9564 | -106.986 | 64.7 | 65 | 65 | 65 | | | | | | | | |
| 80590005 | Colorado | Jefferson | WELCH | 39.63878 | -105.139 | 73 | 75 | NA | NA | 67.3 | 69.1 | 67.3 | 69.1 | 66.5 | 68.3 | 66.5 | 68.3 |
| 80590006 | Colorado | Jefferson | ROCKY FLATS-N | 39.9128 | -105.189 | 77.3 | 78 | 81 | 83 | 72 | 72.6 | 72 | 72.6 | 72 | 72.6 | 72 | 72.6 |
| 80590011 | Colorado | Jefferson | NATIONAL RENEWABLE ENERGY LABS - NREL | 39.74372 | -105.178 | 79.3 | 80 | 83 | 84 | 73 | 73.7 | 73 | 73.7 | 72.5 | 73.2 | 72.5 | 73.2 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80590013 | Colorado | Jefferson | Aspen Park | 39.54152 | -105.298 | 70 | 70 | NA | NA | 64.4 | 64.4 | 64.4 | 64.4 | 62.7 | 62.7 | 62.7 | 62.7 |
| 80671004 | Colorado | La Plata | | 37.30389 | -107.484 | 67 | 67 | NA | NA | | | | | | | | |
| 80677001 | Colorado | La Plata | LOCATED IN PINE RIVER VALLEY: THE MOST DENSELY POPULATED AREA. | 37.13678 | -107.629 | 68.7 | 69 | NA | 66 | | | | | | | | |
| 80690007 | Colorado | Larimer | Rocky Mountain NP - Long's Peak | 40.27813 | -105.546 | 69 | 70 | 71 | 72 | 64.2 | 65.1 | 64.2 | 65.1 | 63.4 | 64.3 | 63.4 | 64.3 |
| 80690011 | Colorado | Larimer | FORT COLLINS - WEST | 40.59254 | -105.141 | 75.7 | 77 | 77 | 77 | 70.8 | 72 | 70.8 | 72 | 70.4 | 71.6 | 70.4 | 71.6 |
| 80691004 | Colorado | Larimer | Fort Collins - CSU - S. Mason | 40.57747 | -105.079 | 69 | 70 | 69 | 71 | 64.6 | 65.5 | 64.6 | 65.5 | 64 | 65 | 64 | 65 |
| 81030005 | Colorado | Rio Blanco | | 40.03889 | -107.848 | 60.3 | 61 | NA | NA | | | | | | | | |
| 81230009 | Colorado | Weld | Greeley - Weld County Tower | 40.38637 | -104.737 | 70 | 70 | 71 | 72 | 65.9 | 65.9 | 65.9 | 65.9 | 65.4 | 65.4 | 65.4 | 65.4 |
| 120013012 | Florida | Alachua | Paynes Prairie Farm | 29.56611 | -82.2661 | 59.3 | 61 | 59 | 57 | | | | | | | | |
| 120030002 | Florida | Baker | OLUSTEE | 30.20111 | -82.4411 | 60 | 61 | 58 | 56 | | | | | | | | |
| 120050006 | Florida | Bay | ST.ANDREWS STATE PARK: PANAMA CITY BEACH | 30.13043 | -85.7315 | 60.7 | 62 | 58 | 56 | 53.7 | 54.9 | 53.7 | 54.9 | 54.1 | 55.3 | | |
| 120090007 | Florida | Brevard | Melbourne | 28.05361 | -80.6286 | 58.3 | 59 | NA | 56 | | | | | | | | |
| 120094001 | Florida | Brevard | Cocoa Beach | 28.31084 | -80.6153 | 61 | 62 | 58 | 56 | | | | | | | | |
| 120110033 | Florida | Broward | Vista View Park | 26.07354 | -80.3385 | 59 | 59 | 59 | 59 | | | | | 50.3 | 50.3 | 50.3 | 50.3 |
| 120110034 | Florida | Broward | Daniela Banu NCORE | 26.05389 | -80.2569 | 63 | 63 | 57 | 58 | 55.7 | 55.7 | 55.7 | 55.7 | 55.2 | 55.2 | | |
| 120112003 | Florida | Broward | Pompano Highlands | 26.29203 | -80.0965 | 61 | 62 | 57 | 57 | | | | | | | | |
| 120118002 | Florida | Broward | Dr. Von Mizell-Eula Johnson State Park (prev. John U Lloyd State Park) | 26.08842 | -80.1112 | 62.3 | 63 | 57 | 58 | | | | | | | | |
| 120210004 | Florida | Collier | LAURAL OAKS ELEMENTARY | 26.27008 | -81.711 | 58.7 | 60 | 58 | 53 | | | | | | | | |
| 120230002 | Florida | Columbia | Lake City - Veteran's Domicile | 30.17806 | -82.6192 | 60.3 | 62 | NA | NA | | | | | | | | |
| 120310077 | Florida | Duval | Sheffield | 30.47773 | -81.5873 | 58 | 58 | 60 | 60 | 48.8 | 48.8 | 49.3 | 49.3 | 45.2 | 45.2 | | |
| 120310100 | Florida | Duval | Mayo Clinic | 30.26028 | -81.4536 | 60 | 60 | 59 | 59 | 50.9 | 50.9 | 50.6 | 50.6 | 51.4 | 51.4 | | |
| 120310106 | Florida | Duval | Cisco Drive | 30.37822 | -81.8409 | 61 | 61 | 59 | 58 | 52 | 52 | 52 | 52 | 51 | 51 | 51 | 51 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120330004 | Florida | Escambia | Ellyson Industrial Park | 30.52537 | -87.2036 | 64 | 65 | 58 | 55 | 55.6 | 56.4 | 55.2 | 56 | 54.3 | 55.1 | 53.7 | 54.6 |
| 120330018 | Florida | Escambia | Pensacola NAS | 30.36805 | -87.271 | 63 | 64 | 59 | 59 | 54.1 | 55 | 55.4 | 56.3 | 53.8 | 54.6 | 53.5 | 54.3 |
| 120350004 | Florida | Flagler | Flagler | 29.48908 | -81.2768 | 59.3 | 60 | NA | 53 | | | | | | | | |
| 120550003 | Florida | Highlands | Archbold Biological Station | 27.18922 | -81.3404 | 60.3 | 61 | NA | 56 | | | | | | | | |
| 120570081 | Florida | Hillsborough | Simmons Park | 27.74003 | -82.4651 | 67.7 | 68 | 64 | 63 | 60.5 | 60.8 | 59.9 | 60.2 | 60.3 | 60.5 | 60.6 | 60.8 |
| 120571035 | Florida | Hillsborough | Davis Island | 27.92836 | -82.4545 | 65.7 | 67 | 58 | 58 | 58.5 | 59.6 | 57.7 | 58.9 | 58.5 | 59.6 | 55.6 | 56.7 |
| 120571065 | Florida | Hillsborough | USMC Reserve Center (Gandy) | 27.89252 | -82.5384 | 66.3 | 67 | 66 | 65 | 58.9 | 59.5 | 58.5 | 59.2 | 58.7 | 59.3 | 60.9 | 61.6 |
| 120573002 | Florida | Hillsborough | SYDNEY | 27.96565 | -82.2304 | 66.3 | 67 | 62 | 59 | 58.1 | 58.7 | 58.1 | 58.7 | 55.9 | 56.5 | 55.9 | 56.5 |
| 120590004 | Florida | Holmes | Bonifay | 30.84861 | -85.6039 | 58.7 | 60 | 56 | 54 | | | | | | | | |
| 120619991 | Florida | Indian River | Indian River Lagoon | 27.8492 | -80.4554 | 62 | 63 | 59 | 59 | | | | | | | | |
| 120690002 | Florida | Lake | Clermont | 28.52389 | -81.7233 | 63.7 | 65 | 63 | 59 | 55.1 | 56.2 | 55.1 | 56.2 | 52.8 | 53.9 | | |
| 120712002 | Florida | Lee | Cape Coral - Rotary Park | 26.54821 | -81.9815 | 60.3 | 62 | 59 | 55 | | | | | | | | |
| 120713002 | Florida | Lee | Bay Oaks Park | 26.44925 | -81.9393 | 60.3 | 62 | NA | NA | | | | | | | | |
| 120730012 | Florida | Leon | Tallahassee Community College | 30.43972 | -84.3464 | 60.7 | 61 | 58 | 55 | 52.7 | 53 | 52.7 | 53 | | | | |
| 120779991 | Florida | Liberty | Sumatra | 30.1103 | -84.9903 | 56.3 | 57 | 56 | 56 | | | | | | | | |
| 120813002 | Florida | Manatee | Port Manatee | 27.63309 | -82.5459 | 61 | 63 | 59 | 54 | 54.5 | 56.3 | 54.2 | 56 | 52.7 | 54.4 | 52.8 | 54.6 |
| 120814012 | Florida | Manatee | G.T. BRAY PARK | 27.48087 | -82.6187 | 63 | 64 | 61 | 56 | 55.6 | 56.5 | 55.1 | 56 | 54.4 | 55.3 | | |
| 120814013 | Florida | Manatee | 39TH STREET SITE | 27.44976 | -82.522 | 61 | 62 | 59 | 57 | 53.6 | 54.5 | 53.4 | 54.2 | 52.6 | 53.5 | | |
| 120830003 | Florida | Marion | Ocala YMCA | 29.17053 | -82.1006 | 61.3 | 62 | 62 | 60 | | | | | | | | |
| 120830004 | Florida | Marion | Marion County Sheriff | 29.19275 | -82.1731 | 58.7 | 60 | 58 | 57 | | | | | | | | |
| 120850007 | Florida | Martin | Stuart | 27.17246 | -80.2407 | 61.7 | 63 | 57 | 54 | | | | | | | | |
| 120860027 | Florida | Miami-Dade | Rosenstiel | 25.73288 | -80.1618 | 63 | 64 | 56 | 60 | | | | | 56.5 | 57.4 | 56.7 | 57.6 |
| 120860029 | Florida | Miami-Dade | Perdue | 25.58733 | -80.3259 | 61.5 | 62 | 58 | 60 | | | | | | | | |
| 120910002 | Florida | Okaloosa | Ft. Walton Beach | 30.42653 | -86.6662 | 61 | 62 | 58 | 51 | 53.1 | 54 | 52.7 | 53.6 | 52.3 | 53.2 | | |
| 120950008 | Florida | Orange | Winegard Elementary School | 28.45445 | -81.3812 | 63 | 64 | NA | NA | 55.2 | 56 | 55.2 | 56 | 54.1 | 55 | 54.1 | 55 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120952002 | Florida | Orange | WINTER PARK | 28.59639 | -81.3625 | 63 | 64 | 62 | 62 | 54.4 | 55.3 | 54.4 | 55.3 | 53.4 | 54.2 | 53.4 | 54.2 |
| 120972002 | Florida | Osceola | Osceola County Fire Station | 28.34751 | -81.6365 | 64.3 | 66 | 64 | 59 | 54.7 | 56.1 | 54.7 | 56.1 | 53.1 | 54.5 | 53.1 | 54.5 |
| 121010005 | Florida | Pasco | San Antonio | 28.33223 | -82.3056 | 61.3 | 62 | 59 | 56 | | | | | | | | |
| 121012001 | Florida | Pasco | Holiday | 28.19557 | -82.7563 | 62 | 63 | 62 | 59 | 54.5 | 55.4 | 54.3 | 55.2 | 54.1 | 54.9 | | |
| 121030004 | Florida | Pinellas | St. Petersburg College | 27.94669 | -82.7318 | 62.7 | 65 | 64 | 61 | 55.4 | 57.4 | 55.4 | 57.4 | 54.7 | 56.8 | 53.4 | 55.4 |
| 121030018 | Florida | Pinellas | Azalea Park | 27.78587 | -82.7399 | 60.7 | 61 | 61 | 58 | 54.3 | 54.5 | 54.3 | 54.5 | 53.2 | 53.4 | | |
| 121035002 | Florida | Pinellas | John Chesnut Sr. Park - East Lake | 28.0903 | -82.7007 | 59.7 | 61 | 61 | 60 | 52.4 | 53.5 | 52.4 | 53.5 | 52.1 | 53.2 | 50.6 | 51.7 |
| 121056005 | Florida | Polk | Sikes Elementary School | 27.93975 | -82.0001 | 65.3 | 67 | 62 | 60 | 55.1 | 56.5 | 55.1 | 56.5 | | | | |
| 121056006 | Florida | Polk | Baptist Childrens' Home | 28.02889 | -81.9722 | 64.3 | 66 | 62 | 60 | | | | | | | | |
| 121110013 | Florida | St. Lucie | Savannas | 27.38908 | -80.311 | 61.3 | 62 | 58 | 55 | | | | | | | | |
| 121130015 | Florida | Santa Rosa | Woodlawn Beach Middle School | 30.39413 | -87.008 | 62 | 64 | 60 | 57 | 54.1 | 55.8 | 54 | 55.8 | 52.7 | 54.4 | 53 | 54.7 |
| 121151005 | Florida | Sarasota | Lido Park | 27.30727 | -82.5704 | 62.7 | 63 | 59 | 57 | 54.8 | 55 | | | | | | |
| 121151006 | Florida | Sarasota | Paw Park | 27.35028 | -82.4797 | 63 | 64 | 61 | 58 | 55 | 55.8 | 55.1 | 56 | | | | |
| 121152002 | Florida | Sarasota | Jackson Road | 27.08919 | -82.3626 | 61 | 61 | 58 | 55 | | | | | | | | |
| 121171002 | Florida | Seminole | Sanford (Seminole Community College) | 28.74611 | -81.3106 | 62.7 | 64 | 61 | 59 | 53.5 | 54.6 | 53.5 | 54.6 | 51.7 | 52.8 | 51.7 | 52.8 |
| 121272001 | Florida | Volusia | Port Orange | 29.10915 | -80.9937 | 59 | 59 | NA | NA | | | | | 50.3 | 50.3 | | |
| 121275002 | Florida | Volusia | DAYTONA BLIND SERVICES | 29.20667 | -81.0525 | 59.7 | 61 | 57 | 56 | | | | | | | | |
| 121290001 | Florida | Wakulla | St. Marks Wildlife Refuge | 30.0925 | -84.1611 | 59 | 59 | 55 | 53 | | | | | | | | |
| 130210012 | Georgia | Bibb | Macon-Forestry | 32.80526 | -83.5435 | 65 | 65 | 61 | 58 | 53.5 | 53.5 | 53.5 | 53.5 | 51.4 | 51.4 | 51.4 | 51.4 |
| 130510021 | Georgia | Chatham | Savannah-E. President | 32.06848 | -81.0494 | 57 | 57 | 57 | 56 | 49.7 | 49.7 | 49.7 | 49.7 | | | | |
| 130550001 | Georgia | Chattooga | Summerville | 34.47453 | -85.4088 | 61 | 62 | 56 | 56 | 51.2 | 52 | 51.2 | 52 | 50.5 | 51.3 | 50.5 | 51.3 |
| 130590002 | Georgia | Clarke | Athens | 33.91814 | -83.3444 | 64.3 | 65 | 59 | 59 | 53.2 | 53.8 | 53.2 | 53.8 | 53.4 | 54 | 53.4 | 54 |
| 130670003 | Georgia | Cobb | Kennesaw | 34.01544 | -84.6074 | 66.5 | 67 | 61 | 61 | 54.3 | 54.7 | 54.3 | 54.7 | 54.6 | 55 | 54.6 | 55 |
| 130730001 | Georgia | Columbia | Evans | 33.58204 | -82.1312 | 60 | 61 | 56 | 55 | 50.8 | 51.7 | 50.8 | 51.7 | 49.9 | 50.7 | 49.9 | 50.7 |
| 130770002 | Georgia | Coweta | Newnan | 33.40405 | -84.7457 | 64.5 | 66 | NA | NA | 53.9 | 55.2 | 53.9 | 55.2 | 53.3 | 54.5 | 53.3 | 54.5 |
| 130850001 | Georgia | Dawson | Dawsonville | 34.37623 | -84.0595 | 65 | 65 | 60 | 59 | 52.3 | 52.3 | 52.3 | 52.3 | 51.5 | 51.5 | 51.5 | 51.5 |
| 130890002 | Georgia | DeKalb | South DeKalb | 33.6878 | -84.2905 | 70.3 | 71 | 67 | 64 | 59.7 | 60.3 | 59.7 | 60.3 | 59.7 | 60.3 | 59.7 | 60.3 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 130970004 | Georgia | Douglas | Douglasville | 33.74124 | -84.7764 | 68 | 69 | 66 | 63 | 57.7 | 58.6 | 57.7 | 58.6 | 57.9 | 58.7 | 57.9 | 58.7 |
| 131210055 | Georgia | Fulton | United Avenue | 33.72074 | -84.3573 | 74.3 | 75 | 68 | 65 | 64.1 | 64.8 | 64.1 | 64.8 | 63.1 | 63.6 | 63.1 | 63.6 |
| 131270006 | Georgia | Glynn | Brunswick | 31.16981 | -81.495 | 56.3 | 57 | 55 | 54 | | | | | 47.3 | 47.9 | | |
| 131350002 | Georgia | Gwinnett | Gwinnett | 33.9632 | -84.0691 | 70.7 | 72 | 66 | 64 | 57.1 | 58.1 | 57.1 | 58.1 | 57.1 | 58.1 | 57.1 | 58.1 |
| 131510002 | Georgia | Henry | McDonough | 33.43395 | -84.1618 | 72 | 74 | 66 | 64 | 60.8 | 62.5 | 60.8 | 62.5 | 60 | 61.6 | 60 | 61.6 |
| 132130003 | Georgia | Murray | Fort Mountain | 34.78522 | -84.6264 | 65 | 65 | 62 | 62 | 54.4 | 54.4 | 54.4 | 54.4 | 53.1 | 53.1 | 53.1 | 53.1 |
| 132150008 | Georgia | Muscogee | Columbus-Airport | 32.52127 | -84.9446 | 61 | 62 | 59 | 57 | 51.2 | 52.1 | 51.2 | 52.1 | 51 | 51.9 | 51 | 51.9 |
| 132230003 | Georgia | Paulding | Yorkville: King Farm | 33.9285 | -85.0453 | 63 | 63 | NA | NA | 52.1 | 52.1 | 52.1 | 52.1 | 51.1 | 51.1 | 51.1 | 51.1 |
| 132319991 | Georgia | Pike | Georgia Station | 33.1787 | -84.4052 | 67.5 | 68 | 61 | 58 | 57.3 | 57.7 | 57.3 | 57.7 | 57.4 | 57.9 | 57.4 | 57.9 |
| 132450091 | Georgia | Richmond | Augusta | 33.4339 | -82.0224 | 61.7 | 62 | 62 | 60 | 52.1 | 52.4 | 52.1 | 52.4 | 51.7 | 51.9 | 51.7 | 51.9 |
| 132470001 | Georgia | Rockdale | Conyers | 33.58855 | -84.0696 | 71 | 74 | 65 | 62 | 60.1 | 62.7 | 60.1 | 62.7 | 59.1 | 61.6 | 59.1 | 61.6 |
| 132611001 | Georgia | Sumter | Leslie | 31.95429 | -84.081 | 60.3 | 61 | 58 | 57 | 52.6 | 53.2 | 52.6 | 53.2 | | | | |
| 170010007 | Illinois | Adams | JOHN WOOD COMMUNITY COLLEGE | 39.91541 | -91.3359 | 62.7 | 63 | 63 | 61 | | | | | | | | |
| 170190007 | Illinois | Champaign | Thomasboro | 40.24491 | -88.1885 | 65.3 | 68 | 65 | 65 | | | | | | | | |
| 170191001 | Illinois | Champaign | ISWS CLIMATE STATION | 40.05278 | -88.3725 | 65.7 | 66 | 60 | 59 | | | | | | | | |
| 170230001 | Illinois | Clark | 416 S. State St. Hwy 1-West Union | 39.21086 | -87.6683 | 65 | 66 | 60 | 61 | 56.6 | 57.5 | 56.6 | 57.5 | | | | |
| 170310001 | Illinois | Cook | VILLAGE GARAGE | 41.67099 | -87.7325 | 73 | 77 | 71 | 72 | 69.6 | 73.4 | 69.6 | 73.4 | 68.2 | 71.9 | 68.2 | 71.9 |
| 170310032 | Illinois | Cook | SOUTH WATER FILTRATION PLANT | 41.75583 | -87.5454 | 72.3 | 75 | 75 | 74 | 69.6 | 72.2 | 69.9 | 72.5 | 68.6 | 71.2 | 68 | 70.6 |
| 170310076 | Illinois | Cook | COM ED MAINTENANCE BLDG | 41.7514 | -87.7135 | 72 | 75 | NA | 70 | 69.3 | 72.2 | 69.3 | 72.2 | 67.4 | 70.3 | 67.4 | 70.3 |
| 170311003 | Illinois | Cook | TAFT HS | 41.98433 | -87.792 | 68.3 | 69 | 71 | 71 | 66 | 66.7 | 65.2 | 65.8 | 64.8 | 65.5 | 63.4 | 64 |
| 170311601 | Illinois | Cook | COOK COUNTY TRAILER | 41.66812 | -87.9906 | 69.3 | 70 | 72 | 73 | 65.1 | 65.8 | 65.1 | 65.8 | 63.1 | 63.8 | 63.1 | 63.8 |
| 170313103 | Illinois | Cook | IEPA TRAILER | 41.96519 | -87.8763 | 62.7 | 64 | 64 | 63 | 59.4 | 60.7 | 59.4 | 60.7 | 57.9 | 59.1 | 57.9 | 59.1 |
| 170314002 | Illinois | Cook | COOK COUNTY TRAILER | 41.85524 | -87.7525 | 68.7 | 72 | 70 | 71 | 67.2 | 70.5 | 66.3 | 69.5 | 66.2 | 69.4 | 64.2 | 67.2 |
| 170314007 | Illinois | Cook | REGIONAL OFFICE BUILDING | 42.06029 | -87.8632 | 72 | 74 | 69 | 70 | 68.5 | 70.4 | 68 | 69.9 | 67.2 | 69 | 66 | 67.9 |
| 170314201 | Illinois | Cook | NORTHBROOK WATER PLANT | 42.14 | -87.7992 | 73.3 | 77 | 74 | 74 | 69.7 | 73.3 | 69.2 | 72.7 | 68.4 | 71.8 | 67.2 | 70.6 |
| 170317002 | Illinois | Cook | WATER PLANT | 42.06205 | -87.6753 | 74 | 77 | 73 | 74 | 70.6 | 73.5 | 69.7 | 72.6 | 69.8 | 72.7 | 69.4 | 72.2 |
| 170436001 | Illinois | DuPage | MORTON ARBORETUM | 41.81305 | -88.0728 | 69.7 | 71 | 70 | 70 | 66 | 67.2 | 66 | 67.2 | 64.6 | 65.8 | 64.6 | 65.8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 170491001 | Illinois | Effingham | CENTRAL JR HIGH | 39.06716 | -88.5489 | 65.7 | 67 | NA | NA | 58.4 | 59.6 | 58.4 | 59.6 | | | | |
| 170650002 | Illinois | Hamilton | TEN MILE CREEK DNR OFFICE | 38.08216 | -88.6249 | 65.7 | 67 | 65 | 65 | 58.3 | 59.4 | 58.3 | 59.4 | | | | |
| 170831001 | Illinois | Jersey | ILLINI JR HIGH | 39.11054 | -90.3241 | 68 | 68 | NA | NA | 61.4 | 61.4 | 61.4 | 61.4 | 61.2 | 61.2 | 61.2 | 61.2 |
| 170859991 | Illinois | Jo Daviess | Stockton | 42.2869 | -89.9997 | 64.7 | 65 | 62 | 62 | | | | | | | | |
| 170890005 | Illinois | Kane | LARSEN JUNIOR HIGH | 42.04915 | -88.273 | 69.3 | 71 | 70 | 70 | 64.3 | 65.8 | 64.3 | 65.8 | 62.1 | 63.6 | 62.1 | 63.6 |
| 170971007 | Illinois | Lake | CAMP LOGAN TRAILER | 42.46757 | -87.81 | 73.7 | 75 | 73 | 74 | 68.7 | 69.9 | 68.4 | 69.6 | 70.7 | 71.9 | 67.9 | 69.1 |
| 171110001 | Illinois | McHenry | CARY GROVE HS | 42.22144 | -88.2422 | 69.7 | 72 | 71 | 71 | 64.2 | 66.3 | 64.2 | 66.3 | 62.4 | 64.4 | 62.4 | 64.4 |
| 171132003 | Illinois | McLean | ISU HARRIS PHYSICAL PLANT | 40.51874 | -88.9969 | 64.3 | 65 | 65 | 67 | | | | | | | | |
| 171150013 | Illinois | Macon | IEPA TRAILER | 39.86683 | -88.9256 | 66.3 | 67 | 64 | 64 | | | | | | | | |
| 171170002 | Illinois | Macoupin | IEPA TRAILER | 39.39608 | -89.8097 | 65 | 66 | 62 | 62 | 57.9 | 58.8 | 57.9 | 58.8 | | | | |
| 171190008 | Illinois | Madison | CLARA BARTON SCHOOL | 38.89019 | -90.148 | 70 | 71 | NA | NA | 63 | 63.9 | 63 | 63.9 | 63 | 63.9 | 63 | 63.9 |
| 171191009 | Illinois | Madison | SOUTHWEST CABLE TV | 38.72657 | -89.96 | 69 | 72 | 67 | 63 | 61.8 | 64.5 | 61.8 | 64.5 | 61.1 | 63.8 | 61.1 | 63.8 |
| 171193007 | Illinois | Madison | WATER PLANT | 38.86067 | -90.1059 | 70.7 | 71 | 69 | 70 | 63.6 | 63.9 | 63.6 | 63.9 | 63.6 | 63.9 | 63.6 | 63.9 |
| 171199991 | Illinois | Madison | Alhambra | 38.869 | -89.6228 | 67.3 | 68 | 64 | 67 | 60.2 | 60.9 | 60.2 | 60.9 | | | | |
| 171430024 | Illinois | Peoria | FIRESTATION | 40.68742 | -89.6069 | 65 | 67 | 63 | 62 | | | | | | | | |
| 171431001 | Illinois | Peoria | PEORIA HEIGHTS HS | 40.7455 | -89.5859 | 66 | 67 | 65 | 65 | | | | | | | | |
| 171570001 | Illinois | Randolph | IEPA TRAILER | 38.17628 | -89.7885 | 66.3 | 67 | 62 | 64 | 58.1 | 58.7 | 58.1 | 58.7 | 56.4 | 57 | 56.4 | 57 |
| 171613002 | Illinois | Rock Island | ROCK ISLAND ARSENAL | 41.51473 | -90.5174 | 63.3 | 65 | 65 | 63 | | | | | | | | |
| 171630010 | Illinois | Saint Clair | IEPA-RAPS TRAILER | 38.61203 | -90.1605 | 69 | 71 | 65 | 66 | 61.8 | 63.6 | 61.8 | 63.6 | 61.7 | 63.5 | 61.7 | 63.5 |
| 171670014 | Illinois | Sangamon | Illinois Building State Fairgrounds | 39.83152 | -89.6409 | 66 | 68 | 62 | 62 | | | | | | | | |
| 171971011 | Illinois | Will | COM ED TRAINING CENTER | 41.22154 | -88.191 | 65.3 | 67 | 64 | 65 | | | | | | | | |
| 172012001 | Illinois | Winnebago | MAPLE ELEMENTARY SCHOOL | 42.33498 | -89.0378 | 67.3 | 68 | 66 | 66 | | | | | | | | |
| 180030002 | Indiana | Allen | Leo High School | 41.22142 | -85.0168 | 64.7 | 67 | 64 | 66 | 57.9 | 59.9 | 57.9 | 59.9 | 55.7 | 57.6 | 55.7 | 57.6 |
| 180030004 | Indiana | Allen | Ft. Wayne- Beacon St. | 41.09497 | -85.1018 | 64 | 66 | 61 | NA | 57.1 | 58.9 | 57.1 | 58.9 | 55 | 56.7 | 55 | 56.7 |
| 180050007 | Indiana | Bartholomew | Hope- Hauser Jr-Sr High School | 39.29432 | -85.7668 | 67.7 | 68 | 63 | 64 | 59.5 | 59.8 | 59.5 | 59.8 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 180110001 | Indiana | Boone | Perry Worth ELEMENTRY SCHOOL: WEST OF WHITESTOWN | 39.99773 | -86.3954 | 67 | 69 | 66 | 67 | 60.2 | 62 | 60.2 | 62 | 57.8 | 59.5 | 57.8 | 59.5 |
| 180150002 | Indiana | Carroll | Flora-Flora Airport | 40.54046 | -86.553 | 63.7 | 64 | 63 | 64 | 56.6 | 56.9 | 56.6 | 56.9 | | | | |
| 180190008 | Indiana | Clark | Charlestown State Park-1051.8 meters East of SR 62/ Indiana armory | 38.39382 | -85.6641 | 70.3 | 71 | 63 | 63 | 61.4 | 62.1 | 61.4 | 62.1 | 59.9 | 60.5 | 59.9 | 60.5 |
| 180350010 | Indiana | Delaware | Albany- Albany Elem. Sch. | 40.30039 | -85.2459 | 62.3 | 66 | 61 | 64 | 54.4 | 57.7 | 54.4 | 57.7 | | | | |
| 180390007 | Indiana | Elkhart | Bristol- Bristol Elem. Sch. | 41.71696 | -85.8247 | 64.3 | 68 | 61 | 62 | 57.4 | 60.8 | 57.4 | 60.8 | 56.2 | 59.5 | 56.2 | 59.5 |
| 180431004 | Indiana | Floyd | New Albany- Green Valley Elem. Sch. | 38.30791 | -85.8343 | 71 | 73 | 64 | 64 | 62.9 | 64.6 | 62.9 | 64.6 | 61.1 | 62.8 | 61.1 | 62.8 |
| 180550001 | Indiana | Greene | Plummer: 2500 S. W-Citizens gas Plummer maintenance facility | 38.98558 | -86.9901 | 66.7 | 67 | 64 | 64 | 58.2 | 58.4 | 58.2 | 58.4 | | | | |
| 180570006 | Indiana | Hamilton | Our Lady of Grace-Noblesville | 40.0683 | -85.9925 | 66.3 | 69 | 64 | 64 | 59.1 | 61.5 | 59.1 | 61.5 | 56.5 | 58.8 | 56.5 | 58.8 |
| 180630004 | Indiana | Hendricks | AVON- 255 S. SR 267 (also 255 S. Avon Ave.) Avon: IN | 39.75889 | -86.3986 | 63.3 | 67 | 61 | 62 | 57.5 | 60.9 | 57.5 | 60.9 | 55.3 | 58.6 | 55.3 | 58.6 |
| 180690002 | Indiana | Huntington | Roanoke- Roanoke Elem. School | 40.9596 | -85.3796 | 60.7 | 64 | NA | NA | 54 | 57 | 54 | 57 | 52 | 54.8 | 52 | 54.8 |
| 180710001 | Indiana | Jackson | Brownstown- 225 W & 200 N. Water facility | 38.92084 | -86.0805 | 65.7 | 66 | NA | NA | 57.3 | 57.6 | 57.3 | 57.6 | | | | |
| 180810002 | Indiana | Johnson | Indian Creek Elementary School in Trafalgar: DUE SOUTH OF INDIANAPOLIS | 39.41724 | -86.1524 | 61 | 62 | NA | NA | 54 | 54.9 | 54 | 54.9 | 53.3 | 54.2 | 53.3 | 54.2 |
| 180839991 | Indiana | Knox | Vincennes | 38.7408 | -87.4853 | 66.7 | 69 | 65 | 66 | 58.8 | 60.8 | 58.8 | 60.8 | 58 | 60 | 58 | 60 |
| 180890022 | Indiana | Lake | Gary-IITRI/ 1219.5 meters east of Tennessee St.- old ammunition bunker | 41.60667 | -87.3047 | 68.3 | 70 | 69 | 71 | 64.5 | 66.1 | 64.6 | 66.2 | 63.4 | 65 | 64 | 65.6 |
| 180892008 | Indiana | Lake | HAMMOND CAAP-Hammond- 141st St. | 41.63944 | -87.4936 | 65.5 | 66 | 68 | 69 | 62.5 | 63 | 62.4 | 62.9 | 61.2 | 61.6 | 61.2 | 61.6 |
| 180910010 | Indiana | LaPorte | LAPORTE OZONE SITE AT WATER TREATMENT PLANT | 41.62917 | -86.6844 | 65 | 67 | 63 | 64 | 59.9 | 61.7 | 59.4 | 61.3 | 60.8 | 62.6 | 59.9 | 61.7 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 180950010 | Indiana | Madison | SCHOOL LOCATED ON THE SW CORNER OF US 36 AND IND 109 | 40.00251 | -85.6564 | 62.3 | 68 | NA | NA | 54.9 | 60 | 54.9 | 60 | 53.1 | 58 | 53.1 | 58 |
| 180970050 | Indiana | Marion | Indpls.- Ft. Harrison | 39.85889 | -86.0214 | 70.3 | 72 | 65 | 65 | 63.9 | 65.4 | 63.9 | 65.4 | 60.2 | 61.6 | 60.2 | 61.6 |
| 180970057 | Indiana | Marion | Indpls- Harding St. | 39.74903 | -86.1863 | 66 | 69 | 66 | 68 | 61.2 | 64 | 61.2 | 64 | 57.3 | 59.9 | 57.3 | 59.9 |
| 180970073 | Indiana | Marion | Indpls.- E. 16th St. | 39.78949 | -86.0609 | 65.5 | 66 | NA | NA | 60.2 | 60.6 | 60.2 | 60.6 | 56.5 | 56.9 | 56.5 | 56.9 |
| 180970078 | Indiana | Marion | Indpls- Washington Park/ in parking lot next to police station | 39.81083 | -86.1144 | 68.5 | 69 | 64 | 66 | 63.5 | 64 | 63.5 | 64 | 59.4 | 59.9 | 59.4 | 59.9 |
| 180970087 | Indiana | Marion | Indpls.- I 70 | 39.78793 | -86.1309 | 65.3 | 67 | 59 | 62 | 60.6 | 62.1 | 60.6 | 62.1 | 56.7 | 58.1 | 56.7 | 58.1 |
| 181090005 | Indiana | Morgan | Monrovia- Monrovia HS. | 39.57563 | -86.4779 | 63 | 64 | NA | NA | 55.7 | 56.6 | 55.7 | 56.6 | | | | |
| 181230009 | Indiana | Perry | Leopold- Perry Central HS | 38.11515 | -86.6033 | 66.7 | 67 | 64 | 64 | 57.9 | 58.2 | 57.9 | 58.2 | 56.6 | 56.8 | 56.6 | 56.8 |
| 181270024 | Indiana | Porter | Ogden Dunes- Water Treatment Plant | 41.6175 | -87.1992 | 69.7 | 71 | 72 | 73 | 65.1 | 66.3 | 64.4 | 65.6 | 65 | 66.2 | 64.6 | 65.8 |
| 181270026 | Indiana | Porter | VALPARAISO | 41.51212 | -87.0362 | 69.3 | 73 | 68 | 66 | 63.7 | 67.1 | 63.7 | 67.1 | 63.9 | 67.3 | 63.9 | 67.3 |
| 181290003 | Indiana | Posey | ST. PHILLIPS- St. Phillips road CAAP trailer | 38.00641 | -87.7184 | 66.7 | 67 | 61 | 61 | 57.8 | 58 | 57.8 | 58 | 55.7 | 55.9 | 55.7 | 55.9 |
| 181410010 | Indiana | St. Joseph | Potato Creek State Park | 41.55167 | -86.3706 | 65 | 68 | 63 | 63 | 58.6 | 61.3 | 58.6 | 61.3 | 57.7 | 60.3 | 57.7 | 60.3 |
| 181410015 | Indiana | St. Joseph | South Bend-Shields Dr. | 41.69666 | -86.2147 | 70 | 72 | 65 | 67 | 62.9 | 64.7 | 62.9 | 64.7 | 61.8 | 63.6 | 61.8 | 63.6 |
| 181410016 | Indiana | St. Joseph | Granger-Beckley St. | 41.75472 | -86.11 | 67.3 | 69 | 64 | 66 | 60.5 | 62 | 60.5 | 62 | 59.5 | 61 | 59.5 | 61 |
| 181450001 | Indiana | Shelby | TRITON Middle SCHOOL: NORTH OF FAIRLAND | 39.61337 | -85.8707 | 64.7 | 68 | 63 | 64 | 58.3 | 61.3 | 58.3 | 61.3 | 56 | 58.9 | 56 | 58.9 |
| 181630013 | Indiana | Vanderburgh | Inglefield/ Scott School | 38.11389 | -87.5367 | 68.3 | 69 | 62 | 64 | 59.2 | 59.9 | 59.2 | 59.9 | 57.8 | 58.4 | 57.8 | 58.4 |
| 181630021 | Indiana | Vanderburgh | Evansville- Buena Vista | 38.01333 | -87.5772 | 69 | 70 | 65 | 66 | 59.4 | 60.2 | 59.4 | 60.2 | 57.6 | 58.5 | 57.6 | 58.5 |
| 181670018 | Indiana | Vigo | TERRE HAUTE CAAP/ McLean High School | 39.48599 | -87.4013 | 66.7 | 68 | 63 | 65 | 58.1 | 59.2 | 58.1 | 59.2 | | | | |
| 181670024 | Indiana | Vigo | Sandcut/ SITE LOCATED BY HOME BEHIND SHED. | 39.55853 | -87.3129 | 64.3 | 67 | 61 | 62 | 56.1 | 58.5 | 56.1 | 58.5 | | | | |
| 181699991 | Indiana | Wabash | Salamonie Reservoir | 40.81604 | -85.6614 | 68.7 | 70 | 64 | 65 | 60.6 | 61.8 | 60.6 | 61.8 | | | | |
| 181730008 | Indiana | Warrick | Boonville- Boonville HS | 38.05167 | -87.2781 | 68.7 | 69 | 64 | 66 | 58.7 | 58.9 | 58.7 | 58.9 | 58 | 58.2 | 58 | 58.2 |
| 181730009 | Indiana | Warrick | Lynnville- Tecumseh HS | 38.1945 | -87.3414 | 66 | 66 | NA | NA | 56.5 | 56.5 | 56.5 | 56.5 | 56.1 | 56.1 | 56.1 | 56.1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 181730011 | Indiana | Warrick | Dayville | 37.95444 | -87.3217 | 67.7 | 68 | 63 | 65 | 58.6 | 58.9 | 58.6 | 58.9 | 57.2 | 57.5 | 57.2 | 57.5 |
| 190170011 | Iowa | Bremer | WAVERLY AIRPORT SITE | 42.74304 | -92.5132 | 61 | 63 | 61 | 60 | | | | | | | | |
| 190450021 | Iowa | Clinton | CLINTON: RAINBOW PARK | 41.875 | -90.1776 | 63 | 64 | 61 | 63 | | | | | | | | |
| 190850007 | Iowa | Harrison | | 41.83226 | -95.9282 | 62.7 | 64 | 62 | 61 | | | | | | | | |
| 190851101 | Iowa | Harrison | PISGAH: HIGHWAY MAINTENANCE | 41.78026 | -95.9484 | 62 | 62 | NA | NA | | | | | | | | |
| 191130028 | Iowa | Linn | KIRKWOOD | 41.91056 | -91.6521 | 61 | 61 | NA | NA | | | | | | | | |
| 191130033 | Iowa | Linn | COGGON ELEMENTARY SCHOOL BLDG. NORTHERN LIMITS OF LINN COUNTY | 42.28101 | -91.5269 | 62.3 | 65 | 62 | 61 | | | | | | | | |
| 191130040 | Iowa | Linn | Public Health | 41.97677 | -91.6877 | 61.7 | 63 | 59 | 60 | | | | | | | | |
| 191370002 | Iowa | Montgomery | VIKING LAKE STATE PARK | 40.96911 | -95.045 | 60.3 | 61 | 57 | 57 | | | | | | | | |
| 191471002 | Iowa | Palo Alto | EMMETSBURG: IOWA LAKES COMMUNITY COLL. | 43.1237 | -94.6935 | 61.3 | 62 | 63 | 61 | | | | | | | | |
| 191530030 | Iowa | Polk | CARPENTER | 41.60316 | -93.6431 | 60 | 61 | 59 | 58 | | | | | | | | |
| 191630014 | Iowa | Scott | SCOTT COUNTY PARK | 41.69917 | -90.5219 | 63.3 | 65 | 60 | 60 | | | | | | | | |
| 191630015 | Iowa | Scott | DAVENPORT: JEFFERSON SCH. | 41.53001 | -90.5876 | 61.3 | 63 | 61 | 60 | | | | | | | | |
| 191690011 | Iowa | Story | SLATER CITY HALL | 41.88287 | -93.6878 | 60 | 60 | NA | NA | | | | | | | | |
| 191770006 | Iowa | Van Buren | LAKE SUGEMA STATE PARK II | 40.69508 | -92.0063 | 60 | 61 | 58 | 56 | | | | | | | | |
| 191810022 | Iowa | Warren | GRAVEL ROAD IN LAKE AQUABI STATE PARK | 41.28553 | -93.584 | 58 | 58 | NA | NA | | | | | | | | |
| 200910010 | Kansas | Johnson | HERITAGE PARK | 38.83858 | -94.7464 | 60 | 61 | 57 | 60 | 54.6 | 55.5 | 54.6 | 55.5 | | | | |
| 201030003 | Kansas | Leavenworth | Leavenworth | 39.32739 | -94.951 | 61.3 | 63 | 61 | 61 | 55.1 | 56.6 | 55.1 | 56.6 | 53.9 | 55.4 | 53.9 | 55.4 |
| 201330003 | Kansas | Neosho | CHANUTE | 37.67696 | -95.4759 | 61 | 61 | 59 | 60 | | | | | | | | |
| 201730010 | Kansas | Sedgwick | WICHITA HD | 37.70207 | -97.3148 | 63.7 | 65 | 60 | 64 | | | | | | | | |
| 201730018 | Kansas | Sedgwick | Sedgwick Ozone | 37.89751 | -97.4921 | 64 | 65 | 62 | 64 | | | | | | | | |
| 201770013 | Kansas | Shawnee | KNI | 39.02427 | -95.7113 | 62.3 | 63 | 60 | 59 | | | | | | | | |
| 201910002 | Kansas | Sumner | PECK | 37.47689 | -97.3664 | 63.7 | 64 | 61 | 63 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 201950001 | Kansas | Trego | CEDAR BLUFF | 38.77008 | -99.7634 | 61.7 | 63 | 60 | 62 | | | | | | | | |
| 202090021 | Kansas | Wyandotte | JFK | 39.11722 | -94.6356 | 63 | 64 | 63 | 65 | 57.5 | 58.4 | 57.5 | 58.4 | 56.4 | 57.3 | 56.4 | 57.3 |
| 210130002 | Kentucky | Bell | MIDDLESBORO | 36.60843 | -83.7369 | 60.7 | 61 | 56 | 56 | 52.7 | 52.9 | 52.7 | 52.9 | | | | |
| 210150003 | Kentucky | Boone | EAST BEND | 38.91833 | -84.8526 | 63 | 64 | 61 | NA | 54.1 | 55 | 54.1 | 55 | 53.7 | 54.6 | 53.7 | 54.6 |
| 210190017 | Kentucky | Boyd | ASHLAND PRIMARY (FIVCO) | 38.45934 | -82.6404 | 65 | 66 | 59 | 59 | 57.5 | 58.4 | 57.5 | 58.4 | 56.4 | 57.3 | 56.4 | 57.3 |
| 210290006 | Kentucky | Bullitt | SHEPHERDSVILLE | 37.98629 | -85.7119 | 65.7 | 66 | 64 | 64 | 58.1 | 58.3 | 58.1 | 58.3 | 57.5 | 57.8 | 57.5 | 57.8 |
| 210373002 | Kentucky | Campbell | NORTHERN KENTUCKY UNIVERSITY (NKU) | 39.02188 | -84.4745 | 68.7 | 70 | 63 | 63 | 59 | 60.1 | 59 | 60.1 | 57.7 | 58.8 | 57.7 | 58.8 |
| 210430500 | Kentucky | Carter | GRAYSON LAKE | 38.23887 | -82.9881 | 62 | 63 | 55 | 56 | 54.6 | 55.5 | 54.6 | 55.5 | 53.7 | 54.5 | 53.7 | 54.5 |
| 210470006 | Kentucky | Christian | HOPKINSVILLE | 36.91171 | -87.3233 | 61 | 62 | 58 | 59 | 53.5 | 54.3 | 53.5 | 54.3 | | | | |
| 210590005 | Kentucky | Daviess | OWENSBORO PRIMARY | 37.78078 | -87.0753 | 65 | 65 | 64 | 64 | 55.7 | 55.7 | 55.7 | 55.7 | 53.4 | 53.4 | 53.4 | 53.4 |
| 210610501 | Kentucky | Edmonson | Mammoth Cave NP - Houchin Meadow | 37.13179 | -86.143 | 63.7 | 64 | 59 | 59 | 55.2 | 55.5 | 55.2 | 55.5 | | | | |
| 210670012 | Kentucky | Fayette | LEXINGTON PRIMARY | 38.06503 | -84.4976 | 65.7 | 67 | 60 | 63 | 56.9 | 58 | 56.9 | 58 | 56.1 | 57.2 | 56.1 | 57.2 |
| 210890007 | Kentucky | Greenup | WORTHINGTON | 38.54814 | -82.7312 | 61.7 | 63 | 54 | 55 | 54.3 | 55.4 | 54.3 | 55.4 | 53.2 | 54.4 | 53.2 | 54.4 |
| 210910012 | Kentucky | Hancock | LEWISPORT | 37.93829 | -86.8972 | 67.5 | 68 | 63 | 65 | 58 | 58.4 | 58 | 58.4 | 55.9 | 56.4 | 55.9 | 56.4 |
| 210930006 | Kentucky | Hardin | ELIZABETHTOWN | 37.70561 | -85.8526 | 64.7 | 65 | 60 | 61 | 55.9 | 56.2 | 55.9 | 56.2 | 56 | 56.3 | 56 | 56.3 |
| 211010014 | Kentucky | Henderson | BASKETT | 37.8712 | -87.4638 | 68.3 | 69 | NA | NA | 58.8 | 59.4 | 58.8 | 59.4 | 58 | 58.6 | 58 | 58.6 |
| 211110027 | Kentucky | Jefferson | Bates | 38.13784 | -85.5765 | 69 | 69 | NA | NA | 61.2 | 61.2 | 61.2 | 61.2 | 60.2 | 60.2 | 60.2 | 60.2 |
| 211110051 | Kentucky | Jefferson | Watson Lane | 38.06091 | -85.898 | 68.3 | 69 | 65 | 65 | 60.8 | 61.4 | 60.8 | 61.4 | 59 | 59.6 | 59 | 59.6 |
| 211110067 | Kentucky | Jefferson | CANNONS LANE | 38.22876 | -85.6545 | 74.3 | 75 | 69 | 70 | 65.4 | 66 | 65.4 | 66 | 63.7 | 64.3 | 63.7 | 64.3 |
| 211130001 | Kentucky | Jessamine | NICHOLASVILLE | 37.89147 | -84.5883 | 64 | 65 | 60 | 62 | 55.2 | 56.1 | 55.2 | 56.1 | 54.7 | 55.6 | 54.7 | 55.6 |
| 211390003 | Kentucky | Livingston | SMITHLAND | 37.15539 | -88.394 | 65 | 66 | 62 | 64 | 56.1 | 57 | 56.1 | 57 | 56.3 | 57.2 | 56.3 | 57.2 |
| 211451024 | Kentucky | McCracken | JACKSON PURCHASE (PADUCAH PRIMARY) | 37.05822 | -88.5725 | 62.7 | 63 | 63 | 65 | 54.3 | 54.5 | 54.3 | 54.5 | 53.6 | 53.9 | 53.6 | 53.9 |
| 211759991 | Kentucky | Morgan | Crockett | 37.9214 | -83.0662 | 64 | 64 | 57 | 57 | 56.5 | 56.5 | 56.5 | 56.5 | | | | |
| 211850004 | Kentucky | Oldham | BUCKNER | 38.4002 | -85.4443 | 68.3 | 70 | 63 | 63 | 59.3 | 60.7 | 59.3 | 60.7 | 58 | 59.4 | 58 | 59.4 |
| 211930003 | Kentucky | Perry | HAZARD | 37.28329 | -83.2093 | 58 | 58 | 56 | 56 | 51.2 | 51.2 | 51.2 | 51.2 | | | | |
| 211950002 | Kentucky | Pike | PIKEVILLE PRIMARY | 37.4826 | -82.5353 | 59.3 | 60 | 54 | 55 | 52.9 | 53.5 | 52.9 | 53.5 | | | | |
| 211990003 | Kentucky | Pulaski | SOMERSET | 37.09798 | -84.6115 | 61 | 62 | 57 | 58 | 53 | 53.9 | 53 | 53.9 | | | | |
| 212130004 | Kentucky | Simpson | FRANKLIN | 36.70861 | -86.5663 | 63.7 | 64 | 59 | 60 | 55.4 | 55.7 | 55.4 | 55.7 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 212219991 | Kentucky | Trigg | Cadiz | 36.7841 | -87.8499 | 62 | 63 | 60 | 59 | 54.2 | 55.1 | 54.2 | 55.1 | | | | |
| 212270009 | Kentucky | Warren | ED SPEAR PARK (SMITHS GROVE) | 37.04926 | -86.2149 | 61.3 | 62 | 57 | 60 | 53.1 | 53.7 | 53.1 | 53.7 | | | | |
| 212299991 | Kentucky | Washington | Mackville | 37.7046 | -85.0485 | 64 | 64 | 60 | 60 | 55.6 | 55.6 | 55.6 | 55.6 | | | | |
| 220050004 | Louisiana | Ascension | Dutchtown | 30.22965 | -90.9656 | 70 | 71 | 64 | 64 | 64.6 | 65.5 | 64.6 | 65.5 | 63.7 | 64.6 | 63.7 | 64.6 |
| 220150008 | Louisiana | Bossier | Shreveport / Airport | 32.53627 | -93.7489 | 65.3 | 66 | 58 | 58 | 57.7 | 58.3 | 57.7 | 58.3 | 55.4 | 56 | 55.4 | 56 |
| 220170001 | Louisiana | Caddo | Dixie | 32.68336 | -93.8616 | 63.3 | 64 | 59 | 60 | 56.2 | 56.9 | 56.2 | 56.9 | 53.5 | 54 | 53.5 | 54 |
| 220190002 | Louisiana | Calcasieu | Carlyss | 30.14027 | -93.3684 | 66.3 | 68 | 61 | 61 | 61.9 | 63.4 | 61.9 | 63.4 | | | | |
| 220190009 | Louisiana | Calcasieu | Vinton | 30.2278 | -93.58 | 64 | 64 | 63 | 63 | 59 | 59 | 59 | 59 | | | | |
| 220330003 | Louisiana | East Baton Rouge | LSU | 30.41981 | -91.182 | 71 | 72 | 64 | 63 | 64.6 | 65.5 | 64.6 | 65.5 | 63.7 | 64.6 | 63.7 | 64.6 |
| 220330009 | Louisiana | East Baton Rouge | Capitol | 30.46198 | -91.1792 | 67.3 | 69 | 65 | 65 | 60.8 | 62.4 | 60.8 | 62.4 | 59.8 | 61.3 | 59.8 | 61.3 |
| 220470009 | Louisiana | Iberville | Bayou Plaquemine | 30.22126 | -91.3154 | 66 | 66 | 65 | 67 | 61.1 | 61.1 | 61.1 | 61.1 | 59.9 | 59.9 | 59.9 | 59.9 |
| 220511001 | Louisiana | Jefferson | Kenner | 30.04124 | -90.2728 | 66.7 | 68 | 63 | 62 | 60.9 | 62.1 | 61.2 | 62.4 | 61.8 | 63 | 61.9 | 63.1 |
| 220550007 | Louisiana | Lafayette | Lafayette / USGS | 30.22611 | -92.0429 | 65 | 66 | 60 | 61 | 59 | 59.9 | 59 | 59.9 | | | | |
| 220570004 | Louisiana | Lafourche | Thibodaux | 29.7641 | -90.7653 | 63.7 | 65 | 61 | 59 | 58.1 | 59.3 | 58.1 | 59.3 | 57.6 | 58.8 | 57.6 | 58.8 |
| 220630002 | Louisiana | Livingston | French Settlement | 30.31541 | -90.8114 | 68 | 70 | 61 | 62 | 62.5 | 64.3 | 62.5 | 64.3 | 61.4 | 63.2 | 61.4 | 63.2 |
| 220730004 | Louisiana | Ouachita | Monroe / Airport | 32.50996 | -92.0462 | 59 | 59 | 58 | 58 | 53.7 | 53.7 | 53.7 | 53.7 | | | | |
| 220770001 | Louisiana | Pointe Coupee | New Roads | 30.68172 | -91.3662 | 67 | 68 | 66 | 64 | 60.5 | 61.4 | 60.5 | 61.4 | 60.1 | 61 | 60.1 | 61 |
| 220870004 | Louisiana | St. Bernard | Meraux | 29.93961 | -89.9239 | 65.3 | 66 | 59 | 58 | 59 | 59.7 | 59.4 | 60.1 | 59.3 | 59.9 | 59.6 | 60.2 |
| 220930002 | Louisiana | St. James | Convent | 29.99497 | -90.8174 | 63.3 | 65 | 59 | 59 | 58.5 | 60 | 58.5 | 60 | 57.9 | 59.4 | 57.9 | 59.4 |
| 220950002 | Louisiana | St. John the Baptist | Garyville | 30.05752 | -90.6193 | 65 | 66 | 60 | 60 | 60 | 60.9 | 60 | 60.9 | 59.7 | 60.7 | 59.7 | 60.7 |
| 220990001 | Louisiana | St. Martin | St. Martinville | 30.08887 | -91.8696 | 65 | 65 | 61 | 62 | 59.3 | 59.3 | 59.3 | 59.3 | | | | |
| 221030002 | Louisiana | St. Tammany | Madisonville | 30.42938 | -90.1997 | 66 | 68 | 59 | 60 | 58.4 | 60.1 | 58.7 | 60.4 | 58.9 | 60.7 | | |
| 221210001 | Louisiana | West Baton Rouge | Port Allen | 30.50064 | -91.2136 | 67 | 68 | 65 | 66 | 60.6 | 61.5 | 60.6 | 61.5 | 59.5 | 60.4 | 59.5 | 60.4 |
| 260050003 | Michigan | Allegan | Holland | 42.76779 | -86.1486 | 73.7 | 75 | 75 | 75 | 67.7 | 68.9 | 67.2 | 68.4 | 68.7 | 69.9 | 67 | 68.1 |
| 260190003 | Michigan | Benzie | | 44.61694 | -86.1094 | 68.3 | 69 | 64 | 68 | 62.2 | 62.8 | 61.9 | 62.6 | 61.9 | 62.5 | | |
| 260210014 | Michigan | Berrien | Coloma | 42.19779 | -86.3097 | 73.3 | 74 | 71 | 73 | 68.1 | 68.7 | 66.6 | 67.2 | 67.8 | 68.4 | 65.8 | 66.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 260270003 | Michigan | Cass | Cassopolis | 41.89557 | -86.0016 | 72 | 74 | 68 | 70 | 64 | 65.8 | 64 | 65.8 | 63.3 | 65.1 | 63.3 | 65.1 |
| 260330901 | Michigan | Chippewa | NORTH OF EASTERDAY AVENUE | 46.49363 | -84.3642 | 58 | 59 | NA | NA | | | | | | | | |
| 260370001 | Michigan | Clinton | ROSE LAKE: STOLL RD.(8562 E.) | 42.79834 | -84.3938 | 67 | 67 | NA | NA | 59.1 | 59.1 | 59.1 | 59.1 | 57.6 | 57.6 | 57.6 | 57.6 |
| 260490021 | Michigan | Genesee | | 43.04722 | -83.6702 | 67.7 | 68 | 64 | 67 | 60 | 60.2 | 60 | 60.2 | | | | |
| 260492001 | Michigan | Genesee | Otisville | 43.16834 | -83.4615 | 68 | 69 | 65 | 67 | | | | | | | | |
| 260630007 | Michigan | Huron | RURAL THUMB AREA OZONE SITE | 43.83639 | -82.6429 | 67.7 | 68 | 68 | 70 | | | | | 62.7 | 63 | | |
| 260650012 | Michigan | Ingham | | 42.73862 | -84.5346 | 67 | 67 | NA | NA | 59 | 59 | 59 | 59 | 57.6 | 57.6 | 57.6 | 57.6 |
| 260770008 | Michigan | Kalamazoo | KALAMAZOO FAIRGROUNDS | 42.27807 | -85.5419 | 69.7 | 71 | 65 | 68 | 62 | 63.1 | 62 | 63.1 | 60 | 61.1 | 60 | 61.1 |
| 260810020 | Michigan | Kent | GR-Monroe | 42.98417 | -85.6713 | 69 | 70 | 70 | 72 | 62.3 | 63.2 | 62.3 | 63.2 | | | | |
| 260810022 | Michigan | Kent | APPROXIMATELY 1/4 MILE SOUTH OF 14 MILE RD | 43.17667 | -85.4166 | 67.3 | 68 | 65 | 67 | 60.2 | 60.8 | 60.2 | 60.8 | | | | |
| 260910007 | Michigan | Lenawee | 6792 RAISIN CENTER HWY: LENAWEE CO.RD.COMM.OWNER: TECUMSEH | 41.99557 | -83.9466 | 67 | 68 | 64 | 66 | | | | | | | | |
| 260990009 | Michigan | Macomb | New Haven | 42.73139 | -82.7935 | 71.7 | 72 | 68 | 69 | 63.7 | 64 | 63.5 | 63.8 | 62.6 | 62.9 | 62 | 62.3 |
| 260991003 | Michigan | Macomb | | 42.51334 | -83.006 | 67.3 | 69 | 66 | 68 | 59.5 | 61 | 59.5 | 61 | 58.3 | 59.7 | 58.3 | 59.7 |
| 261010922 | Michigan | Manistee | | 44.307 | -86.2426 | 67 | 68 | NA | NA | 60.5 | 61.4 | 60.5 | 61.4 | 60.1 | 61 | 60.4 | 61.3 |
| 261050007 | Michigan | Mason | LOCATED 550 FT NORTH OF US10 | 43.95333 | -86.2944 | 68.7 | 70 | 64 | 67 | 62.5 | 63.7 | 62.5 | 63.7 | 61.7 | 62.9 | 61.7 | 62.9 |
| 261130001 | Michigan | Missaukee | LOCATED ABOUT 1/4 MILE WEST OF SITE | 44.31056 | -84.8919 | 66.7 | 67 | 63 | 65 | | | | | | | | |
| 261210039 | Michigan | Muskegon | | 43.27806 | -86.3111 | 75 | 76 | 74 | 79 | 69.1 | 70 | 68.4 | 69.3 | 68 | 68.9 | 67.7 | 68.6 |
| 261250001 | Michigan | Oakland | Oak Park | 42.46306 | -83.1832 | 70.7 | 73 | 69 | 69 | 63.8 | 65.8 | 63.8 | 65.8 | 61.6 | 63.6 | 61.6 | 63.6 |
| 261390005 | Michigan | Ottawa | Jenison | 42.89445 | -85.8527 | 69.3 | 70 | 69 | 71 | 62.8 | 63.5 | 62.8 | 63.5 | 62.3 | 62.9 | 62.3 | 62.9 |
| 261470005 | Michigan | St. Clair | Port Huron | 42.95334 | -82.4562 | 72 | 73 | 70 | 69 | 65.8 | 66.7 | 65.4 | 66.3 | 65.8 | 66.8 | 64.8 | 65.7 |
| 261530001 | Michigan | Schoolcraft | Seney | 46.28888 | -85.9502 | 67 | 70 | 64 | 66 | | | | | | | | |
| 261579991 | Michigan | Tuscola | Unionville | 43.6138 | -83.3591 | 65.7 | 66 | 64 | 66 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 261610008 | Michigan | Washtenaw | TOWNER ST: SOUTH; 2 LANE RESIDENIAL - HOSPITAL | 42.24057 | -83.5996 | 67.7 | 69 | 66 | 68 | 61.8 | 62.9 | 61.8 | 62.9 | 60.1 | 61.3 | 60.1 | 61.3 |
| 261619991 | Michigan | Washtenaw | Ann Arbor | 42.41664 | -83.9022 | 69.3 | 71 | 62 | 65 | 62.5 | 64 | 62.5 | 64 | 60.7 | 62.2 | 60.7 | 62.2 |
| 261630001 | Michigan | Wayne | Allen Park | 42.22862 | -83.2082 | 66.3 | 68 | 67 | 70 | 59.6 | 61.1 | 59.6 | 61.1 | 59 | 60.6 | 59 | 60.6 |
| 261630019 | Michigan | Wayne | East 7 Mile | 42.43084 | -83.0001 | 73 | 74 | 70 | 71 | 64.9 | 65.7 | 64.9 | 65.7 | 63.6 | 64.5 | 63.6 | 64.5 |
| 261659991 | Michigan | Wexford | Hoxeyville | 44.18089 | -85.739 | 66.7 | 67 | 64 | 68 | | | | | | | | |
| 270031001 | Minnesota | Anoka | Cedar Creek | 45.40184 | -93.2031 | 60 | 61 | NA | 59 | | | | | | | | |
| 270031002 | Minnesota | Anoka | Anoka County Airport | 45.13768 | -93.2076 | 62.7 | 63 | 64 | 63 | 58.8 | 59.1 | 58.8 | 59.1 | 58.8 | 59.1 | 58.8 | 59.1 |
| 270052013 | Minnesota | Becker | FWS Wetland Management District | 46.85181 | -95.8463 | 58.7 | 59 | NA | 60 | | | | | | | | |
| 270177417 | Minnesota | Carlton | Fond du Lac Band | 46.71369 | -92.5117 | 59 | 59 | NA | 55 | | | | | | | | |
| 270353204 | Minnesota | Crow Wing | Brainerd Lakes Regional Airport | 46.39674 | -94.1303 | 59 | 59 | NA | 57 | | | | | | | | |
| 270495302 | Minnesota | Goodhue | Stanton Air Field | 44.47375 | -93.0126 | 60.7 | 61 | NA | 60 | | | | | | | | |
| 270530962 | Minnesota | Hennepin | Near Road I-35/I-94 | 44.96524 | -93.2548 | 55.7 | 56 | 53 | 53 | 52.6 | 52.9 | 52.6 | 52.9 | 51.3 | 51.6 | 51.3 | 51.6 |
| 270750005 | Minnesota | Lake | Boundary Waters | 47.94862 | -91.4956 | 55.7 | 56 | NA | 55 | | | | | | | | |
| 270834210 | Minnesota | Lyon | Southwest Minnesota Regional Airport | 44.4438 | -95.8179 | 59.3 | 60 | 62 | 62 | | | | | | | | |
| 270953051 | Minnesota | Mille Lacs | Mille Lacs Band | 46.2053 | -93.7595 | 60 | 60 | 59 | 57 | | | | | 52 | 52 | | |
| 271095008 | Minnesota | Olmsted | Ben Franklin School | 43.99691 | -92.4504 | 60.7 | 61 | 62 | 63 | | | | | | | | |
| 271370034 | Minnesota | Saint Louis | Voyageurs NP - Sullivan Bay | 48.41252 | -92.8292 | 54.7 | 55 | 56 | 55 | | | | | | | | |
| 271377550 | Minnesota | Saint Louis | U of M - Duluth | 46.81826 | -92.0894 | 53 | 53 | NA | NA | | | | | | | | |
| 271390505 | Minnesota | Scott | B.F. Pearson School | 44.79144 | -93.5125 | 61.3 | 63 | 61 | 60 | | | | | 56.4 | 57.9 | 56.4 | 57.9 |
| 271453052 | Minnesota | Stearns | Talahi School | 45.54984 | -94.1335 | 60 | 61 | 62 | 60 | | | | | | | | |
| 271636016 | Minnesota | Washington | St. Croix Watershed Research Station | 45.168 | -92.7651 | 60 | 61 | NA | 62 | | | | | | | | |
| 271713201 | Minnesota | Wright | St. Michael Elementary School | 45.20916 | -93.6692 | 61.3 | 63 | 63 | 63 | | | | | | | | |
| 280110001 | Mississippi | Bolivar | Cleveland | 33.74606 | -90.723 | 62 | 62 | NA | NA | | | | | | | | |
| 280330002 | Mississippi | DeSoto | Hernando | 34.82166 | -89.9878 | 63.7 | 65 | 64 | 67 | 56.4 | 57.6 | 56.4 | 57.6 | 55.7 | 56.8 | 55.7 | 56.8 |
| 280450003 | Mississippi | Hancock | Waveland | 30.30083 | -89.3959 | 61.7 | 63 | 58 | 58 | 53.6 | 54.8 | 53.2 | 54.3 | 53.5 | 54.7 | 52.6 | 53.8 |
| 280470008 | Mississippi | Harrison | Gulfport Youth Court | 30.39037 | -89.0498 | 65.3 | 67 | 58 | 60 | 56.8 | 58.3 | 57.1 | 58.6 | 55 | 56.4 | 54.8 | 56.2 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 280490020 | Mississippi | Hinds | Jackson NCORE | 32.32911 | -90.1827 | 60.3 | 61 | 55 | 56 | 50 | 50.6 | 50 | 50.6 | | | | |
| 280490021 | Mississippi | Hinds | Hinds CC | 32.34672 | -90.2257 | 62 | 63 | 57 | 55 | 51.4 | 52.2 | 51.4 | 52.2 | | | | |
| 280590006 | Mississippi | Jackson | Pascagoula | 30.37829 | -88.5339 | 64.7 | 67 | 59 | 61 | 56.6 | 58.7 | 55.9 | 57.9 | 56.7 | 58.8 | 55.8 | 57.8 |
| 280750003 | Mississippi | Lauderdale | Meridian | 32.36457 | -88.7315 | 57 | 58 | 54 | 54 | | | | | | | | |
| 280810005 | Mississippi | Lee | TUPELO AIRPORT NEAR OLD NWS OFFICE | 34.26492 | -88.7662 | 58.3 | 59 | 57 | 59 | | | | | | | | |
| 281619991 | Mississippi | Yalobusha | Coffeeville | 34.00275 | -89.7992 | 55.7 | 57 | 55 | 57 | | | | | | | | |
| 290030001 | Missouri | Andrew | Savannah | 39.9544 | -94.849 | 62.7 | 63 | 60 | 61 | | | | | | | | |
| 290190011 | Missouri | Boone | Finger Lakes | 39.07807 | -92.3163 | 63.3 | 64 | 57 | 57 | | | | | | | | |
| 290270002 | Missouri | Callaway | New Bloomfield | 38.70608 | -92.0931 | 62.7 | 64 | 59 | 59 | | | | | | | | |
| 290370003 | Missouri | Cass | Richard Gebaur-South | 38.75961 | -94.5798 | 63 | 63 | 61 | 61 | | | | | | | | |
| 290390001 | Missouri | Cedar | El Dorado Springs | 37.69 | -94.035 | 60.7 | 61 | 57 | 60 | | | | | | | | |
| 290470003 | Missouri | Clay | Watkins Mill State Park | 39.40745 | -94.2654 | 66.7 | 69 | 64 | 65 | 59.7 | 61.7 | 59.7 | 61.7 | 59.5 | 61.5 | 59.5 | 61.5 |
| 290470005 | Missouri | Clay | Liberty | 39.30317 | -94.377 | 66 | 69 | 64 | 66 | 60.8 | 63.6 | 60.8 | 63.6 | 59.9 | 62.6 | 59.9 | 62.6 |
| 290470006 | Missouri | Clay | Rocky Creek | 39.33191 | -94.5809 | 68.7 | 70 | 66 | 68 | 62.9 | 64.1 | 62.9 | 64.1 | 61.8 | 62.9 | 61.8 | 62.9 |
| 290490001 | Missouri | Clinton | Trimble | 39.53063 | -94.5559 | 67.3 | 68 | 62 | 63 | 60.5 | 61.2 | 60.5 | 61.2 | 59.2 | 59.8 | 59.2 | 59.8 |
| 290770036 | Missouri | Greene | Hillcrest High School | 37.25614 | -93.2999 | 60 | 61 | 59 | 61 | | | | | | | | |
| 290770042 | Missouri | Greene | Fellows Lake | 37.31919 | -93.2044 | 60.3 | 61 | 57 | 59 | | | | | | | | |
| 290970004 | Missouri | Jasper | Alba | 37.2385 | -94.4247 | 60.7 | 61 | 60 | 63 | 53.2 | 53.5 | 53.2 | 53.5 | | | | |
| 290990019 | Missouri | Jefferson | Arnold West | 38.44857 | -90.3987 | 69 | 70 | 68 | 68 | 61.1 | 62 | 61.1 | 62 | 60 | 60.9 | 60 | 60.9 |
| 291130003 | Missouri | Lincoln | Foley | 39.04512 | -90.8663 | 65 | 65 | NA | NA | 58.1 | 58.1 | 58.1 | 58.1 | 56.9 | 56.9 | 56.9 | 56.9 |
| 291370001 | Missouri | Monroe | MTSP | 39.47498 | -91.789 | 59.3 | 60 | 55 | 54 | | | | | | | | |
| 291570001 | Missouri | Perry | | 37.70264 | -89.6986 | 67 | 67 | 62 | 64 | 59.3 | 59.3 | 59.3 | 59.3 | | | | |
| 291831002 | Missouri | Saint Charles | West Alton | 38.87255 | -90.2265 | 72.7 | 74 | NA | 69 | 66.1 | 67.3 | 66.1 | 67.3 | 65 | 66.2 | 65 | 66.2 |
| 291831004 | Missouri | Saint Charles | Orchard Farm | 38.8994 | -90.4492 | 71 | 72 | 66 | 65 | 63.7 | 64.6 | 63.7 | 64.6 | 62 | 62.8 | 62 | 62.8 |
| 291860005 | Missouri | Sainte Genevieve | Bonne Terre | 37.90084 | -90.4239 | 65.3 | 66 | 62 | 63 | 59.4 | 60 | 59.4 | 60 | 59.8 | 60.4 | 59.8 | 60.4 |
| 291890005 | Missouri | Saint Louis | Pacific | 38.49015 | -90.7051 | 65 | 66 | 64 | 63 | 57.5 | 58.4 | 57.5 | 58.4 | 56.7 | 57.5 | 56.7 | 57.5 |
| 291890014 | Missouri | Saint Louis | Maryland Heights | 38.71085 | -90.4761 | 70 | 71 | 69 | 68 | 62.6 | 63.5 | 62.6 | 63.5 | 61.4 | 62.3 | 61.4 | 62.3 |
| 292130004 | Missouri | Taney | Branson | 36.70773 | -93.222 | 57 | 57 | NA | NA | 49.8 | 49.8 | 49.8 | 49.8 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 295100085 | Missouri | St. Louis City | Blair Street | 38.65643 | -90.1983 | 67.3 | 71 | 65 | 67 | 61.4 | 64.8 | 61.4 | 64.8 | 59.3 | 62.5 | 59.3 | 62.5 |
| 300710010 | Montana | Phillips | Malta | 48.31751 | -107.862 | 55.3 | 56 | 57 | 55 | | | | | | | | |
| 300750001 | Montana | Powder River | BROADUS | 45.4403 | -105.37 | 58.5 | 60 | NA | 62 | | | | | | | | |
| 300830001 | Montana | Richland | Sidney Oil Field | 47.80339 | -104.486 | 55 | 55 | NA | NA | | | | | | | | |
| 300870001 | Montana | Rosebud | Birney - Tongue river | 45.36615 | -106.49 | 57 | 58 | NA | NA | | | | | | | | |
| 310550019 | Nebraska | Douglas | 4102 Woolworth Ave. on Healthcenter Warehouse | 41.24749 | -95.9731 | 62.7 | 64 | 61 | 61 | | | | | | | | |
| 310550028 | Nebraska | Douglas | | 41.20796 | -95.9459 | 60 | 62 | NA | NA | | | | | | | | |
| 310550053 | Nebraska | Douglas | Whitmore | 41.32251 | -95.9386 | 63.5 | 64 | 60 | 58 | | | | | | | | |
| 311079991 | Nebraska | Knox | Santee Sioux | 42.82915 | -97.8541 | 64 | 65 | 65 | 67 | | | | | | | | |
| 311090016 | Nebraska | Lancaster | | 40.98472 | -96.6775 | 60 | 60 | 56 | 56 | | | | | | | | |
| 350010023 | New Mexico | Bernalillo | DEL NORTE HIGH SCHOOL | 35.1343 | -106.585 | 67.3 | 70 | 68 | 69 | 63.2 | 65.7 | 63.2 | 65.7 | 62.1 | 64.6 | 62.1 | 64.6 |
| 350010029 | New Mexico | Bernalillo | SOUTH VALLEY | 35.01708 | -106.657 | 65.3 | 66 | 66 | 67 | 61.1 | 61.8 | 61.1 | 61.8 | 60.2 | 60.8 | 60.2 | 60.8 |
| 350011012 | New Mexico | Bernalillo | Foothills | 35.1852 | -106.508 | 66.7 | 69 | 72 | 73 | 63.5 | 65.7 | 63.5 | 65.7 | 62.5 | 64.6 | 62.5 | 64.6 |
| 350130008 | New Mexico | Dona Ana | 6O La Union | 31.93066 | -106.631 | 67.3 | 68 | 72 | 76 | | | | | 63.8 | 64.5 | 63.8 | 64.5 |
| 350130020 | New Mexico | Dona Ana | 6ZK Chaparral | 32.04121 | -106.41 | 68.3 | 71 | 70 | 71 | 65.4 | 67.9 | 65.4 | 67.9 | 64 | 66.5 | 64 | 66.5 |
| 350130021 | New Mexico | Dona Ana | 6ZM Desert View | 31.79622 | -106.584 | 72.7 | 74 | 80 | 81 | | | | | 69.3 | 70.5 | 69.3 | 70.5 |
| 350130022 | New Mexico | Dona Ana | 6ZN Santa Teresa | 31.78789 | -106.683 | 71.3 | 74 | 75 | 75 | | | | | | | | |
| 350130023 | New Mexico | Dona Ana | 6ZQ Solano | 32.31759 | -106.768 | 66 | 67 | 70 | 66 | | | | | | | | |
| 350151005 | New Mexico | Eddy | 5ZR ON BLM LAND BORDERING RESIDENTIAL AREA OUTSIDE CARLSBAD CITY LIM | 32.38012 | -104.263 | 69.7 | 74 | 77 | 77 | | | | | | | | |
| 350153001 | New Mexico | Eddy | Carlsbad Caverns NP - Maintenance Area | 32.1783 | -104.441 | 71 | 71 | NA | NA | | | | | | | | |
| 350250008 | New Mexico | Lea | 5ZS Hobbs Jefferson | 32.72666 | -103.123 | 67.7 | 70 | 66 | 66 | | | | | | | | |
| 350390026 | New Mexico | Rio Arriba | 3CRD Coyote Ranger District | 36.18774 | -106.698 | 65.3 | 67 | 64 | 64 | 61.9 | 63.5 | 61.9 | 63.5 | 61.8 | 63.4 | 61.8 | 63.4 |
| 350431001 | New Mexico | Sandoval | | 35.29948 | -106.549 | 65.7 | 68 | 68 | 70 | 62.3 | 64.5 | 62.3 | 64.5 | 61.4 | 63.6 | 61.4 | 63.6 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 350490021 | New Mexico | Santa Fe | | 35.61975 | -106.08 | 64 | 66 | 66 | 67 | 60.8 | 62.7 | 60.8 | 62.7 | 60.6 | 62.5 | 60.6 | 62.5 |
| 350610008 | New Mexico | Valencia | | 34.8147 | -106.74 | 65.3 | 67 | 66 | 66 | 61.5 | 63.1 | 61.5 | 63.1 | 60.8 | 62.4 | 60.8 | 62.4 |
| 370030005 | North Carolina | Alexander | Taylorsvillte Liledoun | 35.9138 | -81.191 | 64.3 | 65 | 58 | 58 | 54.1 | 54.7 | 54.1 | 54.7 | | | | |
| 370110002 | North Carolina | Avery | Linville Falls | 35.97235 | -81.9331 | 61.7 | 62 | 57 | 57 | 53.5 | 53.8 | 53.5 | 53.8 | | | | |
| 370119991 | North Carolina | Avery | Cranberry | 36.1058 | -82.0454 | 64 | 64 | 59 | 59 | 56.3 | 56.3 | 56.3 | 56.3 | | | | |
| 370210030 | North Carolina | Buncombe | Bent Creek | 35.5001 | -82.5999 | 62 | 63 | 58 | 58 | 53.2 | 54.1 | 53.2 | 54.1 | | | | |
| 370270003 | North Carolina | Caldwell | Lenoir (city) | 35.9359 | -81.5306 | 64 | 64 | 57 | 57 | 53.8 | 53.8 | 53.8 | 53.8 | | | | |
| 370330001 | North Carolina | Caswell | Cherry Grove | 36.30703 | -79.4674 | 62 | 63 | 56 | 57 | 51.9 | 52.8 | 51.9 | 52.8 | | | | |
| 370510008 | North Carolina | Cumberlan d | Wade | 35.15869 | -78.728 | 62 | 63 | 59 | NA | 53.8 | 54.6 | 53.8 | 54.6 | | | | |
| 370510010 | North Carolina | Cumberlan d | Honeycutt School | 35.0023 | -78.9917 | 63.3 | 64 | 60 | 63 | 54.7 | 55.4 | 54.7 | 55.4 | | | | |
| 370630015 | North Carolina | Durham | Durham Armory | 36.03296 | -78.904 | 61.7 | 62 | 58 | 58 | 51.1 | 51.3 | 51.1 | 51.3 | 50.4 | 50.7 | 50.4 | 50.7 |
| 370650099 | North Carolina | Edgecombe | Leggett | 35.98828 | -77.5843 | 62 | 62 | 59 | 59 | 52.2 | 52.2 | 52.2 | 52.2 | | | | |
| 370670022 | North Carolina | Forsyth | Hattie Avenue | 36.11069 | -80.2264 | 66.7 | 67 | 64 | 63 | 56 | 56.2 | 56 | 56.2 | 54.9 | 55.1 | 54.9 | 55.1 |
| 370670030 | North Carolina | Forsyth | Clemmons Middle | 36.026 | -80.342 | 67.3 | 68 | 59 | 59 | 56.2 | 56.7 | 56.2 | 56.7 | 55 | 55.6 | 55 | 55.6 |
| 370671008 | North Carolina | Forsyth | Union Cross | 36.05097 | -80.1437 | 66.3 | 67 | 60 | 59 | 55.6 | 56.2 | 55.6 | 56.2 | 54.4 | 54.9 | 54.4 | 54.9 |
| 370750001 | North Carolina | Graham | Joanna Bald | 35.25793 | -83.7956 | 63.5 | 64 | 62 | 62 | 54.6 | 55 | 54.6 | 55 | | | | |
| 370770001 | North Carolina | Granville | Butner | 36.14111 | -78.7681 | 64.3 | 65 | 57 | 57 | 54.2 | 54.8 | 54.2 | 54.8 | | | | |
| 370810013 | North Carolina | Guilford | Mendenhall School | 36.10901 | -79.8023 | 65.3 | 66 | 62 | 62 | 54.4 | 55 | 54.4 | 55 | 53.5 | 54 | 53.5 | 54 |
| 370870008 | North Carolina | Haywood | Waynesville School | 35.50716 | -82.9634 | 61.3 | 62 | 58 | 59 | 53.3 | 53.9 | 53.3 | 53.9 | | | | |
| 370870035 | North Carolina | Haywood | Frying Pan Mountain | 35.37917 | -82.7925 | 64.3 | 66 | 61 | 61 | 55.7 | 57.1 | 55.7 | 57.1 | | | | |
| 370870036 | North Carolina | Haywood | Purchase Knob | 35.58714 | -83.0742 | 64.3 | 65 | 61 | 62 | 56 | 56.6 | 56 | 56.6 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 371010002 | North Carolina | Johnston | West Johnston Co. | 35.59095 | -78.4622 | 63.7 | 65 | 60 | 60 | 53.8 | 54.9 | 53.8 | 54.9 | 51.6 | 52.6 | 51.6 | 52.6 |
| 371050002 | North Carolina | Lee | Blackstone | 35.4325 | -79.2887 | 61.5 | 62 | NA | NA | 52.2 | 52.6 | 52.2 | 52.6 | | | | |
| 371070004 | North Carolina | Lenoir | Lenoir Co. Comm. Coll. | 35.23146 | -77.5688 | 62.7 | 63 | 60 | 61 | | | | | | | | |
| 371090004 | North Carolina | Lincoln | Crouse | 35.43856 | -81.2768 | 66.3 | 67 | 61 | 61 | 55.7 | 56.2 | 55.7 | 56.2 | 55.2 | 55.8 | 55.2 | 55.8 |
| 371139991 | North Carolina | Macon | Coweeta | 35.0608 | -83.4306 | 61.3 | 62 | 55 | 55 | 52.1 | 52.7 | 52.1 | 52.7 | | | | |
| 371170001 | North Carolina | Martin | Jamesville School | 35.81066 | -76.9062 | 60 | 60 | 56 | 54 | | | | | | | | |
| 371190041 | North Carolina | Mecklenburg | Garinger High School | 35.2401 | -80.7857 | 68.7 | 69 | 66 | 64 | 58 | 58.3 | 58 | 58.3 | 57 | 57.3 | 57 | 57.3 |
| 371190046 | North Carolina | Mecklenburg | University Meadows | 35.31416 | -80.7135 | 70 | 70 | 66 | 64 | 58.3 | 58.3 | 58.3 | 58.3 | 57.4 | 57.4 | 57.4 | 57.4 |
| 371239991 | North Carolina | Montgomery | Candor | 35.2632 | -79.8365 | 61 | 61 | 57 | 58 | 51.3 | 51.3 | 51.3 | 51.3 | | | | |
| 371290002 | North Carolina | New Hanover | Castle Hayne | 34.36417 | -77.8386 | 59 | 60 | 58 | 58 | | | | | 48.3 | 49.1 | | |
| 371450003 | North Carolina | Person | Bushy Fork | 36.30697 | -79.092 | 62 | 63 | 59 | 57 | 52.9 | 53.8 | 52.9 | 53.8 | | | | |
| 371470006 | North Carolina | Pitt | Pitt Agri. Center | 35.64128 | -77.3601 | 62.7 | 64 | 59 | 59 | | | | | | | | |
| 371570099 | North Carolina | Rockingham | Bethany sch. | 36.30889 | -79.8592 | 65.3 | 66 | 60 | 60 | 55.1 | 55.7 | 55.1 | 55.7 | 54.2 | 54.8 | 54.2 | 54.8 |
| 371590021 | North Carolina | Rowan | Rockwell | 35.55187 | -80.395 | 63.7 | 65 | 62 | 61 | 52.7 | 53.8 | 52.7 | 53.8 | 52.5 | 53.6 | 52.5 | 53.6 |
| 371730002 | North Carolina | Swain | Bryson City | 35.43477 | -83.4421 | 60 | 60 | 56 | 57 | 51.9 | 51.9 | 51.9 | 51.9 | | | | |
| 371730007 | North Carolina | Swain | | 35.49871 | -83.3102 | 59 | 61 | 58 | NA | 50.9 | 52.6 | 50.9 | 52.6 | | | | |
| 371790003 | North Carolina | Union | Monroe School | 34.97404 | -80.5406 | 67.7 | 68 | 62 | 61 | 59 | 59.2 | 59 | 59.2 | 57.8 | 58.1 | 57.8 | 58.1 |
| 371830014 | North Carolina | Wake | Millbrook School | 35.85611 | -78.5742 | 65.7 | 66 | 60 | 60 | 55.3 | 55.6 | 55.3 | 55.6 | 53.6 | 53.8 | 53.6 | 53.8 |
| 371990004 | North Carolina | Yancey | Mt. Mitchell | 35.76541 | -82.2649 | 65 | 65 | 62 | 62 | 56.2 | 56.2 | 56.2 | 56.2 | | | | |
| 380070002 | North Dakota | Billings | PAINTED CANYON | 46.8943 | -103.379 | 59 | 60 | 60 | 58 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 380130004 | North Dakota | Burke | LOSTWOOD NWR | 48.64193 | -102.402 | 58.3 | 59 | 56 | 56 | | | | | | | | |
| 380171004 | North Dakota | Cass | FARGO NW | 46.93375 | -96.8554 | 58 | 59 | 60 | 58 | | | | | | | | |
| 380250003 | North Dakota | Dunn | DUNN CENTER | 47.3132 | -102.527 | 58 | 58 | NA | NA | | | | | | | | |
| 380530002 | North Dakota | McKenzie | TRNP-NU | 47.5812 | -103.3 | 57.7 | 58 | 58 | 56 | | | | | | | | |
| 380570004 | North Dakota | Mercer | BEULAH NORTH | 47.29861 | -101.767 | 57 | 58 | 58 | 57 | | | | | | | | |
| 380650002 | North Dakota | Oliver | HANNOVER | 47.18583 | -101.428 | 59.3 | 60 | 60 | 58 | | | | | | | | |
| 381050003 | North Dakota | Williams | Williston | 48.15278 | -103.64 | 57 | 58 | NA | NA | | | | | | | | |
| 390030009 | Ohio | Allen | Lima | 40.77094 | -84.0539 | 67.7 | 70 | 64 | 65 | 59.9 | 61.9 | 59.9 | 61.9 | 58 | 60 | 58 | 60 |
| 390071001 | Ohio | Ashtabula | Conneaut | 41.9597 | -80.5728 | 70 | 70 | 65 | 67 | 62.4 | 62.4 | 61.4 | 61.4 | 61.8 | 61.8 | 59.7 | 59.7 |
| 390170004 | Ohio | Butler | HAMILTON | 39.38338 | -84.5444 | 72 | 72 | NA | NA | 62.7 | 62.7 | 62.7 | 62.7 | 60.3 | 60.3 | 60.3 | 60.3 |
| 390170018 | Ohio | Butler | Middletown Airport | 39.52944 | -84.3935 | 71.3 | 73 | 67 | 67 | 62 | 63.5 | 62 | 63.5 | 59.8 | 61.2 | 59.8 | 61.2 |
| 390179991 | Ohio | Butler | Oxford | 39.5327 | -84.7286 | 69.3 | 70 | 64 | 64 | 60.2 | 60.8 | 60.2 | 60.8 | 58.5 | 59.1 | 58.5 | 59.1 |
| 390230001 | Ohio | Clark | Springfield Well Fd | 40.00103 | -83.8046 | 69.3 | 70 | 63 | 64 | 60.6 | 61.2 | 60.6 | 61.2 | 58.2 | 58.8 | 58.2 | 58.8 |
| 390230003 | Ohio | Clark | Mud Run | 39.85567 | -83.9977 | 68.3 | 69 | 65 | 65 | 60.2 | 60.8 | 60.2 | 60.8 | 57.7 | 58.2 | 57.7 | 58.2 |
| 390250022 | Ohio | Clermont | Batavia | 39.0828 | -84.1441 | 70 | 70 | 66 | 64 | 59.4 | 59.4 | 59.4 | 59.4 | 57.2 | 57.2 | 57.2 | 57.2 |
| 390271002 | Ohio | Clinton | Wilmington | 39.43004 | -83.7885 | 69.7 | 70 | 63 | 63 | 59.4 | 59.6 | 59.4 | 59.6 | 58 | 58.2 | 58 | 58.2 |
| 390350034 | Ohio | Cuyahoga | District 6 | 41.55523 | -81.5753 | 69 | 70 | 70 | 72 | 61 | 61.8 | 61.3 | 62.2 | 65.7 | 66.6 | 61 | 61.9 |
| 390350060 | Ohio | Cuyahoga | GT Craig NCore | 41.49212 | -81.6784 | 62.7 | 64 | 63 | 62 | 54.8 | 55.9 | 54.5 | 55.6 | 61.3 | 62.5 | 53.9 | 55 |
| 390350064 | Ohio | Cuyahoga | Berea BOE | 41.36186 | -81.8646 | 65.3 | 66 | 66 | 66 | 58.5 | 59.1 | 58.3 | 59 | 63.6 | 64.2 | 56.2 | 56.8 |
| 390355002 | Ohio | Cuyahoga | Mayfield | 41.53707 | -81.4588 | 69.3 | 71 | 68 | 67 | 61.1 | 62.6 | 60.2 | 61.6 | 62.1 | 63.6 | 59.3 | 60.7 |
| 390410002 | Ohio | Delaware | Delaware | 40.35669 | -83.064 | 65.3 | 67 | 62 | 61 | 56.2 | 57.6 | 56.2 | 57.6 | 54.2 | 55.6 | 54.2 | 55.6 |
| 390479991 | Ohio | Fayette | Deer Creek | 39.6359 | -83.2605 | 66.7 | 68 | 61 | 58 | 58.2 | 59.4 | 58.2 | 59.4 | 55.9 | 57 | 55.9 | 57 |
| 390490029 | Ohio | Franklin | New Albany | 40.08451 | -82.8156 | 70.3 | 71 | 66 | 66 | 62 | 62.6 | 62 | 62.6 | 58.6 | 59.2 | 58.6 | 59.2 |
| 390490037 | Ohio | Franklin | FRANKLIN_PK | 39.96523 | -82.9555 | 65.5 | 66 | NA | NA | 58.1 | 58.5 | 58.1 | 58.5 | 54.9 | 55.3 | 54.9 | 55.3 |
| 390490081 | Ohio | Franklin | Maple Canyon | 40.0877 | -82.9598 | 66.3 | 67 | 62 | 62 | 58.8 | 59.4 | 58.8 | 59.4 | 55.4 | 56 | 55.4 | 56 |
| 390550004 | Ohio | Geauga | Notre Dame | 41.51505 | -81.2499 | 71.3 | 72 | 66 | 65 | 61.5 | 62.1 | 61.5 | 62.1 | 59.9 | 60.5 | 59.9 | 60.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 390570006 | Ohio | Greene | Xenia | 39.66575 | -83.9427 | 67.3 | 68 | 62 | 63 | 58.3 | 58.9 | 58.3 | 58.9 | 56.2 | 56.8 | 56.2 | 56.8 |
| 390610006 | Ohio | Hamilton | Sycamore | 39.2787 | -84.3663 | 73.3 | 75 | 70 | 69 | 63.8 | 65.3 | 63.8 | 65.3 | 61.3 | 62.7 | 61.3 | 62.7 |
| 390610010 | Ohio | Hamilton | Colerain | 39.21487 | -84.6909 | 71.3 | 72 | 67 | 67 | 61.8 | 62.4 | 61.8 | 62.4 | 59.5 | 60.1 | 59.5 | 60.1 |
| 390610040 | Ohio | Hamilton | Taft NCore | 39.12886 | -84.504 | 71.3 | 72 | 69 | 68 | 62.1 | 62.7 | 62.1 | 62.7 | 59.6 | 60.2 | 59.6 | 60.2 |
| 390810017 | Ohio | Jefferson | Stuebenville | 40.36644 | -80.6156 | 63 | 65 | 60 | 62 | 55.2 | 56.9 | 55.2 | 56.9 | 54.3 | 56 | 54.3 | 56 |
| 390830002 | Ohio | Knox | CENTERBURG | 40.31003 | -82.6917 | 66.5 | 67 | NA | NA | 56.4 | 56.8 | 56.4 | 56.8 | 54.8 | 55.2 | 54.8 | 55.2 |
| 390850003 | Ohio | Lake | Eastlake | 41.67301 | -81.4225 | 73.7 | 74 | 72 | 74 | 64.6 | 64.8 | 64.9 | 65.2 | 66.1 | 66.4 | 65.7 | 66 |
| 390850007 | Ohio | Lake | Painesville | 41.72681 | -81.2422 | 69 | 70 | 66 | 64 | 61.3 | 62.2 | 61.2 | 62 | 62.5 | 63.4 | 63 | 64 |
| 390870011 | Ohio | Lawrence | Wilgus | 38.62901 | -82.4589 | 63.7 | 64 | 56 | 57 | 55.7 | 56 | 55.7 | 56 | 55.1 | 55.4 | 55.1 | 55.4 |
| 390870012 | Ohio | Lawrence | ODOT Ironton | 38.50808 | -82.6592 | 66 | 67 | 58 | 58 | 58.1 | 59 | 58.1 | 59 | 56.9 | 57.8 | 56.9 | 57.8 |
| 390890005 | Ohio | Licking | Heath | 40.02604 | -82.433 | 65.7 | 67 | 59 | 60 | 56.1 | 57.3 | 56.1 | 57.3 | 54.2 | 55.3 | 54.2 | 55.3 |
| 390930018 | Ohio | Lorain | Sheffield | 41.42088 | -82.0957 | 65.7 | 67 | 58 | 60 | 58.2 | 59.4 | 58.1 | 59.2 | 59.1 | 60.3 | 56.5 | 57.6 |
| 390950024 | Ohio | Lucas | Erie | 41.64407 | -83.5462 | 67.5 | 69 | 64 | 67 | 60.4 | 61.7 | 61.1 | 62.4 | 58.6 | 59.9 | 58.9 | 60.2 |
| 390950027 | Ohio | Lucas | Waterville | 41.4942 | -83.7189 | 64.7 | 66 | 63 | 64 | 58.5 | 59.6 | 58.5 | 59.6 | 57.2 | 58.3 | 57.2 | 58.3 |
| 390970007 | Ohio | Madison | London | 39.78819 | -83.4761 | 67.3 | 68 | 61 | 61 | 58.4 | 59 | 58.4 | 59 | 57.1 | 57.7 | 57.1 | 57.7 |
| 390990013 | Ohio | Mahoning | Oakhill | 41.09619 | -80.6589 | 59.7 | 63 | 64 | NA | 51.4 | 54.2 | 51.4 | 54.2 | 50.2 | 53 | 50.2 | 53 |
| 391030004 | Ohio | Medina | Chippewa | 41.0604 | -81.9239 | 64.3 | 65 | 61 | 65 | 56.1 | 56.7 | 56.1 | 56.7 | 55.1 | 55.7 | 55.1 | 55.7 |
| 391090005 | Ohio | Miami | Miami East HS | 40.08502 | -84.1138 | 67.7 | 68 | 61 | 63 | 58.5 | 58.8 | 58.5 | 58.8 | 57 | 57.3 | 57 | 57.3 |
| 391130037 | Ohio | Montgomery | Eastwood | 39.78564 | -84.1344 | 70.3 | 71 | 67 | 68 | 61.2 | 61.8 | 61.2 | 61.8 | 59.3 | 59.9 | 59.3 | 59.9 |
| 391219991 | Ohio | Noble | Quaker City | 39.9428 | -81.3373 | 64.7 | 66 | 61 | 61 | 56.6 | 57.7 | 56.6 | 57.7 | | | | |
| 391331001 | Ohio | Portage | Lake Rockwell | 41.18247 | -81.3305 | 62 | 63 | 62 | 67 | 54.1 | 55 | 54.1 | 55 | 52.3 | 53.2 | 52.3 | 53.2 |
| 391351001 | Ohio | Preble | Preble NCore | 39.83562 | -84.7205 | 67 | 67 | 63 | 64 | 58.2 | 58.2 | 58.2 | 58.2 | 57 | 57 | 57 | 57 |
| 391510016 | Ohio | Stark | Malone Univ | 40.82812 | -81.3785 | 68.3 | 69 | 65 | 65 | 59.1 | 59.8 | 59.1 | 59.8 | 58.5 | 59.1 | 58.5 | 59.1 |
| 391510022 | Ohio | Stark | Brewster | 40.71278 | -81.5983 | 65 | 66 | 61 | 62 | 56.1 | 56.9 | 56.1 | 56.9 | | | | |
| 391514005 | Ohio | Stark | Alliance | 40.93133 | -81.1235 | 68.3 | 70 | 64 | 65 | 59.4 | 60.8 | 59.4 | 60.8 | 58.6 | 60.1 | 58.6 | 60.1 |
| 391530020 | Ohio | Summit | Patterson Park | 41.10649 | -81.5035 | 63.3 | 65 | 64 | NA | 55 | 56.4 | 55 | 56.4 | 54 | 55.5 | 54 | 55.5 |
| 391550011 | Ohio | Trumbull | TCSE | 41.24045 | -80.6627 | 68.3 | 69 | 65 | 65 | 58.7 | 59.3 | 58.7 | 59.3 | 57.6 | 58.2 | 57.6 | 58.2 |
| 391550013 | Ohio | Trumbull | Kinsman Maintenance | 41.4546 | -80.5896 | 66 | 66 | 64 | 65 | 57.3 | 57.3 | 57.3 | 57.3 | 56 | 56 | 56 | 56 |
| 391650007 | Ohio | Warren | Lebanon | 39.42689 | -84.2008 | 71.7 | 72 | 70 | 69 | 62.5 | 62.7 | 62.5 | 62.7 | 60.4 | 60.6 | 60.4 | 60.6 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 391670004 | Ohio | Washington | Marietta WTP | 39.43212 | -81.4604 | 64.3 | 65 | 60 | 60 | 55.9 | 56.5 | 55.9 | 56.5 | 55.3 | 55.9 | 55.3 | 55.9 |
| 391730003 | Ohio | Wood | Bowling Green | 41.37769 | -83.6111 | 64.3 | 66 | 62 | 63 | 56.9 | 58.4 | 56.9 | 58.4 | 56.1 | 57.6 | 56.1 | 57.6 |
| 400019009 | Oklahoma | Adair | STILWELL | 35.75074 | -94.6697 | 59.7 | 61 | NA | 61 | 52 | 53.1 | 52 | 53.1 | | | | |
| 400170101 | Oklahoma | Canadian | OKC WEST-(YUKON) | 35.47922 | -97.7515 | 66.3 | 69 | 65 | 67 | | | | | 56 | 58.3 | 56 | 58.3 |
| 400219002 | Oklahoma | Cherokee | TAHLEQUAH SHELTER | 35.85408 | -94.986 | 59.5 | 60 | NA | NA | 53.3 | 53.8 | 53.3 | 53.8 | | | | |
| 400270049 | Oklahoma | Cleveland | MOORE WATER TOWER | 35.32011 | -97.4841 | 66.7 | 68 | 64 | 66 | | | | | | | | |
| 400310651 | Oklahoma | Comanche | LAWTON NORTH | 34.63298 | -98.4288 | 65 | 66 | 65 | 66 | | | | | | | | |
| 400370144 | Oklahoma | Creek | MANNFORD | 36.10548 | -96.3612 | 64 | 65 | 63 | 65 | 56.6 | 57.5 | 56.6 | 57.5 | 56 | 56.9 | 56 | 56.9 |
| 400430860 | Oklahoma | Dewey | SEILING MUNICIPAL AIRPORT | 36.15841 | -98.932 | 66 | 68 | 61 | 64 | | | | | | | | |
| 400719010 | Oklahoma | Kay | NEWKIRK IMPROVE | 36.95622 | -97.0314 | 62 | 63 | NA | NA | | | | | | | | |
| 400871073 | Oklahoma | McClain | GOLDSBY | 35.15965 | -97.4738 | 66.3 | 67 | NA | NA | | | | | | | | |
| 400979014 | Oklahoma | Mayes | CHEROKEE HEIGHTS | 36.22841 | -95.2499 | 62 | 62 | 59 | 61 | 54.9 | 54.9 | 54.9 | 54.9 | 53.3 | 53.3 | 53.3 | 53.3 |
| 401090033 | Oklahoma | Oklahoma | OKC CENTRAL-OSDH | 35.47704 | -97.4943 | 67.3 | 68 | NA | NA | 60.4 | 61.1 | 60.4 | 61.1 | 57.9 | 58.5 | 57.9 | 58.5 |
| 401090096 | Oklahoma | Oklahoma | CHOCTAW | 35.4778 | -97.303 | 66.3 | 67 | 65 | 67 | 59.9 | 60.6 | 59.9 | 60.6 | | | | |
| 401091037 | Oklahoma | Oklahoma | OKC NORTH | 35.61413 | -97.4751 | 69 | 70 | 68 | 70 | 61.2 | 62.1 | 61.2 | 62.1 | 59.5 | 60.4 | 59.5 | 60.4 |
| 401159004 | Oklahoma | Ottawa | QUAPAW SHELTER | 36.92222 | -94.8389 | 55.7 | 57 | NA | NA | 49.1 | 50.2 | 49.1 | 50.2 | | | | |
| 401210415 | Oklahoma | Pittsburg | McALESTER MUNICIPAL AIRPORT | 34.88561 | -95.7844 | 61 | 63 | 62 | 62 | | | | | | | | |
| 401359021 | Oklahoma | Sequoyah | | 35.40814 | -94.5244 | 59.3 | 60 | 57 | 58 | 51.9 | 52.5 | 51.9 | 52.5 | | | | |
| 401430174 | Oklahoma | Tulsa | TULSA SOUTH | 35.95371 | -96.005 | 65 | 65 | 62 | 64 | 59.3 | 59.3 | 59.3 | 59.3 | 58.2 | 58.2 | 58.2 | 58.2 |
| 401430178 | Oklahoma | Tulsa | TULSA EAST | 36.1338 | -95.7645 | 64 | 65 | 64 | 66 | 58.6 | 59.5 | 58.6 | 59.5 | 57.2 | 58.1 | 57.2 | 58.1 |
| 401431127 | Oklahoma | Tulsa | NORTH TULSA - FIRE STATION#24 | 36.2049 | -95.9765 | 65 | 65 | 61 | 65 | 58.5 | 58.5 | 58.5 | 58.5 | 58.1 | 58.1 | 58.1 | 58.1 |
| 450010001 | South Carolina | Abbeville | DUE WEST | 34.32532 | -82.3864 | 58 | 58 | NA | NA | 49.5 | 49.5 | 49.5 | 49.5 | | | | |
| 450030003 | South Carolina | Aiken | JACKSON MIDDLE SCHOOL | 33.34223 | -81.7887 | 60.3 | 62 | 60 | 58 | 51.5 | 53 | 51.5 | 53 | | | | |
| 450070005 | South Carolina | Anderson | Big Creek | 34.62324 | -82.5321 | 58.7 | 60 | NA | NA | 49.8 | 50.9 | 49.8 | 50.9 | 48.9 | 50 | 48.9 | 50 |
| 450150002 | South Carolina | Berkeley | BUSHY PARK PUMP STATION | 32.98725 | -79.9367 | 57.3 | 58 | NA | NA | 49.4 | 50 | 49.4 | 50 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 450190046 | South Carolina | Charleston | CAPE ROMAIN | 32.94102 | -79.6572 | 59 | 61 | NA | 57 | 51.3 | 53.1 | 51.2 | 52.9 | | | | |
| 450250001 | South Carolina | Chesterfield | CHESTERFIELD | 34.61537 | -80.1988 | 60 | 60 | 60 | 59 | 51.8 | 51.8 | 51.8 | 51.8 | | | | |
| 450290002 | South Carolina | Colleton | ASHTON | 33.00787 | -80.965 | 56.3 | 57 | NA | NA | | | | | | | | |
| 450310003 | South Carolina | Darlington | Pee Dee Experimental Station | 34.2857 | -79.7449 | 61 | 62 | 58 | 57 | 51.3 | 52.1 | 51.3 | 52.1 | | | | |
| 450370001 | South Carolina | Edgefield | TRENTON | 33.73996 | -81.8536 | 59.7 | 61 | 60 | 58 | 50.3 | 51.4 | 50.3 | 51.4 | | | | |
| 450450016 | South Carolina | Greenville | Hillcrest Middle School | 34.75185 | -82.2567 | 63.3 | 65 | 64 | 64 | 53.8 | 55.3 | 53.8 | 55.3 | 52.8 | 54.2 | 52.8 | 54.2 |
| 450730001 | South Carolina | Oconee | LONG CREEK | 34.80526 | -83.2377 | 63 | 63 | NA | NA | 53 | 53 | 53 | 53 | | | | |
| 450770002 | South Carolina | Pickens | CLEMSON CMS | 34.65361 | -82.8387 | 62.7 | 63 | NA | NA | 53.3 | 53.6 | 53.3 | 53.6 | 52.7 | 53 | 52.7 | 53 |
| 450770003 | South Carolina | Pickens | Wolf Creek | 34.85154 | -82.7446 | 61 | 62 | NA | NA | 51.5 | 52.3 | 51.5 | 52.3 | 51.3 | 52.1 | 51.3 | 52.1 |
| 450790007 | South Carolina | Richland | PARKLANE | 34.09396 | -80.9623 | 60 | 61 | 60 | 58 | 50.3 | 51.2 | 50.3 | 51.2 | 48.8 | 49.6 | 48.8 | 49.6 |
| 450790021 | South Carolina | Richland | CONGAREE BLUFF | 33.81468 | -80.7811 | 55 | 55 | 55 | 55 | 47.2 | 47.2 | 47.2 | 47.2 | | | | |
| 450791001 | South Carolina | Richland | SANDHILL EXPERIMENTAL STATION | 34.13126 | -80.8683 | 64.3 | 65 | 62 | 61 | 54 | 54.5 | 54 | 54.5 | 52.3 | 52.9 | 52.3 | 52.9 |
| 450830009 | South Carolina | Spartanburg | NORTH SPARTANBURG FIRE STATION #2 | 34.98871 | -82.0758 | 66 | 67 | 65 | 63 | 55.2 | 56.1 | 55.2 | 56.1 | 54.9 | 55.7 | 54.9 | 55.7 |
| 450910008 | South Carolina | York | YORK (LANDFILL) | 34.977 | -81.207 | 61.3 | 63 | 62 | 59 | 51.6 | 53 | 51.6 | 53 | 51.1 | 52.5 | 51.1 | 52.5 |
| 450918801 | South Carolina | York | | 34.9127 | -80.8745 | 64 | 64 | 62 | NA | 55.2 | 55.2 | 55.2 | 55.2 | 53.9 | 53.9 | 53.9 | 53.9 |
| 460110003 | South Dakota | Brookings | Research Farm | 44.3486 | -96.8073 | 62 | 63 | 68 | 66 | | | | | | | | |
| 460330132 | South Dakota | Custer | Wind Cave NP - Visitor Center | 43.55764 | -103.484 | 60.3 | 62 | 61 | 63 | | | | | | | | |
| 460710001 | South Dakota | Jackson | SOUTH OF BADLANDS NP HEADQUARTERS | 43.74561 | -101.941 | 60.7 | 63 | 57 | 60 | | | | | | | | |
| 460930001 | South Dakota | Meade | BLACK HAWK ELEMENTARY SCHOOL GROUNDS | 44.15564 | -103.316 | 53.3 | 57 | 63 | 64 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 460990008 | South Dakota | Minnehaha | SD School for the Deaf | 43.54792 | -96.7008 | 65 | 67 | NA | NA | | | | | | | | |
| 461270001 | South Dakota | Union | Union County #1 Jensen | 42.75152 | -96.7072 | 62.3 | 64 | 64 | NA | | | | | | | | |
| 470010101 | Tennessee | Anderson | Freel's Bend O3 and SO2 monitoring | 35.96497 | -84.2232 | 63.7 | 64 | 60 | 58 | 53.8 | 54 | 53.8 | 54 | 51.7 | 52 | 51.7 | 52 |
| 470090101 | Tennessee | Blount | Great Smoky Mountains NP - Look Rock | 35.63348 | -83.9416 | 67 | 67 | 62 | 63 | 57 | 57 | 57 | 57 | 56.9 | 56.9 | 56.9 | 56.9 |
| 470090102 | Tennessee | Blount | Great Smoky Mountains NP - Cade's Cove | 35.60306 | -83.7836 | 61 | 62 | 56 | 58 | 51.9 | 52.7 | 51.9 | 52.7 | | | | |
| 470259991 | Tennessee | Claiborne | Speedwell | 36.46983 | -83.8265 | 62.7 | 63 | 57 | 56 | 53.7 | 54 | 53.7 | 54 | | | | |
| 470370011 | Tennessee | Davidson | East Health | 36.20506 | -86.7447 | 66 | 66 | 63 | 64 | 56.3 | 56.3 | 56.3 | 56.3 | 55.2 | 55.2 | 55.2 | 55.2 |
| 470370026 | Tennessee | Davidson | Percy Priest Dam | 36.1508 | -86.6233 | 66 | 67 | 62 | 63 | 56.1 | 56.9 | 56.1 | 56.9 | 55.2 | 56.1 | 55.2 | 56.1 |
| 470419991 | Tennessee | DeKalb | Edgar Evans | 36.0388 | -85.7331 | 61.3 | 62 | 57 | 57 | 52.4 | 53 | 52.4 | 53 | | | | |
| 470651011 | Tennessee | Hamilton | Soddy-Daisy High School | 35.23348 | -85.1816 | 64.7 | 65 | 60 | 61 | 54.7 | 54.9 | 54.7 | 54.9 | 53.9 | 54.1 | 53.9 | 54.1 |
| 470654003 | Tennessee | Hamilton | Eastside Utility | 35.10264 | -85.1622 | 67 | 68 | 61 | 63 | 56 | 56.8 | 56 | 56.8 | 55 | 55.8 | 55 | 55.8 |
| 470890002 | Tennessee | Jefferson | New Market ozone monitor | 36.10563 | -83.6021 | 67 | 68 | 63 | 61 | 56.9 | 57.7 | 56.9 | 57.7 | 56 | 56.8 | 56 | 56.8 |
| 470930021 | Tennessee | Knox | East Knox Elementary School | 36.08551 | -83.7648 | 64.3 | 65 | 59 | 58 | 54.7 | 55.3 | 54.7 | 55.3 | 53.8 | 54.4 | 53.8 | 54.4 |
| 470931020 | Tennessee | Knox | Spring Hill Elementary School | 36.01919 | -83.8738 | 66.7 | 67 | 57 | 57 | 56.3 | 56.6 | 56.3 | 56.6 | 55.7 | 56 | 55.7 | 56 |
| 471050109 | Tennessee | Loudon | Loudon Middle School ozone monitor | 35.7211 | -84.343 | 68 | 69 | 62 | 60 | 57.2 | 58.1 | 57.2 | 58.1 | 56.1 | 56.9 | 56.1 | 56.9 |
| 471550101 | Tennessee | Sevier | Great Smoky Mountains NP - Cove Mountain | 35.69676 | -83.6096 | 67.3 | 68 | 60 | 61 | 57.4 | 58 | 57.4 | 58 | | | | |
| 471570021 | Tennessee | Shelby | Frayser Ozone Monitor | 35.2175 | -90.0197 | 66.7 | 67 | 65 | 65 | 59.7 | 59.9 | 59.7 | 59.9 | 59.1 | 59.3 | 59.1 | 59.3 |
| 471570075 | Tennessee | Shelby | Memphis NCORE site | 35.1517 | -89.8502 | 67.3 | 69 | 66 | 69 | 60.3 | 61.9 | 60.3 | 61.9 | 59.9 | 61.4 | 59.9 | 61.4 |
| 471571004 | Tennessee | Shelby | Edmund Orgill Park Ozone | 35.37815 | -89.8345 | 65.7 | 66 | 61 | 64 | 57.9 | 58.2 | 57.9 | 58.2 | 57.2 | 57.4 | 57.2 | 57.4 |
| 471632002 | Tennessee | Sullivan | Blountville Ozone Monitor | 36.54137 | -82.4246 | 66 | 66 | 61 | 60 | 60.2 | 60.2 | 60.2 | 60.2 | 60.2 | 60.2 | 60.2 | 60.2 |
| 471632003 | Tennessee | Sullivan | Kingsport ozone monitor | 36.58211 | -82.4857 | 64.7 | 65 | 60 | 59 | 58.6 | 58.9 | 58.6 | 58.9 | 59.1 | 59.4 | 59.1 | 59.4 |
| 471650007 | Tennessee | Sumner | Hendersonville Ozone Site at Old Hickory Dam | 36.29756 | -86.6531 | 66.3 | 67 | 65 | 64 | 56 | 56.6 | 56 | 56.6 | 54.4 | 54.9 | 54.4 | 54.9 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 471870106 | Tennessee | Williamson | FAIRVIEW MIDDLE SCHOOL ozone monitor | 35.94977 | -87.1382 | 60.3 | 61 | 58 | 61 | 50.8 | 51.3 | 50.8 | 51.3 | 50.1 | 50.6 | 50.1 | 50.6 |
| 471890103 | Tennessee | Wilson | Cedars of Lebanon Ozone Monitor | 36.0609 | -86.2863 | 63.5 | 64 | 59 | 60 | 53.3 | 53.7 | 53.3 | 53.7 | 52.5 | 52.9 | 52.5 | 52.9 |
| 480271045 | Texas | Bell | Temple Georgia | 31.12242 | -97.4311 | 68 | 69 | 64 | 66 | | | | | | | | |
| 480271047 | Texas | Bell | Killeen Skylark Field | 31.088 | -97.6797 | 67.3 | 68 | 66 | 67 | | | | | | | | |
| 480290032 | Texas | Bexar | San Antonio Northwest | 29.51509 | -98.6202 | 73 | 74 | 71 | 71 | 67.2 | 68.1 | 67.2 | 68.1 | 66.3 | 67.2 | 66.3 | 67.2 |
| 480290052 | Texas | Bexar | Camp Bullis | 29.63206 | -98.5649 | 72.3 | 73 | 73 | 75 | 67.9 | 68.5 | 67.9 | 68.5 | 66.1 | 66.7 | 66.1 | 66.7 |
| 480290059 | Texas | Bexar | Calaveras Lake | 29.27538 | -98.3117 | 65 | 66 | 65 | 67 | 60.7 | 61.7 | 60.7 | 61.7 | | | | |
| 480391004 | Texas | Brazoria | Manvel Croix Park | 29.52044 | -95.3925 | 74.7 | 77 | 75 | 73 | 70.7 | 72.9 | 70.7 | 72.9 | 67.9 | 70 | 67.9 | 70 |
| 480391016 | Texas | Brazoria | Lake Jackson | 29.04376 | -95.4729 | 65 | 66 | 65 | 68 | 59.2 | 60.1 | 59.2 | 60.1 | | | | |
| 480430101 | Texas | Brewster | Big Bend NP - K-Bar Ranch Road | 29.30265 | -103.178 | 62.3 | 63 | 61 | 61 | | | | | | | | |
| 480610006 | Texas | Cameron | Brownsville | 25.89252 | -97.4938 | 56.5 | 57 | NA | NA | | | | | | | | |
| 480611023 | Texas | Cameron | Harlingen Teege | 26.20034 | -97.7127 | 57 | 57 | 56 | 55 | | | | | | | | |
| 480850005 | Texas | Collin | Frisco | 33.1324 | -96.7864 | 74.3 | 75 | 75 | 74 | 65.7 | 66.3 | 65.7 | 66.3 | 64.4 | 65 | 64.4 | 65 |
| 481130069 | Texas | Dallas | Dallas Hinton | 32.82006 | -96.8601 | 73 | 74 | 67 | 67 | 64.8 | 65.7 | 64.8 | 65.7 | 63.6 | 64.5 | 63.6 | 64.5 |
| 481130075 | Texas | Dallas | Dallas North #2 | 32.91921 | -96.8085 | 73.7 | 75 | 71 | 71 | 65.7 | 66.8 | 65.7 | 66.8 | 64.1 | 65.3 | 64.1 | 65.3 |
| 481130087 | Texas | Dallas | Dallas Redbird Airport Executive | 32.67645 | -96.8721 | 64.7 | 66 | 68 | 71 | 57.4 | 58.6 | 57.4 | 58.6 | 57.2 | 58.4 | 57.2 | 58.4 |
| 481210034 | Texas | Denton | Denton Airport South | 33.21907 | -97.1963 | 78 | 80 | 74 | 76 | 70.1 | 71.9 | 70.1 | 71.9 | 69.1 | 70.9 | 69.1 | 70.9 |
| 481211032 | Texas | Denton | Pilot Point | 33.41065 | -96.9446 | 74 | 76 | 76 | 77 | 66.6 | 68.4 | 66.6 | 68.4 | 65.1 | 66.8 | 65.1 | 66.8 |
| 481390016 | Texas | Ellis | Midlothian OFW | 32.48208 | -97.0269 | 64.3 | 65 | 62 | 62 | 57 | 57.6 | 57 | 57.6 | 56.1 | 56.7 | 56.1 | 56.7 |
| 481391044 | Texas | Ellis | Italy | 32.17542 | -96.8702 | 63.7 | 65 | 61 | 63 | | | | | | | | |
| 481410029 | Texas | El Paso | Ivanhoe | 31.78577 | -106.324 | 63.7 | 66 | 67 | 65 | 62.1 | 64.3 | 62.1 | 64.3 | 61.6 | 63.8 | 61.6 | 63.8 |
| 481410037 | Texas | El Paso | El Paso UTEP | 31.76829 | -106.501 | 71.3 | 73 | 75 | NA | 69.3 | 70.9 | 69.3 | 70.9 | 68.6 | 70.2 | 68.6 | 70.2 |
| 481410044 | Texas | El Paso | El Paso Chamizal | 31.76569 | -106.455 | 69 | 71 | 71 | 69 | 67 | 69 | 67 | 69 | 66.3 | 68.3 | 66.3 | 68.3 |
| 481410055 | Texas | El Paso | Ascarate Park SE | 31.74678 | -106.403 | 66 | 69 | NA | 64 | 64.1 | 67 | 64.1 | 67 | 63.5 | 66.3 | 63.5 | 66.3 |
| 481410057 | Texas | El Paso | Socorro Hueco | 31.6675 | -106.288 | 65.3 | 66 | 70 | 73 | | | | | 62.8 | 63.5 | 62.8 | 63.5 |
| 481410058 | Texas | El Paso | Skyline Park | 31.89391 | -106.426 | 70 | 72 | 70 | 70 | 67.6 | 69.6 | 67.6 | 69.6 | 66.9 | 68.9 | 66.9 | 68.9 |
| 481671034 | Texas | Galveston | Galveston 99th Street | 29.25447 | -94.8613 | 75.7 | 77 | 72 | 70 | 71 | 72.2 | 71.2 | 72.4 | 70.6 | 71.8 | 70.3 | 71.5 |
| 481830001 | Texas | Gregg | Longview | 32.37868 | -94.7118 | 65.3 | 66 | 62 | 61 | 58.8 | 59.5 | 58.8 | 59.5 | 59.4 | 60 | 59.4 | 60 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 482010024 | Texas | Harris | Houston Aldine | 29.90104 | -95.3261 | 79.3 | 81 | 74 | 69 | 75.6 | 77.2 | 75.6 | 77.2 | 73.1 | 74.6 | 73.1 | 74.6 |
| 482010026 | Texas | Harris | Channelview | 29.80271 | -95.1255 | 68.3 | 69 | 65 | 64 | 64.3 | 65 | 64.3 | 65 | 63.8 | 64.4 | 64.4 | 65 |
| 482010029 | Texas | Harris | Northwest Harris County | 30.03952 | -95.674 | 71.3 | 73 | 71 | 70 | 65.3 | 66.9 | 65.3 | 66.9 | 63 | 64.5 | 63 | 64.5 |
| 482010046 | Texas | Harris | Houston North Wayside | 29.82809 | -95.2841 | 67 | 69 | 64 | 62 | 63.9 | 65.8 | 63.9 | 65.8 | 61.7 | 63.6 | 61.7 | 63.6 |
| 482010047 | Texas | Harris | Lang | 29.83417 | -95.4892 | 73.7 | 76 | 71 | 70 | 69.7 | 71.8 | 69.7 | 71.8 | 66.7 | 68.8 | 66.7 | 68.8 |
| 482010051 | Texas | Harris | Houston Croquet | 29.62389 | -95.4742 | 70 | 71 | 74 | 73 | 65.5 | 66.4 | 65.5 | 66.4 | 62.9 | 63.8 | 62.9 | 63.8 |
| 482010055 | Texas | Harris | Houston Bayland Park | 29.69573 | -95.4992 | 76 | 77 | 77 | 78 | 71.1 | 72.1 | 71.1 | 72.1 | 68.3 | 69.2 | 68.3 | 69.2 |
| 482010062 | Texas | Harris | Houston Monroe | 29.62556 | -95.2672 | 63 | 65 | 67 | 63 | 60.9 | 62.8 | 60.9 | 62.8 | 58.7 | 60.5 | 58.7 | 60.5 |
| 482010066 | Texas | Harris | Houston Westhollow | 29.72333 | -95.6358 | 75 | 76 | 70 | 70 | 69.3 | 70.3 | 69.3 | 70.3 | 66.5 | 67.3 | 66.5 | 67.3 |
| 482010416 | Texas | Harris | Park Place | 29.68639 | -95.2947 | 72.3 | 74 | 73 | 73 | 69 | 70.6 | 69 | 70.6 | 66.4 | 68 | 66.4 | 68 |
| 482011015 | Texas | Harris | Lynchburg Ferry | 29.75889 | -95.0794 | 65 | 65 | 64 | 63 | 61.2 | 61.2 | 61.2 | 61.2 | 60.7 | 60.7 | 61.2 | 61.2 |
| 482011017 | Texas | Harris | Baytown Garth | 29.82332 | -94.9838 | 71 | 73 | 68 | 69 | 67.1 | 69 | 67.1 | 69 | | | | |
| 482011034 | Texas | Harris | Houston East | 29.768 | -95.2206 | 73.7 | 75 | 71 | 72 | 70.3 | 71.5 | 70.3 | 71.5 | 68.9 | 70.1 | 68.9 | 70.1 |
| 482011035 | Texas | Harris | Clinton | 29.73373 | -95.2576 | 71.3 | 75 | 71 | 72 | 68 | 71.5 | 68 | 71.5 | 66.7 | 70.1 | 66.7 | 70.1 |
| 482011039 | Texas | Harris | Houston Deer Park #2 | 29.67003 | -95.1285 | 68.7 | 71 | 74 | 71 | 65.1 | 67.3 | 65.1 | 67.3 | 64.3 | 66.4 | 64.9 | 67.1 |
| 482011050 | Texas | Harris | Seabrook Friendship Park | 29.58305 | -95.0155 | 70.7 | 71 | 62 | 61 | 66.3 | 66.6 | 66.5 | 66.8 | 65.9 | 66.1 | 66.2 | 66.5 |
| 482030002 | Texas | Harrison | Karnack | 32.66899 | -94.1675 | 61.3 | 62 | 59 | 61 | 55.1 | 55.7 | 55.1 | 55.7 | | | | |
| 482150043 | Texas | Hidalgo | Mission | 26.22621 | -98.2911 | 55 | 55 | 56 | 60 | | | | | | | | |
| 482210001 | Texas | Hood | Granbury | 32.4423 | -97.8035 | 67.3 | 69 | 64 | 69 | | | | | | | | |
| 482311006 | Texas | Hunt | Greenville | 33.15309 | -96.1156 | 62.3 | 65 | 62 | 63 | 55.1 | 57.5 | 55.1 | 57.5 | | | | |
| 482450009 | Texas | Jefferson | Beaumont Downtown | 30.03642 | -94.0711 | 64.7 | 65 | 65 | 63 | 60.3 | 60.6 | 60.3 | 60.6 | | | | |
| 482450011 | Texas | Jefferson | Port Arthur West | 29.89752 | -93.9911 | 66.7 | 67 | 62 | 60 | 62.7 | 63 | 62.2 | 62.5 | 65 | 65.3 | | |
| 482450022 | Texas | Jefferson | Hamshire | 29.86396 | -94.3178 | 67 | 68 | 63 | 62 | 61.9 | 62.9 | 61.9 | 62.9 | | | | |
| 482450101 | Texas | Jefferson | SETRPC 40 Sabine Pass | 29.72793 | -93.8941 | 65.7 | 67 | NA | 61 | 60.9 | 62.1 | | | 61.5 | 62.8 | | |
| 482450102 | Texas | Jefferson | SETRPC 43 Jefferson Co Airport | 29.9425 | -94.0006 | 63 | 65 | 66 | 63 | 59.7 | 61.6 | 59.4 | 61.3 | 61.1 | 63 | 59.5 | 61.4 |
| 482451035 | Texas | Jefferson | Nederland High School | 29.97893 | -94.0109 | 66.7 | 68 | 61 | 62 | 63.2 | 64.5 | 62.9 | 64.1 | 64.7 | 65.9 | 63 | 64.3 |
| 482510003 | Texas | Johnson | Cleburne Airport | 32.3536 | -97.4367 | 73.7 | 76 | 71 | 74 | | | | | | | | |
| 482570005 | Texas | Kaufman | Kaufman | 32.56497 | -96.3177 | 61 | 61 | 64 | 66 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 483091037 | Texas | McLennan | Waco Mazanec | 31.65307 | -97.0707 | 63 | 63 | 64 | 64 | | | | | | | | |
| 483390078 | Texas | Montgomery | Conroe Relocated | 30.3503 | -95.4251 | 73.7 | 75 | 73 | 72 | 67.5 | 68.7 | 67.5 | 68.7 | 67.5 | 68.7 | 67.5 | 68.7 |
| 483491051 | Texas | Navarro | Corsicana Airport | 32.03193 | -96.3991 | 62.7 | 64 | 63 | 65 | | | | | | | | |
| 483550025 | Texas | Nueces | Corpus Christi West | 27.76534 | -97.4343 | 62.3 | 64 | 62 | 62 | | | | | | | | |
| 483550026 | Texas | Nueces | Corpus Christi Tuloso | 27.83241 | -97.5554 | 61.3 | 63 | 62 | 61 | | | | | | | | |
| 483611001 | Texas | Orange | West Orange | 30.08526 | -93.7613 | 61.7 | 64 | 62 | 61 | 57.8 | 60 | 57.9 | 60.1 | 60.5 | 62.8 | | |
| 483670081 | Texas | Parker | Parker County | 32.86877 | -97.9059 | 70.7 | 73 | 67 | 69 | | | | | | | | |
| 483739991 | Texas | Polk | Alabama-Coushatta | 30.7017 | -94.6742 | 60.3 | 61 | 57 | 57 | | | | | | | | |
| 483819991 | Texas | Randall | Palo Duro | 34.8803 | -101.665 | 65.7 | 68 | 66 | 67 | | | | | | | | |
| 483970001 | Texas | Rockwall | Rockwall Heath | 32.93652 | -96.4592 | 66 | 66 | 63 | 63 | 59.4 | 59.4 | 59.4 | 59.4 | | | | |
| 484230007 | Texas | Smith | Tyler Airport Relocated | 32.34401 | -95.4158 | 64.7 | 65 | 64 | 65 | 57.7 | 58 | 57.7 | 58 | | | | |
| 484390075 | Texas | Tarrant | Eagle Mountain Lake | 32.98789 | -97.4772 | 71 | 72 | 75 | 76 | 63.7 | 64.6 | 63.7 | 64.6 | 63.1 | 64 | 63.1 | 64 |
| 484391002 | Texas | Tarrant | Fort Worth Northwest | 32.80582 | -97.3566 | 72.3 | 74 | 72 | 77 | 64.5 | 66 | 64.5 | 66 | 63.7 | 65.2 | 63.7 | 65.2 |
| 484392003 | Texas | Tarrant | Keller | 32.92247 | -97.2821 | 73.3 | 74 | 72 | 72 | 66.2 | 66.8 | 66.2 | 66.8 | 65.3 | 66 | 65.3 | 66 |
| 484393009 | Texas | Tarrant | Grapevine Fairway | 32.98426 | -97.0637 | 75.3 | 76 | 74 | 76 | 67.6 | 68.3 | 67.6 | 68.3 | 67.2 | 67.9 | 67.2 | 67.9 |
| 484393011 | Texas | Tarrant | Arlington Municipal Airport | 32.65636 | -97.0886 | 67 | 69 | NA | 72 | 59.5 | 61.3 | 59.5 | 61.3 | 59.3 | 61 | 59.3 | 61 |
| 484530014 | Texas | Travis | Austin Northwest | 30.35444 | -97.7603 | 67.7 | 69 | NA | NA | 61.4 | 62.6 | 61.4 | 62.6 | 61.1 | 62.3 | 61.1 | 62.3 |
| 484530020 | Texas | Travis | Austin Audubon Society | 30.48317 | -97.8723 | 66.3 | 67 | 63 | 64 | 60.3 | 61 | 60.3 | 61 | 59.8 | 60.4 | 59.8 | 60.4 |
| 484690003 | Texas | Victoria | Victoria | 28.83617 | -97.0055 | 65 | 65 | 61 | 60 | | | | | | | | |
| 484790016 | Texas | Webb | Laredo Vidaurri | 27.51746 | -99.5152 | 54 | 54 | NA | NA | | | | | | | | |
| 540030003 | West Virginia | Berkeley | MARTINSBURG BALL FIELD | 39.44811 | -77.9638 | 62 | 63 | 57 | 56 | 54.1 | 55 | 54.1 | 55 | | | | |
| 540110006 | West Virginia | Cabell | HENDERSON CENTER/MARSHALL UNIVERSITY - MOVED FROM WATER CO. 5/98 | 38.42413 | -82.4259 | 64 | 64 | NA | NA | 56.6 | 56.6 | 56.6 | 56.6 | 55.6 | 55.6 | 55.6 | 55.6 |
| 540219991 | West Virginia | Gilmer | Cedar Creek | 38.8795 | -80.8477 | 58 | 59 | 54 | 53 | 53.3 | 54.2 | 53.3 | 54.2 | 52 | 52.8 | 52 | 52.8 |
| 540250003 | West Virginia | Greenbrier | SAM BLACK CHURCH - DOH GARAGE - GREENBRIER COUNTY | 37.90853 | -80.6326 | 59.7 | 60 | 56 | 54 | 53.6 | 53.9 | 53.6 | 53.9 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 540290009 | West Virginia | Hancock | | 40.42737 | -80.5923 | 65.5 | 66 | NA | 64 | 56.7 | 57.1 | 56.7 | 57.1 | 55.5 | 56 | 55.5 | 56 |
| 540390020 | West Virginia | Kanawha | | 38.34626 | -81.6212 | 67 | 67 | NA | 61 | 59.3 | 59.3 | 59.3 | 59.3 | 59.3 | 59.3 | 59.3 | 59.3 |
| 540610003 | West Virginia | Monongalia | | 39.64937 | -79.9209 | 62.3 | 64 | 61 | 60 | 56.3 | 57.8 | 56.3 | 57.8 | 56.2 | 57.7 | 56.2 | 57.7 |
| 540690010 | West Virginia | Ohio | | 40.11488 | -80.701 | 67 | 68 | 61 | 60 | 59.1 | 59.9 | 59.1 | 59.9 | 58.8 | 59.7 | 58.8 | 59.7 |
| 540939991 | West Virginia | Tucker | Parsons | 39.0905 | -79.6617 | 61.7 | 62 | 56 | 58 | 55.4 | 55.7 | 55.4 | 55.7 | | | | |
| 541071002 | West Virginia | Wood | Neale Elementary School | 39.32353 | -81.5524 | 65 | 68 | NA | 59 | 56.6 | 59.2 | 56.6 | 59.2 | 56.4 | 59 | 56.4 | 59 |
| 550030010 | Wisconsin | Ashland | BAD RIVER TRIBAL SCHOOL - ODANAH | 46.60225 | -90.6561 | 58.3 | 59 | 58 | 57 | | | | | | | | |
| 550090026 | Wisconsin | Brown | GREEN BAY - UW | 44.53098 | -87.908 | 65.3 | 66 | 62 | 64 | | | | | | | | |
| 550210015 | Wisconsin | Columbia | COLUMBUS | 43.3156 | -89.1089 | 66 | 67 | 64 | 66 | | | | | | | | |
| 550250041 | Wisconsin | Dane | MADISON EAST | 43.10084 | -89.3573 | 65 | 65 | 64 | 65 | | | | | | | | |
| 550270001 | Wisconsin | Dodge | HORICON WILDLIFE AREA | 43.46611 | -88.6211 | 66.3 | 68 | 65 | 66 | | | | | | | | |
| 550290004 | Wisconsin | Door | NEWPORT PARK | 45.2384 | -86.994 | 72.7 | 73 | 70 | 73 | 65.7 | 65.9 | 65.8 | 66 | 65.4 | 65.7 | 65.2 | 65.4 |
| 550350014 | Wisconsin | Eau Claire | EAU CLAIRE - DOT SIGN SHOP | 44.7614 | -91.143 | 62 | 64 | 62 | 62 | | | | | | | | |
| 550390006 | Wisconsin | Fond du Lac | FOND DU LAC | 43.6874 | -88.422 | 64.7 | 66 | 62 | 64 | | | | | | | | |
| 550410007 | Wisconsin | Forest | POTAWATOMI | 45.565 | -88.8086 | 62.7 | 63 | 59 | 59 | | | | | | | | |
| 550550009 | Wisconsin | Jefferson | JEFFERSON - LAATSCH | 43.0034 | -88.8283 | 68 | 69 | 66 | 66 | | | | | | | | |
| 550590019 | Wisconsin | Kenosha | CHIWAUKEE PRAIRIE STATELINE | 42.50472 | -87.8093 | 78 | 79 | 74 | 75 | 72.5 | 73.4 | 72.5 | 73.5 | 73.5 | 74.4 | 75.4 | 76.3 |
| 550590025 | Wisconsin | Kenosha | KENOSHA - WATER TOWER | 42.5958 | -87.8858 | 73.7 | 77 | 72 | 73 | 68.9 | 72 | 67.8 | 70.8 | 70.2 | 73.4 | 66.1 | 69.1 |
| 550610002 | Wisconsin | Kewaunee | KEWAUNEE | 44.44312 | -87.5052 | 69.3 | 70 | 64 | 67 | 63.4 | 64.1 | 62.9 | 63.6 | 62.8 | 63.4 | 62.6 | 63.3 |
| 550630012 | Wisconsin | La Crosse | LACROSSE - DOT BUILDING | 43.7775 | -91.2269 | 62 | 62 | 60 | 59 | | | | | | | | |
| 550710007 | Wisconsin | Manitowoc | MANITOWOC - WDLND DUNES | 44.13862 | -87.6161 | 73 | 74 | 68 | 73 | 66.8 | 67.7 | 66.1 | 67 | 66.5 | 67.4 | 66.2 | 67.2 |
| 550730012 | Wisconsin | Marathon | LAKE DUBAY | 44.70735 | -89.7718 | 64 | 65 | 58 | 57 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 550790010 | Wisconsin | Milwaukee | MILWAUKEE - SIXTEENTH ST. HEALTH CENTER | 43.01667 | -87.9333 | 65.3 | 67 | 61 | NA | 60.4 | 62 | 60.3 | 61.9 | 62.2 | 63.8 | 59.2 | 60.8 |
| 550790026 | Wisconsin | Milwaukee | MILWAUKEE - SER DNR HDQRS | 43.06098 | -87.9135 | 68 | 69 | NA | NA | 62.9 | 63.8 | 63.4 | 64.3 | 64 | 64.9 | 65.9 | 66.9 |
| 550790085 | Wisconsin | Milwaukee | BAYSIDE | 43.1818 | -87.901 | 71.7 | 73 | 70 | 73 | 66.6 | 67.8 | 67.2 | 68.4 | 66.9 | 68.1 | 69.8 | 71.1 |
| 550870009 | Wisconsin | Outagamie | APPLETON - AAL | 44.30738 | -88.3952 | 65.7 | 67 | 62 | 64 | | | | | | | | |
| 550890008 | Wisconsin | Ozaukee | GRAFTON | 43.343 | -87.92 | 71.3 | 72 | 71 | 72 | 66.2 | 66.8 | 65.7 | 66.3 | 68 | 68.7 | 64.5 | 65.1 |
| 550890009 | Wisconsin | Ozaukee | HARRINGTON BEACH PARK | 43.4981 | -87.81 | 73.3 | 74 | 70 | 71 | 68.4 | 69.1 | 67.7 | 68.4 | 68.2 | 68.9 | 67.2 | 67.9 |
| 551010020 | Wisconsin | Racine | RACINE - PAYNE AND DOLAN | 42.77368 | -87.7963 | 76 | 78 | 73 | 75 | 70.5 | 72.3 | 71.1 | 73 | 71.1 | 73 | 73 | 74.9 |
| 551050030 | Wisconsin | Rock | BELOIT - CONVERSE | 42.51831 | -89.0635 | 67.7 | 69 | 65 | 67 | | | | | | | | |
| 551110007 | Wisconsin | Sauk | DEVILS LAKE PARK | 43.4351 | -89.6797 | 63.7 | 64 | 63 | 63 | | | | | | | | |
| 551170006 | Wisconsin | Sheboygan | SHEBOYGAN - KOHLER ANDRAE | 43.66742 | -87.7162 | 80 | 81 | 72 | 75 | 74 | 74.9 | 73.5 | 74.4 | 73.8 | 74.7 | 72.3 | 73.2 |
| 551170009 | Wisconsin | Sheboygan | SHEBOYGAN - HAVEN | 43.8156 | -87.7922 | 70 | 71 | 65 | 69 | 64.2 | 65.1 | 63.8 | 64.7 | 64.4 | 65.3 | 63.2 | 64.1 |
| 551199991 | Wisconsin | Taylor | Perkinstown | 45.2066 | -90.5969 | 61 | 62 | 59 | 58 | | | | | | | | |
| 551250001 | Wisconsin | Vilas | TROUT LAKE | 46.0519 | -89.654 | 61.3 | 62 | 58 | 58 | | | | | | | | |
| 551270005 | Wisconsin | Walworth | LAKE GENEVA | 42.58001 | -88.499 | 69 | 70 | NA | NA | | | | | | | | |
| 551330027 | Wisconsin | Waukesha | WAUKESHA - CLEVELAND AVE | 43.02008 | -88.2151 | 65.7 | 66 | 65 | 68 | 60.4 | 60.7 | 60.4 | 60.7 | 59.9 | 60.2 | 59.9 | 60.2 |
| 560019991 | Wyoming | Albany | Centennial | 41.3642 | -106.24 | 64.7 | 66 | 67 | 68 | | | | | | | | |
| 560050123 | Wyoming | Campbell | Thunder Basin | 44.6522 | -105.29 | 59.7 | 61 | 64 | 66 | | | | | | | | |
| 560050456 | Wyoming | Campbell | Campbell County | 44.14696 | -105.53 | 61.5 | 63 | NA | NA | | | | | | | | |
| 560070100 | Wyoming | Carbon | Atlantic Rim Sun Dog | 41.38694 | -107.617 | 60.7 | 62 | NA | NA | | | | | | | | |
| 560090008 | Wyoming | Converse | Tallgrass Energy Partners - Gaseous | 42.79637 | -105.362 | 59 | 59 | NA | NA | | | | | | | | |
| 560090010 | Wyoming | Converse | Converse County Long-Term | 43.10128 | -105.499 | 62 | 63 | 66 | 66 | | | | | | | | |
| 560130232 | Wyoming | Fremont | Spring Creek | 43.08167 | -107.549 | 61.7 | 62 | 64 | NA | | | | | | | | |
| 560210100 | Wyoming | Laramie | Cheyenne NCore | 41.18223 | -104.778 | 63.3 | 64 | 64 | 65 | | | | | | | | |
| 560250100 | Wyoming | Natrona | Casper Gaseous | 42.82231 | -106.365 | 61.3 | 63 | 65 | 65 | | | | | | | | |
| 560252601 | Wyoming | Natrona | | 42.8608 | -106.236 | 58 | 59 | 64 | NA | | | | | | | | |

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| 560370200 | Wyoming | Sweetwate r | Wamsutter | 41.67767 | -108.025 | 52.7 | 55 | 65 | 63 | | | | | 49.6 | 51.8 | 49.6 | 51.8 |
| 560450003 | Wyoming | Weston | | 43.87306 | -104.192 | 60.5 | 61 | 64 | 64 | | | | | | | | |

# Appendix M

# DRAFT: Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter

**U.S. Environmental Protection Agency**

**Office of Air Quality Planning and Standards**

**Air Quality Policy Division**

**March 16, 2023**

# DRAFT: Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter

**Table of Contents**

## 1. Introduction

The purpose of this guidance document[1] is to assist air agencies[2] that are required to prepare nonattainment plan submissions under Part D of Title I of the Clean Air Act (CAA). Specifically, in this document the Environmental Protection Agency (EPA or Agency) provides guidance to air agencies for the preparation of ozone and particulate matter (PM) plans,[3] and focuses on the requirement for those plans to include contingency measures (CMs). CMs are control requirements that would take effect if an area fails to attain a National Ambient Air Quality Standard (NAAQS) by an applicable attainment date, or fails to make reasonable further progress (RFP) toward attainment. These CM requirements are specified in CAA section 172(c)(9) for nonattainment areas generally, and in section 182(c)(9) for Serious or higher ozone nonattainment areas. This document addresses application of the CM requirements for the ozone and PM NAAQS. It does not address contingency provisions required for maintenance plans in section 175A(d), nor does it address specific contingency provisions for anticipated control measures in Extreme ozone nonattainment areas under section 182(e). It also does not address CM requirements for pollutants other than PM and ozone, where existing CM guidance remains in effect.

EPA is issuing this guidance document because recent court decisions – discussed later in this document – have invalidated key aspects of EPA's historical approach to implementing the CM requirement. These court decisions had the effect of prohibiting an approach that many air agencies have historically used to meet the CM requirement, i.e., the reliance on implemented control measures as CMs (particularly the commonly used approach of relying on surplus reductions from mobile source fleet turnover from already-implemented federal or state control measures). EPA has received feedback from some air agencies that this constraint, together with the evolution toward more stringent control programs in the 30 years since EPA first articulated its CM guidance (explained in Section 2 of this guidance), has increased the difficulty that they face in identifying measures sufficient to meet the CM requirement. Some air agencies, particularly those with longstanding nonattainment problems that have implemented progressively more stringent control measures over time to meet more stringent NAAQS, have stated that the scarcity of remaining unimplemented control measures poses a significant

[1] This document is intended only to provide clarity to the public regarding existing requirements under the CAA or EPA regulations. This document is not a rule or regulation, and the guidance it contains may not apply to a particular situation based upon the individual facts and circumstances. This guidance does not change or substitute for any law, regulation, or other legally binding requirement and is not legally enforceable. The use of non-mandatory language such as "guidance," "recommend," "may," "should," and "can" is intended to describe EPA's policies and recommendations. The use of mandatory terminology such as "must" and "required" is intended to describe controlling legal requirements under the terms of the CAA and of EPA regulations. Such language and anything else in this document is not intended to and does not establish legally binding requirements in and of itself. None of the recommendations in this guidance are binding or enforceable against any person, and neither any part of the guidance nor the guidance as a whole constitutes final agency action that affects the rights and obligations of any person or represents the consummation of agency decision making. Only final EPA actions taken to approve or disapprove state implementation plan (SIP) submissions that implement any of the recommendations in this guidance would be final actions for purposes of CAA section 307(b).

[2] References to air agencies include state, local, and tribal air agencies.

[3] As used in this document, PM refers to both $PM_{10}$ and $PM_{2.5}$. The guidance is intended to address planning requirements for NAAQS for both pollutants.

challenge to meeting CM requirements. EPA intends this guidance to address that increased challenge by clarifying and explaining approaches available to air agencies to meet the CM requirement, while still meeting the CAA as interpreted by the courts.

This guidance focuses on three key aspects of EPA's CM guidance. First, the guidance addresses the method that air agencies should use to calculate EPA-recommended amount of emissions reductions that CMs should provide. Longstanding EPA guidance, discussed in Section 2 of this document guidance, has recommended that CMs provide reductions approximately equal to or greater than the amount needed to meet the requirement for RFP in the relevant area for 1 year. In this guidance EPA continues to recommend an annual progress-based approach for calculating the recommended amount of reductions for CMs but changes the metric to be more closely tied to the air quality improvement needs of the area when the CMs are triggered. (The term "triggered" for CMs refers to the effective date of EPA's final determination that a nonattainment area has failed to attain a NAAQS by the applicable attainment date or has failed to meet RFP.[4] The CAA establishes time frames for EPA to make such determinations.)

Second, the guidance addresses the situation where an air agency cannot identify feasible CMs in sufficient quantity to produce the recommended amount of reductions using the updated metric. Previous EPA policy has indicated that states could provide a "reasoned justification" to have CMs that result in less than the recommended one year's worth (OYW) of RFP. This guidance provides air agencies with specific recommendations about how to develop such reasoned justifications to support state implementation plan (SIP) submissions for which the submitting agency is asserting that it cannot provide for the recommended amount of CM reductions due to a lack of feasible measures.

Finally, this guidance addresses the time period within which reductions from CMs should occur. EPA previously recommended that CMs take effect within 60 days of being triggered, and that the resulting reductions generally occur within 1 year of the CMs being triggered. In instances where there are insufficient CMs available to achieve the recommended amount of emissions reductions within 1 year, EPA provides recommendations for how air agencies could include CMs that provide reductions within up to 2 years of being triggered. This guidance does not alter the 60-day recommendation for the measures to take effect.

While this guidance document focuses on these three aspects of CM guidance that EPA is updating, it also provides additional information to summarize EPA's existing guidance for CMs more broadly, including aspects that EPA is not updating, to ensure clarity and national consistency.

## 2. Background

This section provides background and context on the relevant statutory provisions, previous EPA guidance, and court decisions involving the CM requirement.

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[4] For ozone nonattainment areas classified Serious or above, CAA section 182(c)(9) further specifies that CMs are triggered by an area's failure to meet the applicable RFP milestone. For $PM_{2.5}$, the triggers for CM are further specified by regulation at 40 CFR 1014(a)(1)-(4). The term "triggered" as used here would also include any final EPA determination regarding these requirements.

## 2.1. Nonattainment Area CM Provisions in the CAA

The CAA's nonattainment area CM requirements appear in two specific provisions: sections 172(c)(9) and 182(c)(9). Congress added these CM requirements to the CAA as part of the Amendments of 1990. Any evaluation of these provisions must rely on the statutory language as well as the larger statutory context and structure of the Act with respect to nonattainment plan requirements.

Section 172(c)(9) is included in the Part D Subpart 1 general nonattainment plan SIP requirements applicable to all NAAQS. It provides that states must include specific measures as CMs as a required element of their nonattainment plan SIP submissions. It applies to nonattainment plans regardless of the classification of the nonattainment area, with one notable exception, i.e., states are not required to meet certain nonattainment plan requirements, including the CM requirement, for ozone nonattainment areas classified as "Marginal."[5] Section 172(c)(9) provides as follows:

> (9) Contingency measures
>
> Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national ambient air quality standard by the attainment date applicable under this part [D]. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator.

Section 182(c)(9) is included in the Part D Subpart 2 ozone NAAQS nonattainment plan SIP requirements and applies specifically to states with ozone nonattainment areas classified as "Serious" or above. It provides that states must include specific measures as CMs as a required element of their nonattainment plan SIP submissions. In particular, section 182(c)(9) adds the requirement that the CMs must be in place to be triggered in the event that the state fails to meet a reasonable further progress "milestone" related to sections 182(c)(2)(B) and 182(g).[6] Section 182(c)(9) provides as follows:

> (9) Contingency measures
>
> In addition to the contingency provisions required under [section 172(c)(9)] of this title, the plan revision shall provide for the implementation of specific measures to be undertaken if the area fails to meet any applicable milestone. Such measures shall be included in the plan revision as contingency measures to take effect without further action by the State or the Administrator upon a failure by the State to meet the applicable milestone.

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[5] *See* text at the end of CAA Section 182(a)(4), which states "[s]ection 7502(c)(9) [172(c)(9)] of this title (relating to contingency measures) shall not apply to Marginal Areas."

[6] EPA has explained that "[s]ection 182(c)(9) requires that certain state submissions must provide for the implementation of contingency measures in the event of a failure to meet a milestone; it does not require the state to submit separate and distinct contingency measures allocated exclusively for a failure to meet a milestone." 86 FR 27524 at 27527 (May 21, 2021).

The CAA includes no specific definition of the term "contingency measures" in section 302 or elsewhere, and thus section 172(c)(9) and section 182(c)(9) provide the statutory parameters that both states and EPA must meet with respect to these requirements.

### 2.2. Existing EPA Guidance and Regulations Interpreting the CM Provisions

The statutory requirements of sections 172(c)(9) and 182(c)(9) may appear straightforward, but ambiguities and gaps in the statutory language leave some important questions unanswered. Thus, EPA has previously addressed the CM requirements in a series of guidance documents and implementation rules. To understand EPA's interpretation of these statutory requirements, and the evolution of EPA guidance for CMs, it is helpful to review key aspects of these documents.

#### 2.2.1. 1992 General Preamble

In 1992, EPA published the "General Preamble for Implementation of Title I of the Clean Air Act Amendments of 1990" (General Preamble), which served as a preliminary roadmap outlining how the Agency intended to interpret various provisions of the CAA, as amended in 1990.[7] In the General Preamble, EPA provided its first guidance concerning key aspects of the new statutory CM requirements, including: (i) the recommendation that CMs should provide OYW of RFP; (ii) the conditions under which less or more than OYW of RFP may be appropriate; (iii) the timing of emissions reductions from CMs; (iv) how early implementation of an otherwise required measure could be a valid CM; and (v) what constitutes taking effect "without any further action" in the CM context. EPA provided somewhat different guidance for CMs for each of the criteria pollutants, based on differences in other relevant statutory provisions and the nature of the pollutants, but the portions of the General Preamble most relevant in this guidance document are those for ozone and $PM_{10}$.[8]

<u>Ozone</u>

EPA previously provided guidance to address the CM requirements for the ozone NAAQS, taking into consideration other related provisions of Part D, Subpart 2 (of CAA Title I) that gave context for interpreting these requirements. We highlight some key aspects of the historical guidance that are relevant for this new guidance document.

*Amount of Emissions Reductions*

From the outset, EPA recognized that neither section 172(c)(9), nor section 182(c)(9) "specify how many measures are needed or the magnitude of emissions reductions that must be provided by these measures."[9] Knowing the amount of emissions reductions that CMs should provide is a

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[7] 57 FR 13498 at 13511/Column 1 (April 16, 1992). The General Preamble served as an advance notice of how EPA generally intended, in subsequent rulemakings, to take action on SIP submissions and to interpret various title I provisions. EPA has subsequently applied this guidance in the context of many individual EPA SIP actions.

[8] EPA notes that guidance in the General Preamble and subsequent Addendum (59 FR 41998 (August 16, 1994)) remained applicable for the $PM_{10}$ NAAQS, whereas EPA provided additional guidance and regulatory requirements for purposes of the $PM_{2.5}$ NAAQS in the $PM_{2.5}$ Implementation Rule (81 FR 58010 (August 24, 2016)) discussed below. States must meet the statutory CM requirements in nonattainment area plans for any of the NAAQS for which they have a designated nonattainment area.

[9] 57 FR 13498 at 13511/1.

crucial issue for implementing the CM requirements. Because the express statutory language of these provisions does not provide an answer to this important question, EPA sought to resolve this statutory ambiguity. To do so, EPA considered the purpose of CMs in the context of ozone nonattainment plan requirements.

First, EPA noted that both statutory provisions require that CMs go into effect in the event that the state fails to meet RFP or fails to attain the NAAQS in the area.[10] Second, EPA noted that under section 182(b)(1)(A), states were separately required to make a SIP submission to meet RFP. For Moderate area RFP, the statute requires a 15 percent reduction from the base year emissions inventory (EI) over 6 years. For Serious and above area RFP, the statute requires a 3 percent per year reduction averaged over 3-year periods. The RFP calculation is for VOC, but in states that meet the equivalence provisions in CAA section 182(c)(2)(C), air agencies may substitute nitrogen oxides ($NO_X$) reductions for a shortfall in VOC reductions for the period after the initial 6-year period. With respect to CMs, EPA stated: "If the strategy for an area relies on $NO_X$ substitution in lieu of or in addition to VOC reductions, the State should also submit $NO_X$ contingency measures as necessary to meet the 3 percent requirement."[11]

Third, EPA considered whether it would be appropriate to require that CMs triggered by a failure to meet RFP should result in emissions reductions that could make up for an "entire shortfall" of the full 15 percent (thereby requiring a state to "adopt double the measures" to meet RFP), or some lesser amount. Fourth, EPA observed that in the event of a failure to meet RFP or a failure to attain, the state would need to develop and submit a new SIP submission to address the deficiency as necessary within 1 year.

Even in 1992, states were having difficulty identifying and adopting measures to meet RFP. Therefore, EPA reasoned that it would be more appropriate to interpret the statute to require that upon triggering, the CMs (whether one or more than one cumulatively) should provide emissions reductions equivalent to OYW of RFP, rather than some larger amount. EPA reasoned that this RFP-based approach would assure that the CMs would provide additional emissions reductions while the state took action to address the deficiency that triggered the CMs. The Agency concluded:

> Therefore, EPA will interpret the Act to require States with moderate and above ozone nonattainment areas to include sufficient contingency measures . . . so that, upon implementation of such measures, additional emissions reductions of up to 3 percent of the emissions in the adjusted base year inventory (or such lesser percentage that will cure the identified failure) would be achieved in the year following the year in which the failure has been identified.[12]

This was the genesis of EPA's guidance that CMs should achieve emissions reductions equivalent to "one year's worth" of RFP in the area in question, and the assumption that states and EPA should calculate this amount of emissions reductions based on the initial base year EI

[10] Id. at 13511/1

[11] Id. at 13520/3.

[12] Id. at 13511/2.

for the nonattainment area, rather than some other form of calculation. At the time, EPA logically thought it appropriate to recommend that CMs achieve a specific amount of emissions reductions related to the then current expectations for RFP.

EPA's guidance in the General Preamble concerning the amount of emissions reductions that CMs should achieve was not compelled by specific statutory language. Instead, it reflected the Agency's judgment at the time concerning an appropriate approach. EPA formulated this guidance 30 years ago, at a time before promulgation of multiple iterations of increasingly protective ozone NAAQS, and before development of multiple rounds of nonattainment plans to meet those NAAQS, have made it increasingly more difficult for states to identify and adopt additional control measures that are valid CMs. This guidance document revises the General Preamble's OYW of RFP approach to calculating emissions reductions needed for CMs. The new approach is described in Section 3.

*Conditions Under Which Less or More Reductions are Appropriate*

In the General Preamble, EPA considered the possibility that its recommendation that CMs should achieve OYW of RFP based on the initial base year EI might result in CMs that provided too much or too little emissions reductions, compared to the actual shortfall that might trigger the CMs in the future. Thus, when recommending that the CMs provide emissions reductions equivalent to OYW of RFP, EPA stated that the CMs should result in "additional emissions reductions of up to 3 percent of the emissions in the adjusted base year inventory (*or such lesser percentage that will cure the identified failure*)."[13] By this, EPA was suggesting that if the future RFP or attainment shortfall that triggers the CMs could be cured by less than the full amount of reductions that would result from implementing all the CMs that add up to OYW of RFP, then it may not be necessary to trigger all of the CMs. EPA also acknowledged that "there is the possibility that in some cases 3 percent may not be adequate." For those situations, EPA recommended two alternative approaches, one being a combination of the CMs and an enforceable commitment from the state to create a tracking program, and another being for the state to submit additional CMs to be held "as a reserve" in the event of a larger shortfall.

These complexities that EPA identified serve to illustrate that the OYW of RFP approach was understood by the Agency to be merely a rough estimate of the appropriate amount of emissions reductions, based on certain assumptions at that point in time. It illustrates that EPA was aware that its approach might turn out to be incorrect in either direction, and that CMs based on this approach would not necessarily reflect the amount of emissions reductions needed at the time of an actual triggering event to make up a shortfall.

EPA notes that its guidance in the General Preamble concerning the conditions under which less or more emissions reductions from CMs might be appropriate, and how to address that possibility, was premised upon the theory that the amount of reductions should be based on the separate RFP requirement in the first instance. As explained above, this recommendation resulted from EPA's then expectations concerning the amount of emissions reductions that would be appropriate. EPA had these expectations before the Agency promulgated several more stringent

[13] Id. at 13511/2 (emphasis added).

iterations of the ozone NAAQS and air agencies developed new nonattainment plans to address those NAAQS, which have reduced the pool of available control measures that could be valid CMs.

In this guidance document, EPA is revising its approach to estimating the amount of emissions reductions that CMs should achieve (from OYW of RFP to OYW of progress), and thus EPA's revised guidance does not follow the approach described above related to the conditions under which less or more reductions are appropriate. EPA's new approach is intended to more closely relate the amount of emissions reductions provided by CMs to the potential need for additional emissions reductions in the event CMs are triggered.

*Timing of Emissions Reductions*

Another important point that EPA addressed in the General Preamble was the timing of emissions reductions from CMs. As with the amount of emissions reductions that CMs should achieve, neither CAA section 172(c)(9) nor section 182(c)(9) expressly provide the time frame within which the CM emissions reductions should occur. In light of this statutory ambiguity, EPA considered the context and purpose of CMs to interpret the provisions and provide guidance to states on this important question of timing.

EPA directly addressed the question of how soon after a triggering event CMs should "take effect." To evaluate this question, EPA considered the fact that the statutory provisions imply the need for prompt emissions reductions in the event CMs are triggered and considered the intended purpose for CMs. Thus, in discussing the express statutory requirement that CMs "take effect" with no further action by the state or EPA, the Agency stated its view that: "EPA will expect all actions needed to effect full implementation of the measures to occur within 60 days after EPA notifies the State of its failure."[14] This reflects EPA's view that CMs should generally begin to achieve emissions reductions soon after the triggering event to be consistent with the purpose of CMs. The intended purpose of CMs is to provide emissions reductions and to continue to make progress towards RFP and/or attainment and to bridge the gap after a triggering event, while the state is "conducting additional control measure development and implementation as necessary to correct the shortfall in emissions reductions or to adopt newly required measures resulting from bump-up to a higher classification."[15] Accordingly, EPA recommended that CMs should be measures that will begin to result in additional emissions reductions quickly. EPA is not altering its guidance with respect to this 60-day expectation.

On the equally important question of what the outer date for CMs to achieve the intended emissions reductions should be, EPA guidance did not definitively state when the emissions reductions should occur. By implication, however, EPA was recommending that CMs achieve the necessary emissions reductions during the year following a triggering event, because EPA assumed that would be the period of time during which the state would be developing the subsequent SIP submission to cure the deficiency. This is illustrated by the General Preamble statement that a submission should include sufficient contingency measures so that, "upon

[14] Id. at 13512/1.

[15] Id. at 13511/2.

implementation of such measures, additional emissions reductions…*would be achieved in the year following the year in which the failure has been identified.*”[16]

This was the origin of EPA's guidance to states that CMs should, among other requirements, be measures that will begin to achieve emissions reductions soon after the triggering event, and that the reductions from the CM (the full OYW of RFP) should occur within 1 year following the triggering event.[17] As with other aspects of EPA's guidance, however, these recommendations concerning the timing of emissions reductions from CMs were colored by the Agency's then current understanding. In retrospect, interpreting the CAA to restrict CMs to measures that can achieve needed emissions reductions only in this 1-year time frame may serve to disqualify control measures that could otherwise be valid CMs that would serve the intended purpose of providing emissions reductions and bridging the gap after a state's failure to meet RFP or to attain. As explained below in Section 5, EPA is revising this aspect of its prior guidance and now interpreting the CAA to allow for CMs that result in emissions reductions that occur up to 2 years from the triggering event under appropriate circumstances.

*Early Implementation*

In the General Preamble, EPA recognized that one form of valid CM could be the accelerated implementation of a control measure that the state must include in its SIP to meet another requirement, such as reasonably available control measures or reasonably available control technology (RACM/RACT), or RFP in the nonattainment plan. As an example, EPA suggested that "a State could include as a contingency measure the requirements that measures which would take place in later years if the area met its RFP target or attainment deadline, would take effect earlier if the area did not meet its RFP or attainment deadline."[18]

It is important to note that, for this example, EPA clearly contemplated that although the control measure at issue might be in the SIP to meet another requirement, the triggering of the CM would result in the air agency *accelerating the actual implementation* of such measure so that the emissions reductions would happen *earlier* than otherwise required (i.e., the acceleration is a direct result of the triggering of the CM). Such a CM would meet the statutory language of CAA sections 172(c)(9) and 182(c)(9), which requires CMs to be both conditional and prospective. To clarify, this initial concept in the General Preamble is distinct and separate from EPA's later interpretation of CAA sections 172(c)(9) and 182(c)(9), discussed in Section 2.2.2, to allow states to use the reductions from measures designated as CMs but implemented early (i.e., before triggering), or the surplus emissions reductions from already implemented measures required for other nonattainment plan purposes, to meet the CM requirements. EPA no longer interprets the CAA to allow approval of this latter form of CM, as courts have held this to be an incorrect

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[16] Id. at 13511/2 (emphasis added).

[17] EPA notes that, where air quality is influenced by seasonal variability, this 1-year period should be sufficient to encompass at least one relevant season (e.g., at least one summer). However, EPA acknowledges that it is possible a triggering event could occur at a less convenient time of year. For example, a triggering event could occur in the middle of the relevant season, which could make it difficult for certain CMs to achieve their anticipated reductions within the timeframe needed. Air agencies should take this possibility into account when developing CMs, but EPA recognizes it is impractical to assess all possible timing scenarios.

[18] 57 FR 13498 at 13511/2-3.

reading of the plain language of the statute. However, EPA notes that a CM that requires accelerated implementation of an otherwise already required control measure as a result of a triggering event could still be a valid CM, if appropriately structured. This form of CM may be of limited utility in a situation in which a state has few or no available control measures, and the existing measures in the SIP to meet other requirements are incapable of more accelerated implementation, but EPA generally considers it a potentially available approach.

*Without Further State or EPA Action*

In the General Preamble, EPA acknowledged that although the statutory language of section 172(c)(9) and section 182(c)(9) provides that CMs must take effect "without further action by the State or the Administrator," the Agency interprets this language to allow certain "minimal" actions by the state to implement the measures. For example, EPA noted that actions such as notification of affected sources subject to the triggered CM might be appropriate, whereas additional rulemaking or legislative action by the state to implement the CM would not be. This remains an element of EPA's guidance for CMs and is not affected by this guidance document.

<u>Particulate Matter</u>

EPA also provided guidance to address the CM requirements for the $PM_{10}$ NAAQS in the General Preamble that was very similar to that for the ozone NAAQS. Core tenets of the guidance pertained to: (i) the amount of emissions reductions CMs should achieve; (ii) the fact that CMs are in addition to and beyond what is required for other nonattainment plan purposes; (iii) when states should begin to implement CMs; (iv) the timing of when CMs should be "implemented;" and (iv) when CMs should be "fully adopted and take effect."[19]

*Amount of Emissions Reductions*

As with ozone, EPA recommended that states should have CMs that would achieve OYW of RFP for the area. Unlike ozone, however, Part D, Subpart 4 (of CAA Title I) does not include a statutory requirement for a particular percentage of emissions reductions for purposes of RFP. Instead, EPA guidance recommended that RFP for $PM_{10}$ nonattainment areas should represent generally linear progress toward attainment (i.e., the difference between the attainment projected inventory and the base year EI, divided by the number of years between the base year and the attainment year).[20] Following this approach to RFP, EPA recommended that the CMs should achieve a proportional amount of emissions reductions based on the number of years from the base year to the applicable attainment date:

> the contingency emissions reductions should be approximately equal to the emissions reductions necessary to demonstrate RFP for one year. For instance, reductions equal to 25 percent of the total strategy would be appropriate for a moderate nonattainment area since the control strategy must generally be implemented in a 3- to 4- year period

[19] Id. at 13543-13544.

[20] 59 FR 41998, 42015 (August 16, 1994).

> between SIP development and the attainment date, and since RFP generally requires annual incremental reductions to attain the standards.[21]

Thus, at the time of the General Preamble, EPA was likewise interpreting section 172(c)(9) for purposes of the $PM_{10}$ NAAQS based on its then understanding of the facts and the most appropriate way to address this requirement. Now, as explained in more detail in Section 3, after the addition of $PM_{2.5}$ as a different indicator and NAAQS criteria pollutant, several increasingly more stringent iterations of the $PM_{2.5}$ NAAQS, and in some cases multiple rounds of state development of nonattainment plans for the $PM_{10}$ and $PM_{2.5}$ NAAQS, this OYW of RFP approach to the CM requirement is no longer as appropriate. This guidance document revises the General Preamble's OYW of RFP approach to calculating emissions reductions for CMs for both ozone and PM.

*Timing of CMs*

As noted above, neither section 172(c)(9) nor 182(c)(9) expressly provide when the resulting emissions reductions from CMs should occur. In light of this statutory ambiguity, EPA considered the context and purpose of CMs to interpret the provisions and provide guidance to states on this important question of timing.

In the case of PM, as with ozone, EPA guidance was unclear. In one place, EPA stated that "[c]ontingency measures must be implemented immediately after EPA determines the area has failed to make RFP or to attain the standards."[22] At the end of the very same paragraph, EPA stated that "[c]ontingency measures must be fully adopted and take effect within 1 year without further legislative action once EPA makes such determinations." There is no explanation to elaborate on EPA's use of these different terms (i.e., implemented, fully adopted, and take effect). EPA is now concerned that there has been confusion about the meaning of the term "take effect" and whether that pertains only to the effective date of a state's CMs, or to the date when the state is beginning to "implement" the CMs, and about the related questions related to the timing of partial implementation or full implementation of the CMs. In reviewing its existing CM guidance, EPA has concluded that it is important to revisit the question of when emissions reductions from CMs should occur in light of the purpose of these provisions. Section 5 discusses EPA's revised approach.

### 2.2.2. 1993 Guidance Memoranda

In August 1993, EPA issued two guidance memoranda that further addressed the CM requirements. On August 13, 1993, EPA issued a guidance memorandum regarding the early implementation of CMs for ozone and carbon monoxide nonattainment areas.[23] In this initial 1993 guidance, EPA first explicitly addressed the issue of states electing to implement CMs earlier than otherwise required (i.e., before a triggering event). Specifically, EPA stated: "[i]t

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[21] 57 FR 13498 at 13543-44.

[22] Id. at 13544/1

[23] EPA, Memorandum from G.T. Helms, Chief, Ozone/Carbon Monoxide Programs Branch, Office of Air Quality Planning and Standards, to Air Branch Chief[s], Regions I-X, "Early Implementation of Contingency Measures for Ozone and Carbon Monoxide (CO) Nonattainment Areas," August 13, 1993.

seems illogical to penalize nonattainment areas that are taking extra steps to ensure attainment of the NAAQS by having them adopt additional contingency measures now. Therefore, in cases of early implementation of State contingency measures, we do not feel that it is necessary now to adopt additional contingency measures to backfill for the early activation of contingency measures."[24] In subsequent rulemakings on individual SIP submissions, EPA expanded upon this concept of early implementation of CMs to allow states to have CMs that are control measures that are already implemented and that provide ongoing reductions each year that are in excess of RFP or attainment needs.[25] As noted below, EPA carried forward its then current interpretation of the CM requirement that allowed approval of already implemented measures as CMs in the ozone and $PM_{2.5}$ NAAQS implementation rules, but courts have rejected this interpretation and it no longer informs EPA's interpretation of the CM requirements.

On August 23, 1993, EPA issued another guidance memorandum concerning, among other issues, the CM requirement.[26] In this second 1993 guidance, EPA addressed the content of the CMs and indicated that for states with ozone nonattainment areas classified Moderate and higher that had completed the initial 15 percent VOC reductions for RFP, CMs could be a mixture of VOC and $NO_X$ reductions on a percentage basis.[27] EPA indicated that of the OYW of RFP reductions required, at least 10 percent should be VOC emissions reductions, allowing up to 90 percent of the CM emissions reductions to be $NO_X$ emissions reductions. While EPA's guidance from August 23, 1993, explicitly allowed for $NO_X$ reductions in the context of CMs, it did not alter EPA's approach to the overall amount of reductions required. As explained in Section 3, EPA is now recommending a different approach to calculating the amount of VOC and/or $NO_X$ reductions recommended for purposes of CMs.

#### 2.2.3. 1994 Addendum to the General Preamble

In 1994, EPA published the "Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990" (Addendum).[28] The Addendum provided additional guidance to states with $PM_{10}$ nonattainment areas designated Serious under the Part D Subpart 4 requirements. EPA reiterated its guidance for section 172(c)(9), emphasizing key points including: (i) states must meet the CM requirement with measures that are not required to meet other attainment plan obligations; (ii) the CMs should be already adopted measures that would

[24] Id, at 2.

[25] For example, see 61 FR 36004, at 36009-36010 (July 9, 1996) and 62 FR 10690, at 10695 (March 10, 1997). Also *see* 62 FR 15844 (April 3, 1997); 62 FR 66279 (December 18, 1997); 66 FR 30811 (June 8, 2001); 66 FR 586 and 66 FR 634 (January 3, 2001); and 70 FR 71612, at 71651 (November 29, 2005).

[26] EPA, Memorandum from Michael H. Shapiro, Acting Assistant Administrator for Air and Radiation, to Regional Air Directors, "Guidance on Issues Related to 15 Percent Rate-of-Progress Plans," August 23, 1993.

[27] In this context, "on a percentage basis" refers to substitution on the basis of the percentage of $NO_X$ emissions reductions relative to the $NO_X$ RFP baseline inventory. For example, in an area where the RFP baseline is 200 tons per day of VOC and 100 tons per day of $NO_X$, an RFP shortfall of 1 percent in VOC emissions reductions (i.e., 2 tpd) can be remedied by $NO_X$ emissions reductions of 1 percent of the $NO_X$ inventory (i.e., 1 tpd).

[28] 59 FR 41998.

go into effect with minimal further action upon a triggering event; and (iii) the CMs should result in emissions reductions that are equivalent to OYW of RFP in the area.[29]

In the Addendum, the most notable clarification to prior EPA guidance for $PM_{10}$ was with respect to what additional state or EPA action is permissible after a triggering event, and within what time frame. Comparable to its prior guidance for ozone, EPA stated that it “generally expects” that any such actions to implement CMs should occur within 60 days of the triggering event, and further recommended that the state “should ensure that the measures are fully implemented as expeditiously as practicable after they take effect.”[30] Again, this statement indicated a distinction between the “effective date” and the “implementation” of the CMs, without fully evaluating or explaining what that might mean in terms of when the emissions reductions from CMs should occur.

2.2.4. Implementation Rule for 2008 Ozone NAAQS

For implementation of the 2008 Ozone NAAQS, EPA issued a rule in 2015 that included additional regulatory requirements and additional guidance for ozone nonattainment plan requirements.[31] With respect to the CM requirement, EPA relied on its prior guidance in the General Preamble and provided additional guidance on several points.

In accordance with longstanding guidance, EPA reiterated that to meet statutory requirements CMs must: (i) provide for the implementation of specific measures if the area at issue fails to attain or to meet any milestone; (ii) must take effect without further action by the state or EPA upon a triggering event; and (iii) should represent OYW of RFP “amounting to reductions of 3 percent of the baseline emissions inventory for the nonattainment area.”[32] EPA also repeated its guidance that states could rely on emissions reductions from already implemented measures to be CMs, and in particular its “policy that allows promulgated federal measures to be used as contingency measures as long as they provide emissions reductions in the relevant years in excess of those needed for attainment or RFP.”[33]

The one significant modification to EPA’s prior CM guidance concerned whether the CMs must result in some VOC emissions reductions or may instead result only in $NO_X$ emissions reductions. As noted above, EPA’s prior 1993 guidance had been that some portion of the emissions reductions from the CMs must consist of VOC emissions reductions. However, in 2015 EPA stated that:

> As explained in the proposal, this previous limitation is no longer necessary in all cases. In particular, Moderate and above areas that have completed the initial 15 percent VOC reduction required by CAA section 182(b)(1)(A)(i) can meet the contingency measures requirement based entirely on $NO_X$ controls if that is what the state’s analyses have

[29] Id. at 42014-15.

[30] Id. at 42015/1.

[31] “Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements,” 80 FR 12264 (March 6, 2015).

[32] Id. at 12285.

[33] Id.; citing *LEAN v. EPA*, 382 F.3d 575 (5th Cir. 2004).

demonstrated would be more effective in bringing the area into attainment. There would be no minimum VOC requirement.[34]

As explained in Section 3, EPA now recommends a different approach to calculating the amount of VOC and/or $NO_X$ reductions recommended for purposes of CMs.

Petitioners challenged EPA's implementation rule for the 2008 Ozone NAAQS on other issues, but no party challenged EPA's interpretation of section 172(c)(9) and section 182(c)(9).[35] Accordingly, EPA guidance has remained the same with respect to other aspects of its interpretation of the CM requirements.

### 2.2.5. Implementation Rule for $PM_{2.5}$ NAAQS

In 2016, EPA promulgated an implementation rule intended to address nonattainment plan SIP requirements for the 1997 $PM_{2.5}$ NAAQS and all other iterations of the $PM_{2.5}$ NAAQS going forward.[36] With respect to CM requirements, EPA provided both regulatory requirements in 40 CFR 51.1014 and guidance recommendations in the final rule preamble. This rulemaking highlighted several important distinctions to make with respect to CM for $PM_{2.5}$.

First, states with $PM_{2.5}$ nonattainment areas must have CMs that can be triggered by four different events: (i) a failure to meet an RFP requirement; (ii) a failure to meet any quantitative milestone requirement; (iii) a failure to submit a quantitative milestone report; or (iv) a failure to attain by the applicable attainment date.[37]

Second, EPA codified certain CM requirements in regulatory text. For example, EPA has long interpreted section 172(c)(9) to require that CMs be measures that the state is not otherwise required to adopt and implement to meet other nonattainment plan requirements such as RACM/RACT, and that the state does not otherwise rely upon to meet RFP or attainment requirements. This and other core CM requirements are set forth by regulation for the $PM_{2.5}$ NAAQS.[38] EPA provided additional guidance on these requirements in the preamble to the final rule.[39]

Third, unlike Subpart 2 for ozone, Subpart 4 applicable to the $PM_{2.5}$ NAAQS does not include a statutory provision that defines what amount of emissions reductions constitute RFP, comparable to sections 182(b)(1)(A) and (c)(2)(B). Instead, the RFP requirement for $PM_{2.5}$ is governed by section 172(c)(2), as defined in section 171(1). The latter section provides that RFP means annual incremental reductions in emissions as required or may reasonably be required by EPA

[34] Id. at 12285/2.

[35] *See South Coast Air Quality Management District v. EPA, et al.*, 882 F.3d 1138 (D.C. Cir. 2018). Although the court rejected EPA's approach to implementation of the 2008 Ozone NAAQS with respect to other issues, no petitioners challenged EPA's guidance with respect to CM requirements.

[36] *See* "Fine Particulate Matter National Ambient Air Quality Standards: Nonattainment Area State Implementation Plan Requirements," 81 FR 58010 (August 24, 2016).

[37] 40 CFR 51.1014(a).

[38] 40 CFR 51.1014(b).

[39] 81 FR 58010 at 58066-068 (Moderate area plans); at 58092-93 (Serious area plans); and at 58105-106 (CAA section 189(d) plans).

for purposes of reaching attainment by the attainment date. Thus, rather than a set percentage reduction of emissions measured from the initial EI for the area (base year), EPA has interpreted RFP for $PM_{2.5}$ to mean annual generally linear reductions in emissions from the base year to the attainment year. Air agencies must perform this calculation for both the NAAQS pollutant and for each relevant plan precursor. Rates of reduction may differ for each pollutant or relevant plan precursor, and a state can use the relative air quality impacts of different precursors identified in the attainment modeling to demonstrate that the emissions reductions provide adequate progress toward attainment to meet the RFP requirement.[40]

Finally, EPA explained in the $PM_{2.5}$ Implementation Rule the amount of emissions reductions that CMs should achieve. EPA repeated its longstanding guidance that PM CMs should provide OYW of RFP, calculated as the annual average reductions from the base year EI to the attainment year EI for the area. However, EPA also acknowledged that there could be situations in which states would be unable to develop CMs that would achieve this amount of emissions reductions. In such cases, EPA stated that:

> States should explain the amount of anticipated emissions reductions to be accomplished by the contingency measures outlined in the plan. In the rare event that an area is unable to identify contingency measures to account for approximately 1 year's worth of emissions reductions, the state should provide a reasoned justification why the smaller amount of emissions reductions is appropriate.[41]

EPA did not provide any specific guidance to states concerning how to construct such a reasoned justification, but the Agency anticipated that there could be a factual and analytical basis to support approval of CMs that achieve less than the amount of reductions that EPA has historically recommended. EPA is providing additional guidance on this approach in this document in Section 4.

#### 2.2.6. Implementation Rule for 2015 Ozone NAAQS

For implementation of the 2015 Ozone NAAQS, EPA issued a new implementation rule in 2018 that was primarily an update to the implementation rule for the 2008 Ozone NAAQS.[42] With respect to the CM requirement, EPA relied on its prior guidance in the General Preamble and the prior ozone implementation rule.

In the preamble to the final rule EPA reiterated guidance on a number of key points, including: (i) that CMs must be fully adopted rules or measures that will take effect without further action upon a triggering event; (ii) that CMs should achieve OYW of RFP or approximately 3 percent of the baseline EI; (iii) that states may rely on NOx emissions rather than VOC emissions, if they have already fulfilled the 15 percent VOC reduction requirement for RFP in section

[40] 81 FR 58010, 58055–58063, 58090–58091, 58103–58104. The $PM_{2.5}$ implementation rule also lays out a stepwise option for RFP, but this approach is generally not relevant to the use of RFP in the calculation of the recommend amount of CM reductions based on the average annual rate.

[41] Id. at 58067/3.

[42] *See* "Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements," 83 FR 62998 (December 6, 2018).

182(b)(1)(A)(i) and provide a demonstration that $NO_X$ substitution would be effective to bringing the area to attainment; and (iv) that CMs may consist of already implemented measures, so long as they meet other CM requirements and the state had not relied upon them for RFP or for attainment in the nonattainment plan.[43]

As discussed in Section 2.3.3 below, petitioners challenged EPA's interpretation of CAA sections 172(c)(9) and 182(c)(9) to allow approval of already implemented measures as CMs and the D.C. Circuit agreed.[44] Although the court rejected EPA's statutory interpretation and thus vacated the implementation rule with respect to EPA's position on this specific issue, there were no challenges to any other aspect of EPA's approach to CMs in the Implementation Rule for the 2015 Ozone NAAQS. Accordingly, EPA guidance has remained the same with respect to all other aspects of its interpretation of the CM requirements.

## 2.3. Relevant Court Decisions Addressing the CM Requirement

In addition to the statutory provisions, prior guidance, and existing implementation rules for purposes of the ozone and $PM_{2.5}$ NAAQS, EPA must take into account a number of significant court decisions that interpret the nonattainment plan CM requirements. These decisions focused on specific aspects of EPA's interpretations of the statutory CM requirements, and thus inform EPA's current guidance.

### 2.3.1. *Louisiana Environmental Action Network (LEAN) v EPA*

*LEAN v. EPA* was a challenge to EPA's approval of a portion of a nonattainment plan for the 1979 Ozone NAAQS for the Baton Rouge area of Louisiana.[45] EPA approved a new substitute CM that consisted of a control measure on a stationary source to reduce VOC emissions. The source had already installed and begun operating a flare to reduce VOC to meet this requirement in 1998; EPA's approval of the CM was in 2002 and thus after the control measure was already implemented and achieving emissions reductions. In addition, the source at issue was located outside the boundaries of the designated nonattainment area.

Petitioners challenged EPA's approval on several grounds, including: (i) that because the measure was already implemented, it could not be a CM consistent with the express language in section 172(c)(9) and section 182(c)(9) indicating that they are supposed to occur in the future after a triggering event; and (ii) that because the control measure applied to a source outside the nonattainment area, it could not be a CM.

With respect to the first issue, the court accepted EPA's arguments that the statutory language was ambiguous, thereby allowing EPA to interpret the language to allow continuing emissions reductions from already implemented measures to be CMs.[46] As explained below, subsequent courts have disagreed that the statutory provisions are ambiguous and have ruled that CMs must be conditional and prospective based on the plain language of the provisions. Thus, EPA no

[43] Id. at 63026.

[44] *Sierra Club v. EPA*, 21 F.4th 815, at 827-828 (D.C. Cir. 2021).

[45] 382 F.3d 575 (5th Cir. 2004).

[46] 382 F.3d at 582-585.

longer interprets the CAA to allow approval of already implemented measures, or surplus emissions reductions from such measures, to be CMs.

With respect to the second issue, the court found that the state and EPA had failed to provide adequate technical support to demonstrate that the emissions reductions from a source outside the designated nonattainment area would in fact result in the necessary air quality improvements inside the nonattainment area.[47] However, the court's opinion leaves open the possibility that states could rely on control measures on sources outside the designated nonattainment area as CMs, so long as there is an adequate technical showing that the resulting emissions reductions from the CMs have the required impact within the nonattainment area.[48] Unlike other nonattainment plan requirements, section 172(c)(9) and section 182(c)(9) do not explicitly require that the control measures apply to sources inside the designated nonattainment area. The *LEAN* decision highlights that the technical support for such an approach to CMs must be adequate.

### 2.3.2. *Bahr v. EPA*

*Bahr v. EPA* was a challenge to EPA's approval of a nonattainment plan for the $PM_{10}$ NAAQS for the Phoenix Planning Area of Arizona.[49] EPA approved the state's SIP submission as meeting all applicable nonattainment plan requirements pursuant to section 189(d), including the CM requirements of section 172(c)(9).

The CMs at issue consisted of measures designed to reduce windblown dust, such as paving and stabilizing roads, lowering speed limits, and purchasing and using street sweepers to help reduce ambient $PM_{10}$. There was no dispute that the state had already implemented these measures prior to EPA's approval of the measures as CMs, and that the measures were then in place and thus continuing to reduce windblown dust. The court rejected EPA's approval of the CMs, reasoning that the statutory language of section 172(c)(9) clearly indicates that they must be measures that are to take effect in the future, only after being triggered by a finding of failure to meet RFP or failure to attain.

The 9th Circuit found that the CAA language overrides EPA's argument that allowing approval of already implemented measures as CMs would encourage states to implement control measures sooner, consistent with the overall policy objectives of the CAA to reduce pollution and protect public health. The court stated: "Even if we agreed that the EPA's policy considerations are compelling, such considerations cannot override the plain language of the statute." Although there was a dissenting opinion in this case, agreeing with the decision in the 2004 LEAN case, the majority expressly disagreed with that prior 5th Circuit decision. After the court decisions in *Bahr* and *LEAN*, EPA was left with seemingly contradictory opinions in the 9th and 5th Circuits.

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[47] 382 F.3d at 584-587.

[48] EPA has provided guidance with respect to CM on sources outside the nonattainment area in the $PM_{2.5}$ Implementation Rule. 81 FR 58067 (CM for Moderate nonattainment areas); 81 FR 58105 (CM for Serious nonattainment areas).

[49] 836 F.3d 1218 (9th Cir. 2016).

EPA now draws from this case that the statute prohibits approval as CMs any measures that the state has already implemented, and that will already be in place and achieving emissions reductions, regardless of whether there is ever a future triggering event for CMs such as a finding of failure to meet RFP or finding of failure to attain. States must have CMs that are structured and worded so that they are both conditional and prospective, to take effect only in the event of a future triggering event.

### 2.3.3. *Sierra Club v. EPA*

*Sierra Club v. EPA* was a challenge to EPA's final implementation rule for the 2015 Ozone NAAQS.[50] EPA issued the rule to provide additional regulatory requirements and guidance to all states concerning nonattainment plan SIP requirements for the 2015 ozone NAAQS, including CMs. Among other aspects of the final rule challenged in this case, EPA interpreted section 172(c)(9) and section 182(c)(9) to allow approval of emissions reductions from already implemented measures as CMs. In the challenged rule, EPA also reiterated its interpretation of the CM requirements expressed in the implementation rule for the 2008 Ozone NAAQS, in which EPA explicitly identified surplus emissions reductions that would occur in the future as a result of mobile source fleet turnover as one acceptable form of already implemented CM.[51]

The D.C. Circuit rejected this interpretation. The court held that the specific statutory wording of sections 172(c)(9) and 182(c)(9) are unambiguously "conditional and prospective." The court evaluated the express statutory language in light of dictionary definitions and reasoned that "contingent" means "dependent on or conditioned by something else." Similarly, the court reasoned that already implemented measures are not measures "to take effect" only if and when the contingency occurs.

Significantly, the *Sierra Club* decision explicitly rejected EPA's argument that these statutory provisions are ambiguous because the 5th Circuit found them to be so in the *LEAN* decision, as did the dissent in *Bahr*. Although the court acknowledged the different outcome in the *LEAN* decision, it rejected the conclusion that the statutory language is ambiguous with respect to the conditional and prospective requirements for CMs.

EPA draws from this decision, which the court rendered on a rule of nationwide applicability, that it cannot approve as CMs any measures that are already implemented, and that will already be in place and achieving emissions reductions, regardless of whether there is ever a triggering event in the future such as a finding of failure to meet RFP or finding of failure to attain. Again, states must have CMs that are structured and worded so that they are both conditional and prospective, to take effect only in the event of a future triggering event.

### 2.3.4. *Association of Irritated Residents (AIR) v. EPA*

*AIR v. EPA* was a challenge to EPA's approval of a nonattainment plan SIP submission for the 2008 Ozone NAAQS for the San Joaquin Valley area of California.[52] EPA approved the SIP

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[50] 21.F.4th 815 (D.C. Cir. 2021).

[51] 80 FR 12264 at 12285.

[52] 10 F.4th 937 (9th Cir. 2021).

submission as meeting the CM requirement with a single measure projected to achieve a relatively small amount of emissions reductions, well below the amount that would constitute OYW of RFP in the area. EPA's approval action very explicitly acknowledged this fact. EPA explained its view that other surplus emissions reductions in the area, including those that would result from mobile source fleet turnover, that were not relied upon in the nonattainment plan for any purpose, would provide substantial additional emissions reductions following a failure to meet a milestone or attain the standard by the applicable attainment date, thereby justifying the small amount from the CM.

The 9th Circuit rejected this interpretation. Although the court noted that the CAA does not specify the amount of emissions reductions that CMs must achieve, and that EPA's prior statements concerning this point are nonbinding guidance, the court evaluated EPA's action under an arbitrary and capricious standard of review and concluded that EPA had not provided a sufficiently reasoned explanation for departure from its guidance that CMs should achieve emissions reductions equivalent to OYW of RFP in the area. Notwithstanding EPA's acknowledgement of the issue, and EPA's explanation for its application of its guidance to the facts at issue, the court reasoned that the Agency was allowing surplus emissions from other already implemented measures to make up for a lack of CMs that would achieve the recommended OYW of RFP. In particular, the court stated that EPA "has severed the relationship between the requirement of contingency measures and the benchmark of reasonable further progress, without an adequate explanation of why the new – and far more modest – contingency measure is reasonable."[53]

EPA draws from the *AIR* decision that it cannot approve as meeting the CM requirement proposed CMs with reductions that comprise substantially less than OYW of RFP if our approval is dependent upon surplus emissions reductions from other already implemented measures to justify the smaller amount. States cannot rely on surplus emissions from other already implemented measures even indirectly as a means to reduce the amount of emissions reductions otherwise recommended for CMs. However, the court acknowledged that EPA's prior statements concerning the amount of emissions reductions that CM should achieve to meet the statutory requirements are guidance, and that EPA can revise its guidance if it provides a sufficient reasoned justification for a change. EPA is heeding the court's decision and in this guidance is reconsidering this key aspect of its prior guidance.

### 2.4. Summary of EPA's Existing Approach to CMs

In light of the statute, rules, guidance, and court decisions just described, the following summary distills key aspects of existing CM policy, prior to the issuance of this guidance. As noted throughout this guidance document, EPA is now changing and/or clarifying some of the aspects summarized here, while leaving others unchanged. Specifically, changes described in the remainder of this document relate to items 3 and 5 of the summary:

1. CMs must be conditional and prospective, not already implemented, per the statute and relevant court decisions. For this same reason, EPA cannot approve "excess" or "surplus"

[53] *AIR*, 10 F.4th at 946.

emissions reductions from already required and implemented control measures as meeting the CM requirement. Thus, for example, additional emissions reductions that will occur each year as a result of mobile source fleet turnover, whether from federal or state requirements, cannot constitute CMs, because they are the result of regulatory requirements that are already implemented and the emissions reductions will occur regardless of whether there is, or is not, any future CM triggering event.

2. CMs cannot be control measures that states are required to adopt and implement to meet other legal requirements. They cannot be control measures that the state is required to impose to meet other CAA requirements including, but not limited to, nonattainment plan requirements, such as RACM/RACT, or best available control measures or best available control technology (BACM/BACT), or most stringent measures (MSM), and cannot be measures the state otherwise relies upon to meet RFP or for attainment in the modeled attainment demonstration. States are separately required to meet those other requirements and, by definition, CMs are required to be measures that will provide emissions reductions over and above what the state is required to impose to meet all other separate obligations under the CAA.

3. CMs should achieve emissions reductions equal to or greater than OYW of RFP for the nonattainment area and the NAAQS at issue, as projected in the nonattainment plan. States may meet this OYW requirement to satisfy the CM requirement through one or more control measures; individual measures do not need to provide this amount of reductions in isolation but can be combined with other measures in order to achieve OYW of RFP and thus be deemed a valid CM. CMs (one or more measures) that achieve less than OYW may be sufficient, with a reasoned justification for the lower amount.

4. CMs should take effect within 60 days, and with no further significant action by the state or EPA, following an EPA notification to the state of a failure to meet RFP or a failure to attain.

5. The emissions reductions from the CMs should generally occur in the year following the determination of failure to meet RFP or failure to attain, i.e., during the period that the state and EPA should be addressing the deficiency that triggered the CMs through a new SIP submission, as appropriate.

6. CMs may be measures that apply to sources outside the designated NAA (unlike other nonattainment plan requirements such as RACM/RACT), so long as there is an adequate technical demonstration showing that the emissions reductions from the CMs would provide the necessary air quality benefit within the NAA.

7. It is permissible, but not necessary, for a state to specify that certain CMs are for RFP failure only or for failure to attain only. If specified in this way, however, the state must ensure that adequate CMs are in place for each triggering event; this could result in the need for additional measures if a state elects to differentiate between CMs in this way.

EPA intends the remainder of this document to revise and supplement its existing CM guidance reflected in this summary. In particular, EPA is revising its prior guidance with respect to how to calculate the amount of emissions reductions that CMs should achieve (Section 3), and its guidance concerning the period of time during which emissions reductions from CMs should occur (Section 5). In addition, EPA is expanding its prior guidance concerning what would constitute a reasoned justification for air agencies to provide to establish that they cannot identify and adopt sufficient CMs to achieve the recommended amount of reductions (Section 4).

## 3. Showing that the CMs Achieve Sufficient Reductions

As explained in Section 2, EPA previously recommended that CMs provide reductions that provide for OYW of RFP. Under the historical OYW of RFP approach, air agencies documented the amount of reductions expected from the identified CMs and compared them to the amount of emissions that would constitute RFP in 1 year. EPA now believes that it is appropriate to update its prior guidance in light of changed factual circumstances and a current understanding of what remaining controls may be available for states to adopt as CMs. EPA now considers it more appropriate for CMs to achieve approximately "OYW of progress," which is a different metric than OYW of RFP.

Section 2 briefly describes how OYW of RFP is calculated (i.e*.,* by summarizing how underlying RFP, which is a separate requirement, is calculated), noting differences between the CAA's ozone and PM provisions. To summarize, for ozone, annual RFP is essentially defined as 3 percent of the base year EI anthropogenic emissions. For PM, annual RFP is the average annual reductions between the anthropogenic emissions from the base year EI and the projected attainment year EI (i.e., the projected attainment inventory for the nonattainment area, referred to in this document as the attainment projected inventory).[54] In contrast, OYW of progress is calculated the same way for ozone and PM: by determining the average annual reductions between the base year EI and the projected attainment year EI, determining what percentage of the base year EI this amount represents, then applying that percentage to the projected attainment year EI to determine the amount of reductions needed to ensure ongoing progress if CMs are triggered.[55] This CM guidance should not be read as defining or changing existing underlying RFP interpretations or regulatory requirements for RFP in any way.

In reviewing its guidance regarding the recommended amount of emissions reductions that CMs should achieve, EPA observed that basing the amount of emissions reductions on the annual amount of reductions needed to meet the separate RFP requirement – OYW of RFP – may in some cases lead to an amount that is greater than what would be typically needed to make up for a shortfall in RFP or for attainment purposes. The situation arises because the separate RFP requirement is tied in part to the base year inventory, despite the fact that the actual emissions inventory in nonattainment areas typically declines over time as a result of the implementation of

[54] The term "attainment projected inventory" is described further in Section 3.8.1 (for ozone) and Section 3.8.2 (for particulate matter) of EPA's "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter NAAQS and Regional Haze Regulations". *See https://www.epa.gov/air-emissions-inventories/air-emissions-inventory-guidance-implementation-ozone-and-particulate*.

[55] For the purposes of calculating OYW of progress, references to emissions, including "base year EI" and "projected attainment EI," refer to the anthropogenic portion of the total emissions inventory.

control measures. Because the base year inventory for a given attainment plan is fixed until the attainment date,[56] an amount calculated based on a percentage of that inventory would also be fixed, despite the fact that as the emissions inventory declines in subsequent years, that amount actually represents an ever-growing percentage of any future year inventory. For example, the amount of VOC that represents 3 percent of the base year EI could represent 10 percent or more of the attainment projected inventory in some cases. Meanwhile, the timing of the implementation of CMs (i.e., the future year in which CMs will be triggered, if at all), is uncertain. CMs would be triggered no earlier than the first RFP milestone (and then only if a milestone failure occurred) and might not be triggered until the attainment date.[57] In either case, the emissions inventory will have declined from the baseline.

This declining inventory/increasing percentage effect associated with OYW of RFP is more pronounced in nonattainment areas with higher classifications, particularly for ozone areas, where the base year inventory can be 10 years or more removed from the attainment date. Over long time periods, the attainment projected inventory will likely be significantly smaller than the base year inventory. Consequently, 3 percent of the original base year EI at that time could represent a much larger percentage of the attainment projected inventory. After decades of implementing the CAA, EPA now believes that its OYW of RFP approach to calculating the amount of reductions for CMs was unnecessarily conservative for estimating the amount of emissions reductions needed for CM purposes because a given percentage of the base year inventory tends to represent a much more significant portion of the attainment projected inventory. Further, areas with higher classifications also generally have historically had more significant air quality problems that have required implementing a more comprehensive and stringent set of control measures; therefore, they tend to be the areas where the scarcity of measures presents the greatest challenge to developing CMs that provide sufficient reductions.

For these reasons, EPA believes it is reasonable to revise its guidance concerning the minimum amount of emissions reductions that CMs should achieve. It is more appropriate for CMs to achieve emissions reductions reflecting an amount equal to or greater than the annual emissions reductions between the base year and the attainment year, as applied to the attainment projected inventory, rather than to a set percentage of the base year EI (for ozone) or to the annual average reductions between the base year EI and the attainment projected EI (for PM). In making this change, EPA recognizes attainment of the NAAQS as the primary objective of the nonattainment plan requirements, and thus the appropriate metric should be attainment-focused. In the absence of a CAA-specified amount of emissions reductions required for CMs, EPA's new approach is reasonable given our understanding of the statutory purpose of CMs following a failure to attain or to meet an RFP milestone, which is to ensure uninterrupted progress toward attainment while the next steps unfold in response to the failure. Applying the percentage reduction equivalent to or greater than OYW of progress for CM purposes (rather than OYW of RFP) in the plan

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[56] In the event of reclassification of a nonattainment area for $PM_{10}$ or $PM_{2.5}$, the state is required to update the base year EI as part of the new attainment plan SIP submission; for an ozone nonattainment area, the base year EI remains the same following reclassification.

[57] Note that for Moderate ozone nonattainment areas, the end of the RFP interval occurs at the 6-year mark and thus coincides with the attainment date. For areas classified Serious or above, there are separate RFP milestone-related triggers for CMs that could occur in advance of the attainment date.

submission to determine the recommended amount of CM reductions is a reasonable approach to ensuring such progress. EPA also recognizes an air agency may elect to adopt CMs that achieve more emission reductions than EPA's recommendation. More details about performing this calculation and some examples are provided later.

In addition to focusing on the attainment projected inventory, there is, for ozone, an additional way in which the OYW of progress metric will differ from OYW of RFP: the recommended percentage of reductions represents appropriate progress toward attainment as opposed to a fixed amount. Under the CAA, the rate of emissions reductions to meet OYW of RFP for ozone is essentially specified to be a fixed amount of VOC (3 percent of the base inventory per year).[58] This fixed amount is not necessarily equivalent to the amount of emissions reductions of VOC and/or $NO_X$ that the area will need (as reflected in the attainment projected inventory) to attain the ozone NAAQS by the applicable attainment date. To calculate EPA's recommended amount of CM reductions using the OYW of progress approach, which does relate to the amount of reductions that the area will need (again, as reflected in the attainment projected inventory), air agencies would determine the percentage of the base year EI the annual rate of reductions (i.e., the reductions in anthropogenic emissions between the base year and the attainment year, divided by the number of years between the base year and the attainment year) represents, then apply *that* percentage to the attainment projected EI, rather than calculating the amount based on a fixed 3 percent of the base year EI. The annual rate of reductions (i.e., the percentage) could be more or less than 3 percent. (This is similar to how the percentage is already determined for $PM_{2.5}$ precursors, because RFP for PM is not a fixed percentage). States should perform this calculation separately for both ozone precursors, VOC and $NO_X$.[59] This would ensure that the state develops CMs to achieve reductions related to the reductions of the precursors that are needed for the area to attain, regardless of whether the approach is being applied for PM or for ozone.[60]

### 3.1. OYW of Progress Calculation Described

EPA recommends that air agencies use the following equation to calculate OYW of progress for the purpose of assessing the adequacy of the reductions provided by the submitted CMs:

$$\frac{(base\ year\ EI - attainment\ year\ EI)}{(attainment\ year - base\ year)} \div base\ year\ EI \times attainment\ year\ EI = OYW\ of\ Progress$$

[58] The CAA expresses RFP for ozone in terms of averages over certain time periods. For example, RFP for Serious ozone areas is expressed in CAA section 182(c)(2)(B) as an average of 3% per year over 3 consecutive years.

[59] Under our previous guidance the calculation is done for VOC, with the possibility of $NO_X$ substitution. This is discussed in Section 2.2.1 of this document.

[60] For ozone, EPA notes that the new recommendation for separate $NO_X$ and VOC amounts has the potential to result in more CM reductions being needed for one of the precursors than would have been needed under the prior OYW of RFP approach, which allowed $NO_X$ substitution. EPA estimates this will be an uncommon occurrence, and it does not alter our conclusion that the new recommendation results in an amount of reductions that better aligns with the area's air quality needs for reductions of that precursor, accounting for declining emissions. Air agencies that cannot adopt CMs sufficient to provide the recommended amount of reductions for a given precursor may wish to consider an infeasibility justification for that precursor.

The OYW of progress calculation is based on anthropogenic emissions. All uses of the term "emissions," including "base year EI" and "projected attainment EI," refer to anthropogenic emissions.

States should use this approach for ozone and PM nonattainment plans and should perform the calculation separately for each relevant pollutant and precursor. This calculation can be broken down into three steps.

**Step 1:** Calculate the average annual emissions reductions needed to attain. For each relevant precursor, determine the amount of emissions reductions between the base year and the projected attainment year and divide by the number of years between the base year and the attainment year. Note: for PM, this typically represents the RFP annual average reduction, but for ozone, this will likely be different from the 3 percent annual requirement for RFP.

**Step 2:** Calculate the annual percentage reduction needed to attain. Determine what percentage of the *base year inventory* is represented by the annual average emissions reduction needed to attain by dividing the annual average reductions by the base year inventory for the NAA.

**Step 3:** Calculate the amount of emissions reductions needed for OYW of progress. Multiply the total emissions from the *attainment projected inventory for the NAA* by the annual percentage reduction needed to attain. This represents the amount of emissions reductions CMs should provide to meet OYW of progress.

EPA notes that this calculation depends on an approvable attainment demonstration, which could either be a modeled attainment demonstration or, where the model does not show attainment, one that relies on weight of evidence to demonstrate attainment. For reasons explained in Section 2, EPA believes it is appropriate to base the OYW of progress amount on the attainment projected inventory for the NAA. However, if EPA is unable to approve the attainment demonstration for reasons related to the adequacy of the modeling or weight of evidence demonstration, then EPA would not be able to approve as adequate the amount of CMs the air agency provided.

To affirm that the CMs achieve OYW of progress, the SIP submission should provide documentation of the expected reductions from the CMs contained within the plan and should compare the expected emissions reductions to the OYW of progress amount calculated above. Air agencies should include all steps of these calculations in their SIP submissions. EPA expects that the CM requirement would be met if the expected reductions meet or exceed the OYW of progress amount for the relevant precursor(s) / pollutant(s), and the CMs meet all other applicable requirements and guidance. If submitted CMs fall short of this amount, Section 4 of this guidance addresses the potential for an infeasibility justification for a lesser amount. Air agencies should ensure that other CM requirements and guidance unrelated to the amount of reductions are met (e.g., the measures are prospective and conditional and will take effect without further actions by the state or EPA as §172(c)(9) requires). Finally, we note that this OYW of progress approach is only for the purpose of calculating the amount for CM purposes and does not relieve an area from meeting other applicable CAA requirements (e.g., RFP, the milestone compliance demonstration requirements in CAA §182(g), or the quantitative milestone requirements of §189(c), which are separate and distinct from §172(c)(9) and §182(c)(9)).

OYW of progress is calculated for all relevant precursors to determine the amount of emissions reductions that CMs would need to provide to continue the annual percentage reduction, as applied to the attainment projected inventory. However, attainment demonstration modeling may provide a reasonable basis to identify ratios of the effectiveness of reductions of one precursor to reduce ambient concentrations relative to other precursors. If that is the case, then a state may use the ratio to substitute CM reductions of one precursor for a shortfall in CM reductions of another precursor. This applies to VOC and NOx for ozone and to the $PM_{2.5}$ plan precursors for $PM_{2.5}$. EPA recommends that an air agency intending to use such a substitution approach consult with its Regional Office concerning selection of a methodology for developing appropriate ratios.

## 3.2. Examples OYW of Progress Calculations

This section provides examples of the OYW of progress calculation. The first example is for a Severe ozone nonattainment area and the second is for a Serious $PM_{2.5}$ nonattainment area. EPA is providing these examples for the purpose of illustrating the concepts only and they are not based on any particular nonattainment area.

### 3.2.1. Example for Severe Ozone Nonattainment Area

Consider the example of a state with a Severe ozone nonattainment area that has a 2017 base year EI of 200 tons per day (tpd) of VOC and 150 tpd of $NO_X$. The attainment demonstration shows that the area will attain the ozone NAAQS in 2032. The 2032 attainment projected inventory for the NAA (that are reflected in the modeled attainment demonstration) is 140 tpd of VOC and 50 tpd of $NO_X$. The annual average reduction in emissions during the 15-year plan period is 4.0 tpd for VOC and 6.7 tpd for $NO_X$, which represents 2.0 percent and 4.5 percent of the base year EI of VOC and $NO_X$, respectively, i.e., the annual percent reductions needed to attain.

Under the OYW of progress approach, the CMs should provide emissions reductions sufficient to maintain the annual percentage reductions needed to attain. This amount (OYW of progress) is calculated by applying the annual percent reductions needed to attain to the emissions totals from the projected attainment inventory for the NAA. That is, upon triggering, the CMs should provide emissions reductions sufficient to provide an annual emissions reduction rate of 2.0 percent for VOC and 4.5 percent for $NO_X$, based on the attainment projected inventory. In this example, the CMs should provide emissions reductions equivalent to 2.8 tpd of VOC and 2.2 tpd of $NO_X$. This amount represents OYW of progress for CM purposes (but is not equivalent to the amount of emissions reductions the state would need to achieve for RFP purposes).

$$OYW\ of\ Progress\ for\ VOC: \frac{(200\ tpd - 140\ tpd)}{(2032 - 2017)} \div 200\ tpd \times 140\ tpd = 2.8\ tpd$$

$$OYW\ of\ Progress\ for\ NOx\text{:}\ \frac{(150\ tpd - 50\ tpd)}{(2032 - 2017)} \div 150\ tpd \times 50\ tpd = 2.3\ tpd$$

This example can be broken down into three steps as described in Section 3.1.

**Step 1**: Calculate the annual average reductions needed to attain for each relevant precursor.

| | |
|---|---|
| VOC<br>Step 1a | $200\ tpd - 140\ tpd = 60\ tpd$ |
| VOC<br>Step 1b | $60\ tpd - 15\ years = 4\ tpd$ |
| $NO_X$<br>Step 1a | $150\ tpd - 50\ tpd = 100\ tpd$ |
| $NO_X$<br>Step 1b | $100\ tpd \div 15\ years = 6.7$ tpd |

**Step 2**: Calculate the annual percentage reduction needed to attain.

| | |
|---|---|
| VOC | $4.0\ tpd \div 200\ tpd = 0.02\ (or\ 2\%)$ |
| $NO_X$ | $6.7\ tpd \div 150\ tpd = 0.045\ (or\ 4.5\%)$ |

**Step 3**: Calculate the amount of reductions needed for OYW of progress.

| | |
|---|---|
| VOC | $140\ tpd \times 0.02\ (or\ 2\%) = 2.8\ tpd$ |
| $NO_X$ | $50\ tpd \times 0.045\ (or\ 4.5\%) = 2.3\ tpd$ |

*Comparison of Historical and Revised Guidance:*

Under EPA's prior guidance for CMs, the Agency recommended that CMs should achieve emissions reductions equivalent to OYW of RFP, which is essentially defined for ozone as 3 percent of the VOC emissions from the anthropogenic portion of the base year inventory for the NAA.[61]

| | |
|---|---|
| VOC | $200\ tpd \times 0.03\ (or\ 3\%) = 6.0\ tpd$ |

In this example, under EPA's prior guidance, CMs should provide for emissions reductions equivalent to **6.0 tpd of VOC** (or, under the $NO_X$ substitution guidance, 4.5 tpd of $NO_X$ or a

[61] $NO_X$ reductions could generally be credited to make up for a shortfall in VOC reductions on a percentage-of-inventory basis. In other words, if VOC CMs only achieve reductions equivalent to 2 percent of the VOC base year inventory, the addition of $NO_X$ CMs that achieve 1 percent of the $NO_X$ base year EI could be used to meet a OYW of RFP requirement of 3 percent.

combination of VOC and $NO_X$ on a percentage basis). Under the revised guidance, CMs should provide for emissions reductions equivalent to **2.8 tpd of VOC** and **2.3 tpd of $NO_X$** (although, as noted earlier in this section, a shortfall of reductions from CMs for one of the precursors may be remedied by additional reductions from CMs for other precursors if the attainment demonstration provides the basis to develop a ratio of relative effectiveness).

### 3.2.2. Example for Moderate $PM_{2.5}$ Nonattainment Area

Consider the example of a Moderate $PM_{2.5}$ nonattainment area that has 2011 base year emissions of 100 tpd of direct $PM_{2.5}$ and 200 tpd of $NO_X$ and the air agency has adequately demonstrated the insignificance of precursor emissions of VOC, sulfur dioxide ($SO_2$), and ammonia. The modeled attainment demonstration shows that the area will attain the NAAQS by the end of 2021. The attainment projected inventory in the nonattainment plan is 75 tpd of direct $PM_{2.5}$ emissions and 150 tpd of $NO_X$. The annual average reduction in emissions during the 10 years between the base year and the attainment year is 2.5 tpd of direct $PM_{2.5}$ and 5.0 tpd for $NO_X$, which represents 2.5 percent of the base year emissions for both direct $PM_{2.5}$ and $NO_X$. This represents OYW of RFP, which for purposes of the $PM_{2.5}$ NAAQS is defined as generally linear annual emissions reductions, rather than a set percentage as for ozone. Under EPA's prior guidance for CMs, this OWY of RFP is the amount of emissions reductions that the CMs should achieve.

Under the revised OYW of progress approach, the CMs should provide emissions reductions sufficient to maintain the annual percentage reductions needed to attain. This amount (OYW of progress) is calculated by applying the annual percent reductions needed to attain to the attainment year inventory. That is, upon triggering, the CMs should provide emissions reductions sufficient to provide an annual emissions reduction rate of 2.5 percent for both direct $PM_{2.5}$ and $NO_X$ calculated as a percentage of the attainment projected inventory rather than the base year EI. In this example, the CMs should provide emissions reductions equivalent to 1.9 tpd of direct $PM_{2.5}$ and 3.8 tpd of $NO_X$. This amount represents OYW of progress for CM purposes (but is not the RFP amount).

$$OYW\ of\ Progress\ for\ Direct\ PM2.5\text{:}\ \frac{(100\ tpd - 75\ tpd)}{(2021 - 2011)} \div 100\ tpd \times 75\ tpd = 1.9\ tpd$$

$$OYW\ of\ Progress\ for\ NOx\text{:}\ \frac{(200\ tpd - 150\ tpd)}{(2021 - 2012)} \div 200\ tpd \times 150\ tpd = 3.8\ tpd$$

Like the example above for a Severe ozone nonattainment area, this example can be broken down into three steps as described in Section 3.1.

**Step 1:** Calculate the annual average reductions needed to attain for each relevant precursor. (In this example, we assume the state has adequately demonstrated that it does not need to regulate the $PM_{2.5}$ precursors VOC, $SO_2$ and ammonia.)

| | |
|---|---|
| Direct $PM_{2.5}$ Step 1a | $100\ tpd - 75\ tpd = 25\ tpd$ |
| Direct $PM_{2.5}$ Step 1b | $25\ tpd \div 10\ = 2.5\ tpd$ |
| $NO_X$ Step 1a | $200\ tpd - 150\ tpd = 50\ tpd$ |
| $NO_X$ Step 1b | $50\ tpd \div 10\ = 5.0\ tpd$ |

**Step 2:** Calculate the annual percentage reduction needed to attain.

| | |
|---|---|
| Direct $PM_{2.5}$ | $2.5\ tpd \div 100\ tpd = 0.025\ (or\ 2.5\%)$ |
| $NO_X$ | $5.0\ tpd \div 200\ tpd = 0.025\ (or\ 2.5\%)$ |

**Step 3:** Calculate the amount of reductions needed for OYW of progress.

| | |
|---|---|
| Direct $PM_{2.5}$ | $75\ tpd \times 0.025\ (or\ 2.5\%) = 1.9\ tpd$ |
| $NO_X$ | $150\ tpd \times 0.025\ (or\ 2.5\%) = 3.8\ tpd$ |

*Comparison of Historical and Revised Guidance:*

Under EPA's prior guidance, EPA recommended that CMs should provide for emissions reductions equivalent to OYW of RFP for direct $PM_{2.5}$ and each $PM_{2.5}$ plan precursor. The amount of OYW of RFP is determined by the same method as described above for step 1. That is, calculate the annual average reductions needed to attain for each relevant precursor by subtracting the attainment projected inventory from the base year EI and dividing that value by the number of years between the base year and the attainment year.

| | |
|---|---|
| Direct $PM_{2.5}$ Step 1a | $100\ tpd - 75\ tpd = 25\ tpd$ |
| Direct $PM_{2.5}$ Step 1b | $25\ tpd \div 10\ = 2.5\ tpd$ |
| $NO_X$ Step 1a | $200\ tpd - 150\ tpd = 50\ tpd$ |
| $NO_X$ Step 1b | $50\ tpd \div 10\ = 5.0\ tpd$ |

In this example, under EPA's prior guidance, CMs should provide for emissions reductions equivalent to **2.5 tpd of direct $PM_{2.5}$** and **5.0 tpd of $NO_X$**. Under the revised guidance, CMs should provide for emissions reductions equivalent to **1.9 tpd of direct $PM_{2.5}$** and **3.8 tpd of $NO_X$.**

### 4. Reasoned Justification for Less Than OYW of Progress

Notwithstanding the updated OYW of progress calculation in Section 3, EPA recognizes that some air agencies may still be concerned that they cannot meet the recommended amount of reductions from CMs. As noted in Section 2, EPA guidance currently interprets the CAA to allow an air agency that is unable to provide sufficient emissions reductions from CMs to provide a reasoned justification for a lesser amount. EPA has not to date provided further guidance on how to develop such a justification, but some air agencies have requested clarification, claiming that they are unable to provide sufficient reductions because there are not remaining sufficient feasible measures to meet the requirements for CMs. This guidance is intended to provide such additional clarification in response to these requests.

If, after adequately evaluating additional control measures, the air agency is unable to identify and adopt feasible CMs that would reduce emissions by an amount sufficient to meet the OYW of progress recommendation, then it may be appropriate for the air agency to submit CMs that result in less than that amount, using the reasoned justification approach described in this section. While EPA notes that CAA section 172(c)(9) and section 182(c)(9) do not explicitly provide for consideration of whether specific measures are feasible, the Agency believes that it is reasonable to infer that the statute does not require control measures regardless of any technological or cost constraints whatsoever. It is more reasonable to interpret the CM requirement not to require air agencies to adopt and impose infeasible measures. The statutory provisions applicable to other nonattainment area plan control measure requirements, including RACM/RACT (for ozone and PM), BACM/BACT (for PM), and most stringent measures (for PM) allow air agencies to exclude certain measures that are deemed unreasonable or infeasible (depending on the requirement). For example, the most stringent measures provision in CAA section 188(e) requires plans to include "the most stringent measures that are included in the implementation plan of any state or are achieved in practice in any state, *and can feasibly be implemented in the area* [emphasis added]." EPA considers it reasonable to conclude that Congress similarly did not expect air agencies to satisfy the CM requirement with infeasible measures. Thus, EPA anticipates that a demonstrated lack of feasible measures would be a reasoned justification for adopting CMs that only achieve a lesser amount of emission reductions. To justify a lesser amount of emissions reductions based on infeasibility, an air agency would need to provide EPA with an adequate explanation and documentation that there are not additional feasible CMs that could achieve the recommended full OYW of progress amount.

EPA notes that a key factor affecting the availability of feasible measures to be CMs in a given nonattainment area is the degree to which the air agency has (1) already implemented all feasible measures, or (2) already included all feasible measures in the state's SIP to meet other control strategy requirements for implementation no later than the attainment date. In some areas, particularly those with longstanding nonattainment problems where the air agencies have already adopted increasingly stringent measures in attainment plans over the years since EPA issued the General Preamble, the available supply of feasible measures to hold in reserve as CMs may be greatly diminished. These air agencies may be justified in adopting and submitting CMs that would result in less than OYW of progress, if they have identified and evaluated all potentially applicable measures, have adopted the feasible measures necessary to expeditiously attain the relevant NAAQS, have determined that the remaining feasible measures are insufficient to achieve OYW of progress, and have adequately demonstrated these points in their submission to EPA.

EPA recommends that if an air agency is seeking to satisfy the statutory CM requirement with less than OYW of progress based on lack of feasible measures, then that air agency should demonstrate that they have in fact considered all existing and potential control measures relevant to the appropriate source categories and pollutants in the nonattainment area, and have reached reasonable conclusions regarding whether a measure is infeasible.[62] In this guidance, we use the term "infeasibility justification" to refer to this kind of demonstration. The demonstration will entail air agencies documenting their efforts to identify existing and potential measures and explaining their reasoning for concluding that identified measures are infeasible. Where the nonattainment plan associated with the CM submission contains a robust control strategy analysis, that analysis can serve as a foundation for much of this effort. However, EPA recommends additional documentation specific to the infeasibility justification for CMs as described in this section to ensure that the justification is adequate.

This section provides a suggested step-by-step methodology for air agencies to use to develop an infeasibility justification for CMs based on the following general principles:

- It should be based on a case-specific factual analysis that begins with a thorough examination, as described in this section, of relevant emissions sources in the area and the range of existing and potential control measures for such sources. If existing or potential control measures are excluded from this analysis, the resulting infeasibility claim would likely be deficient with respect to the excluded measures.
- The evaluation of existing and potential control measures should encompass a broad range of sources and measures that could reduce relevant emissions. If the control strategy analysis was previously limited in scope (for example, a RACT analysis that only evaluated major sources and CTG-covered sources within an ozone nonattainment area), the air agency should evaluate additional sources because the CM requirement is not limited in this way.
- Once measures are identified, the case-specific factual analysis should explain and document the reasoning behind each claim that an identified measure is infeasible in the area. As explained later in this section, "infeasible" means either technologically or economically infeasible.
- The focus of the infeasibility justification should be on existing and potential control measures that the air agency intends to reject as infeasible as CM; for this type of justification, it may be useful to refer to measures that have already been adopted and described in the air agency's current or previous control strategy submissions, but the

[62] In this document, "existing control measures" refers to controls that are not yet on-the-books or on-the-way, but which could prospectively be applied to sources in the nonattainment area because they are presently being implemented for sources outside the relevant nonattainment area or are presently being implemented for different sources in the nonattainment area. "Potential control measures" refers to identifiable measures that may be feasible for sources in the nonattainment area but have not been previously implemented elsewhere.

information needed to support the infeasibility justification relates primarily to identifying the rejected measures and the reasons why they are infeasible.

We note that, where appropriate, air agencies evaluate control measures for reasons other than the CM requirement and may separately establish that specific control measures are not technologically or economically feasible in their non-CM control strategy analyses (e.g., that a measure is not RACM/RACT, BACM/BACT, or MSM, and is not feasible for meeting RFP or for attaining by the applicable attainment date) under existing guidance.[63] EPA expects that justifications to establish that control measures evaluated as CMs are infeasible could be similar to these analyses but should not simply repeat the control strategy's infeasibility showing. By statute, CMs are a separate nonattainment plan requirement that is in addition to other control measure requirements, so disqualification of a specific control measure for purposes of other requirements does not per se disqualify the measure as a CM. As described in more detail below, a claim that a measure is infeasible for control strategy purposes does not necessarily mean that it is also infeasible as a CM, and in some cases additional explanation should be provided as to why an available measure will not be feasible as a CM at a given source.

It is important to note the possibility, that there may be *feasible* controls that the air agency previously considered in the control strategy analysis, but determined to be unnecessary for attainment, insufficient to advance attainment, or otherwise not required by the CAA. Where these measures are otherwise suitable for adoption as CMs (i.e., they can be implemented within 60 days of triggering, reductions can occur within 2 years of triggering, etc.) EPA recommends that, before undertaking an infeasibility justification as explained in Section 4.1, the air agency first ensures that such measures are already included as CMs in the nonattainment plan submission. If such measures are sufficient to reach OYW of progress, then the infeasibility justification is not necessary. If such measures and all other feasible measures still do not reach OYW of progress, then the shortfall may be addressed by an infeasibility justification.

Even where an air agency submits an infeasibility justification, it should also adopt and submit all feasible CMs (possibly including, pursuant to the previous paragraph, measures it previously excluded from the control strategy), documenting the reductions that would be achieved from the implementation of these CMs, if triggered. A plan that incorporates all feasible reductions but falls short of providing the recommended amount of CM reductions may still satisfy the CM requirement. EPA anticipates that, except in extremely rare instances, a state will be able to identify at least some feasible measures to serve as CMs, even if they achieve substantially less than OYW of progress. In light of the expected variation in the availability of feasible measures and resulting emissions reductions across different nonattainment areas, we are not recommending a minimum amount of CM emissions reductions that would be approvable as part of an infeasibility justification. With sufficient justification, CMs representing a small amount of reductions may be reasonable. However, EPA emphasizes that lower amounts of CM emissions reductions will warrant more robust infeasibility showings. In light of the very strong likelihood

[63] *See*, e.g., 1992 General Preamble at 57 FR 13540-41, which states in reference to RACM/RACT that a submission should contain "a reasoned justification for partial or full rejection of any available control measures, including those considered or presented during the State's public hearing process, that explains, with appropriate documentation, why each rejected control measure is infeasible or otherwise unreasonable."

of any area having at least some available reductions, however small the amount, we do not recommend submission of a plan that provides no CMs (i.e., zero reductions) for a given precursor. [64]

4.1. Recommended procedure for developing a demonstration that the area lacks sufficient feasible measures to achieve 1-years' worth of reductions ("infeasibility justification").

EPA recommends the following four-step approach for air agencies to identify CMs and to develop an infeasibility justification where warranted:

**Step 1:** Identify existing and potential control measures, i.e., measures not already included in the plan, that could be applied to sources in the nonattainment area.

**Step 2:** Review each of the measures identified in Step 1 to determine whether it is feasible as CM. If feasible, include the measure in the CM submission. (Check to see if OYW of progress is met, and if so, the infeasibility justification is no longer needed).

**Step 3:** For the remaining measures (i.e., the infeasible measures from Step 2), document the reason why the air agency reached the conclusion that each measure is infeasible, including whether the conclusion is based on technological or economic infeasibility.

**Step 4:** Prepare the infeasibility justification to include with the SIP submission by identifying each measure determined to be infeasible in Step 3, explaining the reason for each such determination, and providing supporting information and analysis that supports each conclusion.

Each of these steps is explained in more detail below.

**Step 1:** Identify existing and potential control measures not already included in the plan that could be applied to sources in the nonattainment area.

In this step, the air agency should conduct a careful analysis to identify the sources present in the nonattainment area, the "on-the-books" control measures (i.e., the control measures that already apply to those sources) and the "on-the-way" control measures (i.e., the control measures in the nonattainment plan that will be implemented during the upcoming planning period), and any remaining unregulated source categories. In addition, it should identify existing measures (including strengthening and expanding on-the-books and on-the-way measures) and potential measures that could serve as CMs. This analysis should include the following elements:

- An emissions inventory that provides a comprehensive, detailed list of source categories emitting relevant pollutants, including identification of subcategories based on different fuels or materials (e.g., feedstock or production materials) as applicable. For ozone areas that are newly designated for a NAAQS and for PM areas, the base year inventory for the nonattainment area can be used for this purpose. Ozone areas that have been reclassified

[64] EPA notes that in the *AIR* decision, the court rejected a measure that would have achieved 10 percent of the recommended amount. However, EPA's action there was not based on an infeasibility justification as described in this guidance. EPA believes that with the appropriate infeasibility justification, a lesser amount could be supported.

to a higher classification should use the most recent periodic inventory for the nonattainment area.

- The emissions inventory should separate broader source categories into more specific categories that correspond with different control measures that apply and should separately list subcategories that are currently unregulated. For example, reciprocating engines can be categorized according to size or the type of fuel used to allow contingency measures to be specified for certain subcategories. Farming operations can be broken down into tilling dust, harvesting dust, and animal husbandry. Animal husbandry can be categorized by the type of livestock, for example, dairy cattle, range cattle, feedlot cattle, poultry, etc. This level of detail is necessary for the next step of the analysis.

- Identification of the on-the-books and on-the-way controls that apply to the source categories or subcategories present in the nonattainment area.
  - In order to facilitate a comparison of the on-the books and on-the-way control measures with other existing and potential control measures and the identification of unregulated sources and subcategories in the nonattainment area, air agencies should list each source category included in the inventory as described above, the amount of relevant emissions generated by that source category, and the corresponding rules that apply (or are scheduled to apply) to the individual source categories and subcategories, and note any exemptions that apply.

- Identification of existing and potential control measures, including opportunities to strengthen on-the-books and on-the-way rules.[65] A robust attainment plan control strategy analysis[66] can serve as a good starting point for conducting this analysis.[67]
  - The CM analysis should include the full range of sources appropriate for emissions controls in a nonattainment plan, i.e., stationary point sources, anthropogenic area sources (also referred to as nonpoint sources), and mobile sources.
    - For stationary source measures, air agencies can use resources such as EPA's Menu of Control Measures,[68] recent control strategy analyses (e.g., RACM/BACM and RACT/BACT analyses), and control measures in other nonattainment areas (particularly those with higher classifications or more mature programs), the RACT/BACT/LAER Clearinghouse

[65] Changes to on-the-books and on-the-way control measures could include strengthening emissions limits, lowering applicability thresholds, and removing exemptions.

[66] The $PM_{2.5}$ Implementation Rule provides a detailed description of the elements of a control strategy analysis, including guidance regarding the determination of technological and economic feasibility. 81 FR 58010, 58033-58043 (August 24, 2016).

[67] Serious PM areas are required to adopt BACM/BACT, and under some circumstances, MSM. Such measures may also be useful models for contingency measures in other areas.

[68] *https://www.epa.gov/air-quality-implementation-plans/menu-control-measures-naaqs-i*mplementation.

(RBLC)[69], and other resources available to the air agency to identify potential new stationary source control measures.

  - For mobile source measures, there are currently two EPA webpages that provide information on mobile source program design and implementation as well as guidance on the crediting of such programs in a state implementation plan: (1) the Guidance on Control Strategies for State and Local Agencies webpage[70] and (2) the Policy and Technical Guidance webpage.[71]
  - Some air agencies or multi-jurisdictional air organizations provide additional sources of information that can also assist in identifying additional control measures.[72] EPA recommends consulting with the appropriate Regional office regarding sources of measures beyond those EPA has identified above.

- A control measure that the state does not have the legal authority to impose because of federal preemption would not need to be evaluated in detail as part of the infeasibility justification, but the infeasibility justification should include a description of any such measures the air agency considered and excluded due to preemption, specifically identifying the preemption.[73]

In developing the Step 1 list of measures, air agencies may determine that some identified measures may have only a trivial impact on emissions. It would be appropriate for states to exclude trivial measures from the Step 1 list under such circumstances. In keeping with the recommendation earlier in this section regarding the preference for states to adopt at least one CM or a combination of CMs even if they only achieve a relatively small amount of emission reductions, along with an infeasibility justification, EPA recommends that if a state seeks to exclude measures in this way, the emission reductions from such measures should be unquestionably negligible, even when considered alongside other similarly trivial measures (e.g., no more than 1 percent of OYW in total).

[69] *https://cfpub.epa.gov/rblc/.*

[70] *https://www.epa.gov/state-and-local-transportation/guidance-control-strategies-state-and-local-agencies*. This webpage contains EPA guidance to help state and local air quality agencies quantify and implement state implementation plan control strategies that reduce mobile source emissions. Examples include commuter programs, diesel retrofit and replacement, land use, locomotive idle reduction, transportation control measures (TCMs), and transportation pricing programs.

[71] *https://www.epa.gov/state-and-local-transportation/policy-and-technical-guidance*. This webpage provides links to general information on mobile source Clean Air Act requirements and guidance on control strategies.

[72] Two examples are (1) the Ozone Transport Commissions (OTC) 2017 "White Paper on Control Technologies and OTC State Regulations for $NO_X$ Emissions from Eight Source Categories" and (2) the CARB Technology Clearinghouse *https://ww2.arb.ca.gov/our-work/programs/technology-clearinghouse/technology-clearinghouse-tools*.

[73] EPA notes that a state is obligated to meet the CM requirement of the CAA and thus division of authority between the state and local air districts, or between different state agencies within a given state, does not provide a basis to claim lack of authority.

The result of Step 1 would be a detailed list of source categories and subcategories, the associated relevant emissions for each category/subcategory, the "on-the-books" and on-the-way" that apply, and all existing or potential control measures that, prior to any feasibility screen, are applicable to sources in the nonattainment area, that could achieve additional emissions reductions, and that are not already adopted or implemented. The list should be accompanied by a description of how the air agency conducted the search for contingency measures. The list of measures identified in Step 1 will identify the scope of potential CMs and will later be used to define the remaining measures for which the air agency intends to make a technological/economic infeasibility justification in Step 3. It will also allow EPA and the public to comment on the full list of existing or potential measures that the air agency considered, in order to provide an opportunity to identify any potential measures that the air agency did not include in the analysis.

**Step 2:** Review each of the measures identified in Step 1 to determine whether it is feasible as CM. If feasible, include the measure in the CM submission.

In this step, the air agency will apply a feasibility screen to determine whether any of the identified measures are feasible as CMs. The measures not found to be feasible in this step will comprise the list of infeasible measures for which the air agency needs to provide infeasibility justification in Step 3. But first, EPA anticipates that the Step 1 search for existing and potential measures could identify measures that are feasible as CMs. Any measures identified during the Step 1 analysis that are feasible should be adopted as CMs, and an updated comparison with the OYW of progress metric should be conducted. If they are sufficient to reach OYW of progress, then the infeasibility demonstration is no longer needed.

A particular set of measures that an air agency could determine to be feasible in Step 2 and that would not already be included in the control strategy would be the measures that an air agency determined that it is not required to impose to meet RACM requirements because they would not advance the attainment date by 1 year. Assuming these measures meet the other conditions for being a valid CM, they should be adopted as CM in Step 2 unless they are infeasible, or until the OYW of progress recommendation is met. If rejecting those same measures as infeasible as CMs, the air agency should specifically address the feasibility of those measures because the fact that the control measures would not advance the attainment date by 1 year is not a sufficient reason for rejecting those control measures as CMs.

EPA has previously issued guidance addressing feasibility for various control measure requirements in nonattainment plans (e.g., RACM/RACT, BACM/BACT, or MSM).[74] This guidance has described the analytical factors that states should use to evaluate feasibility of CMs, identifying two kinds of feasibility: technological and economic. Each of these is briefly reviewed in this section. The discussion focuses on the considerations for evaluating feasibility of measures for CM purposes, which build upon these previously discussed feasibility

[74] See, e.g., the Appendices to the 1992 General Preamble, 57 FR 18070 at18073-4 (April 28, 1992), the 1992 $NO_X$ Supplement to the General Preamble, 57 FR 55620 at 55624-5 (November 25, 1992), the 1994 $PM_{10}$ General Preamble Addendum, 59 FR 41988 at 42013, and the 2016 $PM_{2.5}$ NAAQS SIP Requirements Rule at 81 FR 58010 at 58084-85.

considerations for other control measure requirements (and therefore this discussion should not be read as addressing feasibility analysis for requirements other than CMs).

*Step 2a. Technological Feasibility*

EPA has identified several factors that affect technological feasibility of a measure, including the source's process and operating procedures, raw materials, physical plant layout, and other environmental impacts such as water pollution, waste disposal, and energy requirements that would negate the environmental benefit of the control. If, upon consideration of these and other relevant factors, the air agency determines that a measure would render the source completely inoperable, make the source clearly unsafe to operate, or create significant negative non-air quality related environmental impacts, such a showing could support a justification that the measure is technologically infeasible.

An additional consideration in technological feasibility is the time frame for achieving reductions. For CMs, as explained in section 5 of this guidance, reductions should be achieved in no more than 2 years from the triggering event. Where an otherwise feasible measure requires longer than 2 years to achieve reductions, this could be a justification for technological infeasibility with appropriate documentation of the time frames involved.

EPA acknowledges that if an air agency determines that a control measure is not technologically feasible in the nonattainment plan control strategy analysis it may also not be technologically feasible as a CM. However, in light of the separate CAA requirement for CM, EPA recommends that any control measures a state rejected because of technological infeasibility in a control strategy analysis should still be evaluated to determine whether they may be feasible as CM. For example, there may be timing considerations (e.g., the need to implement RACT by a specified date) that could render an identified measure infeasible in a RACT analysis, but when considering the time that the CM would likely be implemented, up to and including the 2 years following the CM trigger date (i.e., the maximum date based on failure to attain), the measure may become feasible. Moreover, if a measure was included in the plan's control strategy but its scope/coverage was limited due to technological feasibility considerations, the state should consider it in Step 2 of the CM analysis by evaluating whether additional time would improve the feasibility of expanding its scope/coverage as a potential CM.

Where a measure involves significant planning, such as an extensive stakeholder, planning and/or budgeting process, that measure could still be feasible as a CM. Air agencies would need to complete these planning processes prior to adopting and submitting such a measure in order to assure its timely approval in a SIP, and ensure that it can otherwise meet CM requirements and guidance for timing and implementation without further action. At the same time, EPA believes that it is reasonable for states to account for factors that might prevent a particular measure from taking effect within 60 days of triggering when determining its feasibility as a CM. For example, a measure may be infeasible if it requires a plan for program implementation with details (e.g., project plan, detailed budget, schedule, etc. to assure the timely and successful implementation of the measure) that cannot be specified to take effect within 60 days of triggering. Similarly, a potential measure may be infeasible if it requires program funding to be available upon triggering the CM, but the funding or irrevocable funding commitment cannot be secured prior to the time the state submits, and EPA approves the CM. Securing program funding or irrevocable funding commitments in advance for a CM program which may never be triggered may be a challenge for states. Where a state claims that a measure is infeasible for these reasons, it should clearly identify the specific factors that prevent it from taking effect within 60 days.

*Step 2b. Economic Feasibility*

EPA often uses cost per ton reduced as an indicator of economic feasibility, but there is not a single one-size-fits-all cost per ton (cost/ton) amount that would provide a bright line that renders a control measure economically feasible (or infeasible) for CM purposes for all areas, industry sectors, pollutant/precursors, etc.[75] Instead, evaluating whether a given measure is economically feasible as a CM will include a robust evaluation of the cost of the control measure to be implemented within a given timeframe. Therefore, EPA recommends that air agencies provide cost/ton estimates for each of the measures the air agency is rejecting as a CM on this basis. EPA's Control Cost Manual provides guidance for developing accurate and consistent costs for air pollution control devices.[76] Providing cost/ton estimates for CMs that the air agency is adopting provides a useful basis for illustrating the relatively higher cost/ton of any measures rejected on this basis. Importantly, economic feasibility considerations include the control cost for a source relative to other similar sources that have implemented a specific control measure. EPA presumes that it is reasonable for similar sources to bear similar costs of achieving emissions reductions. Economic feasibility rests very little on the ability of a particular source to "afford" to reduce emissions to the level of similar sources.[77] Air agencies should also ensure that control measures are not rejected categorically as economically infeasible if they may otherwise be economically feasible for some individual sources with that category.

In determining what is economically feasible for CM purposes, the fact that a potential CM is more costly than those in the plan's control strategy is not automatically a basis for concluding it is economically infeasible. EPA expects air agencies may need to consider more costly measures than those in the control strategy because, by definition, triggering CMs means the area has failed to attain or meet RFP through implementing the set of measures within the plan. Consistent with the statutory purpose of CMs to provide additional emissions reductions in the event that the measures in the control strategy fail to meet RFP or to result in attainment, EPA believes that CMs are logically measures that may have greater economic consequence than what was provided in the control strategy. Accordingly, measures that the air agency rejected in the control strategy analysis due to economic considerations should still be evaluated by the air agency in Step 2 as potential CMs. If the air agency still rejects the measures as CM due to economic infeasibility, Step 3 will need to document the agency's reasoning.

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[75] The cost per ton amount referred to here is for an annual or annualized cost; that is, the typical yearly cost associated with a control measure under consideration for CM purposes.

[76] *https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution*. Section 1, Chapter 2 of the Control Cost Manual provides guidance on the cost estimation methodology that is appropriate for use with air pollution control devices such as those under consideration as CMs.

[77] *See*, e.g., 57 FR 18070 at 18074, and 81 FR 58010 at 58085.

The CAA does not indicate whether the cost of controls is a factor to consider when identifying CMs. On one hand, this suggests that air agencies ought to be considering all possible CMs regardless of how much those controls cost to implement. However, as explained above, EPA considers it reasonable to interpret the CM requirements not to require air agencies to adopt and impose economically infeasible measures. As such, EPA believes it is reasonable to expect that there be some upper limit relevant to costs in the context of CM; that at some point costs could become so exorbitant that it would render the otherwise possible CM infeasible. However, this point is difficult to define because it depends on many fact-specific elements that can change over time. EPA believes a reasonable approach is to recommend that the economic feasibility of potential CMs be evaluated based on a cost/ton threshold that is higher than what was considered in a similar economic analysis for control strategies in the nonattainment area, including any thresholds associated with RACT determinations. A measure that was determined economically "unreasonable" for RACT purposes because of cost is not automatically economically infeasible for use as a CM.

As with technological feasibility, the economic feasibility analysis for potential CMs should consider the timeframe by which the measures will need to achieve reductions. As explained in Section 5, EPA recommends that for CMs, this should be no later than 2 years following the trigger for the CM. To the degree that a measure, once triggered, would cost more to implement within 2 years of triggering than it would to implement it over a longer time, this could be a relevant consideration to the measure's economic feasibility as a CM, provided the costs of the "faster" implementation are appropriately documented. At the same time, the economic feasibility analysis should reasonably consider the potential that the trigger for CMs might not occur until the attainment date, and for all creditable emissions reductions to not be realized until 2 years later. Additional time to prepare for implementation of a measure might reasonably lower its cost compared to the cost of implementing it now. Accounting for these timing considerations need not be based on detailed economic forecasts, but should provide a sufficiently robust basis for an air agency's conclusions regarding economic infeasibility of the measure specifically as a CM.

**Step 3:** For the remaining measures (i.e., the infeasible ones from Step 2), describe the reason why the air agency reached the conclusion that they were infeasible (including whether the conclusion is based on technological or economic infeasibility).

Following the generation of the list of measures potentially applicable as CMs (Step 1) and the identification and adoption of the subset of those that are feasible (Step 2), air agencies begin Step 3 with the list of remaining measures for which they intend to provide an infeasibility justification. In Step 3, for each remaining measure, the air agency should develop an explanation of why it rejected the existing or potential control measures during Step 2 review. In keeping with the discussion in Step 2, EPA recommends that the air agency first identify whether the justification for excluding a measure as a CM is based on a determination that the measure is technologically infeasible and/or that it is economically infeasible. The air agency should then provide the basis for each such determination, consistent with the feasibility considerations that it evaluated in Step 2.

For a technological infeasibility determination, the explanation should identify on a measure-by-measure basis, the specific factors that the air agency used in determining that the measure cannot be implemented for the relevant sources (or, as applicable, that its implementation cannot be broadened). If the technological infeasibility determination is tied to the timeframe for achieving reductions (for example, if the measure cannot possibly achieve any reductions within 2 years) the air agency should describe the implementation time frames that it considered. As noted in Step 2, in light of the separate CM requirement, the justification should address why the new or expanded measure is technologically infeasible for CM purposes.

For an economic infeasibility determination, the explanation should identify on a measure-by-measure basis, the cost factors and other related factors that the air agency used in determining that the measure is economically infeasible. EPA recommends that air agencies provide cost/ton estimates for each of the measures being rejected as CMs on this basis. The air agency should also provide an explanation of why this cost/ton is infeasible for the specific CM under consideration. For example, it could compare the cost/ton of the infeasible measure to the estimates for CMs that the state is adopting to illustrate the relatively higher cost/ton of the rejected measures. The explanation of the air agency's judgments regarding infeasibility of measures as CMs should address the CM-specific factors noted in discussion of economic feasibility in Step 2, i.e., the expectation that CMs may be judged on a higher cost threshold than for other control strategy analysis in the SIP, and the costs to implement CMs should consider the later trigger date and potential for additional time beyond the attainment date that may be available to implement CMs.

**Step 4.** Prepare the infeasibility justification to include with the SIP submission by identifying each measure determined to be infeasible in Step 3, explaining the reason for each such determination, and providing supporting information and analysis to support each conclusion.

A state's nonattainment plan SIP submission should provide documentation of Steps 1 through 3 to ensure an adequate record to support the reasoned justification for having CMs that provide emissions reductions that result in less than OYW of progress. Specifically, EPA recommends that the submission should provide thorough description of:

> (1) *the approach used by the air agency in Steps 1 and 2 to identify existing and potential control measures,* which will provide EPA an ability to assess whether existing and potential control measures have been identified, including any beyond the control strategy analysis, and, where feasible, have been included in the submission as CMs; and
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> (2) *the analysis in Step 3 of feasibility for each of these measures and justification for the conclusion that certain measures are technologically and/or economically infeasible,* which will provide EPA with an ability to assess the basis for any infeasibility justification that the air agency makes for the measures identified in Step 1.

EPA recognizes that in cases where the air agency is asserting that numerous measures are infeasible, this documentation effort will require an investment of effort beyond that already invested to document the control strategy analysis. At the same time, we recognize that without adequate record support, EPA would lack a basis for its approval of a reasoned justification for approval of CMs that result in emissions reductions less than OYW of progress, particularly if the amount is significantly less than OYW. To balance these factors, EPA recommends that for Step 1, the air agency should prioritize more robust documentation of its approach for identifying existing and potential measures for the sources and categories that comprise larger portions of the inventory. Similarly, for Steps 2 and 3, EPA recommends that the air agency should provide more robust documentation for the infeasibility analysis for the measures that, if feasible, would have provided a greater amount of reductions. While focusing effort in this way is reasonable, the air agency, in order to provide the strongest justification, should at least describe the basis for infeasibility for any category and measure identified in Step 1. To further affirm that it has addressed all non-trivial measures, an air agency could list the source categories for which it determined in Step 1 that the aggregate reductions from available CM would result in unquestionably negligible emissions reductions. As noted previously, the further a CM plan is from achieving OYW of progress, the more robust the record support for its infeasibility showing should be.

### 5. Guidance on Timing of Reductions from CMs

EPA is also updating its guidance on the recommended timing of emissions reductions that CMs should achieve. Section 172(c)(9) and 182(c)(9) both provide that CMs must "take effect" without further action by EPA or the state, but do not define the term "take effect" or specify timelines for implementing the measures or achieving reductions. As discussed in Section 2, in the 1992 General Preamble, EPA did address the question of how soon the CMs for ozone should take effect, and acknowledged that certain actions, such as notification of sources, modification of permits, etc., would probably be needed before a measure could be implemented effectively. There, EPA concluded that in general, actions needed to affect full implementation of the measures should occur within 60 days after EPA notifies the State of its failure. For purposes of PM, EPA stated in the General Preamble that states should implement CMs "immediately" after a triggering event, but subsequently in the $PM_{2.5}$ Implementation Rule, EPA has indicated that states should implement the CMs "quickly" in recognition of the potential need for minimal administrative actions to begin implementation, and by regulation EPA has required that the CMs expressly specify the time frame during which the CMs will become effective after a triggering event.[78] We continue to believe that 60 days is a reasonable period for such administrative actions to occur before the CMs begin to provide emissions reductions. EPA is not altering its previous guidance with respect to this 60-day period.

Turning to the question of when the emissions reductions from the CMs should occur, as discussed in Section 2, EPA did not make explicit recommendations in the General Preamble. However, EPA implicitly was assuming that the emissions reductions should occur within the year following a triggering event. This was a function of EPA's approach to guidance on the amount of emissions reductions that CMs should achieve, premised on OYW of RFP, and the purpose of CMs as providing emissions reductions that would bridge the gap during the period – which prior guidance generally assumed to be 1 year – that a state would be developing a new SIP submission to address the underlying deficiencies that resulted in the failure to meet RFP or

[78] 57 FR 13498 at 13544/1 ("immediately"); 81 FR 58.066 ("quickly"); 40 CFR 51.1014.

the failure to attain. Following this logic, it was reasonable to conclude that emissions reductions from CMs should generally occur within a year of the triggering event. EPA continues to believe that 1 year is generally the appropriate timeframe for CMs to achieve reductions because of the intended purpose of CMs to provide emissions reductions to bridge the gap between the failure and the subsequent corrective action.

Section 4 of this guidance discusses infeasibility justifications that could be used where an air agency is unable to identify and adopt sufficient CMs to provide OYW of progress due to a lack of feasible measures. However, it is also possible that an air agency lacking sufficient feasible CMs that it could implement to provide emissions reductions within 1year could, upon accounting for reductions in the second year, come closer to reaching – or potentially fully reach – OYW of progress. EPA believes in this case that, rather than exclude measures that are feasible as CMs because they would not result in sufficient emissions reductions in the first year after triggering, it is preferable for air agencies to consider and include these as CMs in their SIP submissions. We think that CMs that result in new emissions reductions during the second year following triggering will still serve the important purpose of CMs to continue progress towards attainment, as the state develops and submits, and EPA acts on, a SIP submission to address the underlying deficiency.

EPA acknowledges that this approach would result in the OYW of progress reductions being spread out over the (up to) 2-year period following the triggering event. In light of the fact that the statute specifies neither the amount of emissions reductions that CMs should achieve, nor the timing for achieving the CM emissions reductions, EPA considers it is reasonable to provide for this option, especially where there are insufficient measures available to achieve sufficient emissions reductions over a 1-year period. If an air agency elects to adopt as CMs measures that will require more than one year from the triggering event to provide the full amount of necessary reductions, then it should provide an adequate explanation of why the reductions could not be achieved within the first year and how much additional time is needed (up to one additional year). Reductions should be achieved as soon as possible. This new approach remains consistent with EPA's original approach because the benefits of reductions in the second year would result in improvements to air quality during the time that the state and EPA are taking the next steps in response to the failure that triggered the CM, such as the state developing and EPA acting on a new SIP submission (e.g., the SIP submission that would be required upon reclassification, or in response to a PM milestone failure under 189(c)(3)). With the benefit of up to an additional year to achieve reductions, air agencies may also be able to avoid the need for an infeasibility justification by instead developing and adopting CMs that will provide the OYW of progress recommended amount of emissions reductions.

Where partial implementation of a measure is feasible in year 1 following triggering of a CM, but further implementation is feasible in year 2 (e.g., a phased-in control measure), the same reasoning applies. EPA believes that it could be appropriate for the reductions in both years to count toward the OYW of progress showing, but the state should adequately explain and document the basis for the inability to fully realize the reductions of the measure in year 1. On the other hand, where the phased measure extends to periods beyond year 2, EPA does not believe it would be appropriate to continue to credit new reductions beyond year 2 to the initial

OYW of progress showing, because by that time, the next steps should be well underway. For example, within 2 years of a CM triggering event, the state generally would have been required to develop and submit a SIP submission containing new control measures necessary to achieve attainment or address RFP. Where an air agency wishes to adopt into a SIP the phased implementation of a CM that continues to achieve additional reductions beyond the second year following triggering, EPA would likely be able to approve that portion of the measure as a SIP strengthening measure, but we would not consider new reductions beyond 2 years to count toward OYW of progress for the CM requirement.