Proposal

Delaware State Implementation Plan Revision
Serious Classification Requirements for
New Castle County for
The 2015 8-Hour Ozone National Ambient Air Quality Standard

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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 "nonattainment" under the 2015 8-hour ozone National Ambient Air Quality Standard (NAAQS) of 0.070 parts per million.[1] Among those nonattainment areas is the Philadelphia-Wilmington-Atlantic City (PA-NJ-MD-DE) Non-Attainment Area (NAA), hereafter referred to as the "Philadelphia NAA". This NAA includes New Castle County in Delaware (DE), five counties in eastern Pennsylvania, one county in Maryland and nine counties in southern New Jersey.

Originally classified as a marginal nonattainment area, the Philadelphia NAA did not meet the standard by the deadline of August 3, 2021 and was reclassified (i.e., "bumped-up") to moderate on October 7, 2022. Again, under the moderate nonattainment classification, Philadelphia NAA did not meet the standard by the deadline of August 3, 2024. As a result, Delaware's New Castle County along with the other states in the NAA requested a voluntary reclassification to serious nonattainment.

On July 30, 2024, EPA released the final rule (89 Federal Register [FR] 61025), which reclassified the nonattainment area as serious for the 2015 8-hour ozone NAAQS, with a new attainment date of August 3, 2027.[2] While the serious attainment date is August 3, 2027, the NAA 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 2026 ozone season.

On August 15, 2025, Delaware formally requested, under Section 107(d)(3)(D) of the Clean Air Act, that the EPA revise the boundaries of the Philadelphia NAA for the 2008 and 2015 ozone NAAQS. Delaware requested the creation of a stand-alone NAA for New Castle County, Delaware, removing Delaware from the existing Philadelphia NAA. On June 4, 2026, EPA issued a final rule[3] creating a standalone New Castle

[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.
[2] Designations of Areas for Air Quality Planning Purposes; Pennsylvania, New Jersey, Maryland, Delaware; Philadelphia-Wilmington-Atlantic City 2015 8-hour Ozone Nonattainment Area, Reclassification to Serious. EPA Final Rule. 89 FR 61025. July 30, 2024. https://www.govinfo.gov/content/pkg/FR-2024-07-30/pdf/2024-16568.pdf.
[3] Revisions of the Nonattainment Designation for the 2008 and 2015 Ozone Standards and Clean Data Determinations for the 2008 and 2015 Ozone Standards: Cecil County, MD and New Castle County, DE. EPA Final Rule. 91 FR 33610. June 4, 2026. https://www.govinfo.gov/content/pkg/FR-2026-06-04/pdf/2026-11169.pdf

County, DE NAA. This document contains Delaware's State Implementation Plan (SIP) revision for meeting the non-attainment plan requirements associated with the 2015 8-hour ozone NAAQS for the New Castle County, DE NAA.

The major components of this SIP revision include:

- Delaware's updated 2017 Base Year Inventory
- Previously approved Control Measures, Clean Fuels Vehicle Program, and Alternative Control Measures
- Reasonable Available Control Technology (RACT)
- Transportation Conformity Requirements
- Ozone Air Quality Status and Trends Analysis
- Performance Standard Modeling and Certification of the Enhanced Inspection and Maintenance Program

A more detailed description of Delaware's 2015 ozone NAAQS history can be found in the table below:

Action	Attainment Status	Effective/ Submittal Date	Attainment Deadline
EPA implements the 2015 ozone NAAQS	NA	12/28/15[4]	NA
Delaware submits designation recommendation to EPA	NA	9/23/16[5]	NA
EPA responds to Delaware's recommendation	NA	12/20/17[6]	NA
Philadelphia NAA area designated as marginal	Marginal	8/3/18[7]	8/3/21

[4] 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.
[5] Ozone Designations - 2015 Standards - Delaware State Recommendations and EPA Response. Accessed May 1, 2025. https://www.epa.gov/sites/default/files/2016-11/documents/de-rec.pdf.
[6] Ozone Designations - 2015 Standards - Delaware State Recommendations and EPA Response. Accessed May 1, 2025. https://www.epa.gov/sites/default/files/2017-12/documents/de-epa-response-ozone.pdf.
[7]Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards. EPA Final Rule. 83 FR 255776. June 4, 2018. https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf .

Action	Attainment Status	Effective/ Submittal Date	Attainment Deadline
Philadelphia NAA redesignated as moderate	Moderate	11/7/22[8]	8/3/24
Delaware submits attainment SIP	Moderate	9/28/23	8/3/24
Delaware submits a request for a voluntary reclassification to serious	Moderate	7/18/24	8/3/24
Philadelphia NAA redesignated as serious	Serious	7/30/24[9]	8/3/27
107(d)(3)(D) CAA Ozone Separation	Serious	7/6/26[10]	NA

[8] 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.

[9] Designations of Areas for Air Quality Planning Purposes; Pennsylvania, New Jersey, Maryland, Delaware; Philadelphia-Wilmington-Atlantic City 2015 8-hour Ozone Nonattainment Area, Reclassification to Serious. EPA Final Rule. 89 FR 61025. July 30, 2024. https://www.govinfo.gov/content/pkg/FR-2024-07-30/pdf/2024-16570.pdf.

[10] Revisions of the Nonattainment Designation for the 2008 and 2015 Ozone Standards and Clean Data Determinations for the 2008 and 2015 Ozone Standards: Cecil County, MD and New Castle County, DE. EPA Final Rule. 91 FR 33610. June 4, 2026. https://www.govinfo.gov/content/pkg/FR-2026-06-04/pdf/2026-11169.pdf.

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List of Acronyms

ACT	Alternative Control Techniques
AIM	Architectural and Industrial Maintenance
AVFT	Alternative Vehicle Fuels and Technologies
AQS	Air Quality System
BYI	Base Year Inventory
C&CP	Consumer and Commercial Products
CAA	Clean Air Act
CARB	California Air Resources Board
CDD	Clean Data Determination
CDP	Clean Data Policy
CFR	Code of Federal Regulations
CMV	Commercial Marine Vessel
CO	Carbon Monoxide
CP	Consumer Products
CRCA100	Coordinating Research Council Project A-100
CTG	Control Technology Guidance
DE	Delaware
DEC	Delaware Electric Cooperative
DelDOT	Delaware Department of Transportation
DEMEC	Delaware Municipal Electric Corporation
DESEU	Delaware Sustainable Energy Utility
DMV	Division of Motor Vehicles
DNREC	Delaware Department of Natural Resources and Environmental Control
D-PACE	Delaware Voluntary Property Assessed Clean Energy
DTC	Delaware Transit Corporation
EGU	Electric Generating Unit
EPA	United States Environmental Protection Agency
ERTAC	Eastern Regional Technical Advisory
FR	Federal Register
GDFs	Gasoline Dispensing Facilities
HAP	Hazardous Air Pollutant
HPMS	Highway Performance Monitoring System
I/M	Inspection and Maintenance Program
LEV	Low Emission Vehicle
LTO	Landings and Take-offs
MAR	Marine, Aircraft, and Rail

MD	Maryland
MLK	Martin Luther King
MOVES	Motor Onroad Vehicle Emissions Simulator
MVEB	Motor Vehicle Emissions Budget
NAA	Non-Attainment Area
NAAQS	National Ambient Air Quality Standard
NEI	National Emission Inventory
NJ	New Jersey
NNSR	Non-attainment New Source Review
NOAA	National Oceanic and Atmospheric Administration
NOx	Oxides of Nitrogen
O_3	Ozone
OBD	On-Board Diagnostic
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
PA	Pennsylvania
PFC	Portable Fuel Containers
PFI	Plan for Implementation
POTW	Publicly Owned Treatment Works
ppm	parts per million
PSM	Performance Standard Modeling
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
RTP	Regional Long-range Transportation Plan
SIP	State Implementation Plan
SSWD	Summer Season Weekday
TIP	Transportation Improvement Program
tpd	Tons per Day
tpy	Tons per Year
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

1.0 Introduction and Background

This document contains Delaware's State Implementation Plan (SIP) revision for meeting the serious nonattainment requirements for Delaware's (DE) New Castle County for the 2015 8-hour ozone (O_3) National Ambient Air Quality Standards (NAAQS). 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 the Clean Air Act (CAA) Sections 172[11] and 182.[12] On June 4, 2026, the Environmental Protection Agency (EPA) issued a final rule[13] issuing a Clean Data Determination (CDD) for the new standalone New Castle County, DE Non-Attainment Area (NAA). As a result of EPA's CDD for the area, not all sections of 182 are required in this SIP revision.

1.1 Background and Requirements

1.1.1 Clean Air Act

The CAA was designed to control air pollution in the United States and is administered by the Environmental Protection Agency (EPA); 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, which

[11] Plan requirements for nonattainment areas. Clean Air Act, Section 172. https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart1-sec7502.htm.
[12] Ozone plan submissions and requirements. Clean Air Act, Section 182. https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm.
[13] Revisions of the Nonattainment Designation for the 2008 and 2015 Ozone Standards and Clean Data Determinations for the 2008 and 2015 Ozone Standards: Cecil County, MD and New Castle County, DE. EPA Final Rule. 91 FR 33610. June 4, 2026. https://www.govinfo.gov/content/pkg/FR-2026-06-04/pdf/2026-11169.pdf

must be met nationally.[14] 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.[15]

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.[16] 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 (NOx) and volatile organic compounds (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.

1.1.2 Ozone Transport Region and Ozone Transport Commission

Congress established the authority to create interstate transport regions in the federal CAA to address air pollution in downwind states that is caused by activities in upwind states. Section 184 of the CAA established the Ozone Transport Region (OTR). The OTR is 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). In order to reduce ozone concentrations in the ambient air, the CAA requires all states in the OTR to implement relevant

[14] 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

[15] 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.

[16] Where this occurs: Air. (2025, April 23). United State Environmental Protection Agency. https://www.epa.gov/nutrientpollution/where-occurs-air#:~:text=Ground%2Dlevel%20ozone%20is%20the,harmful%20amounts%20in%20the%20air.

control measures on VOCs and NOx emission sources to achieve emission reductions.

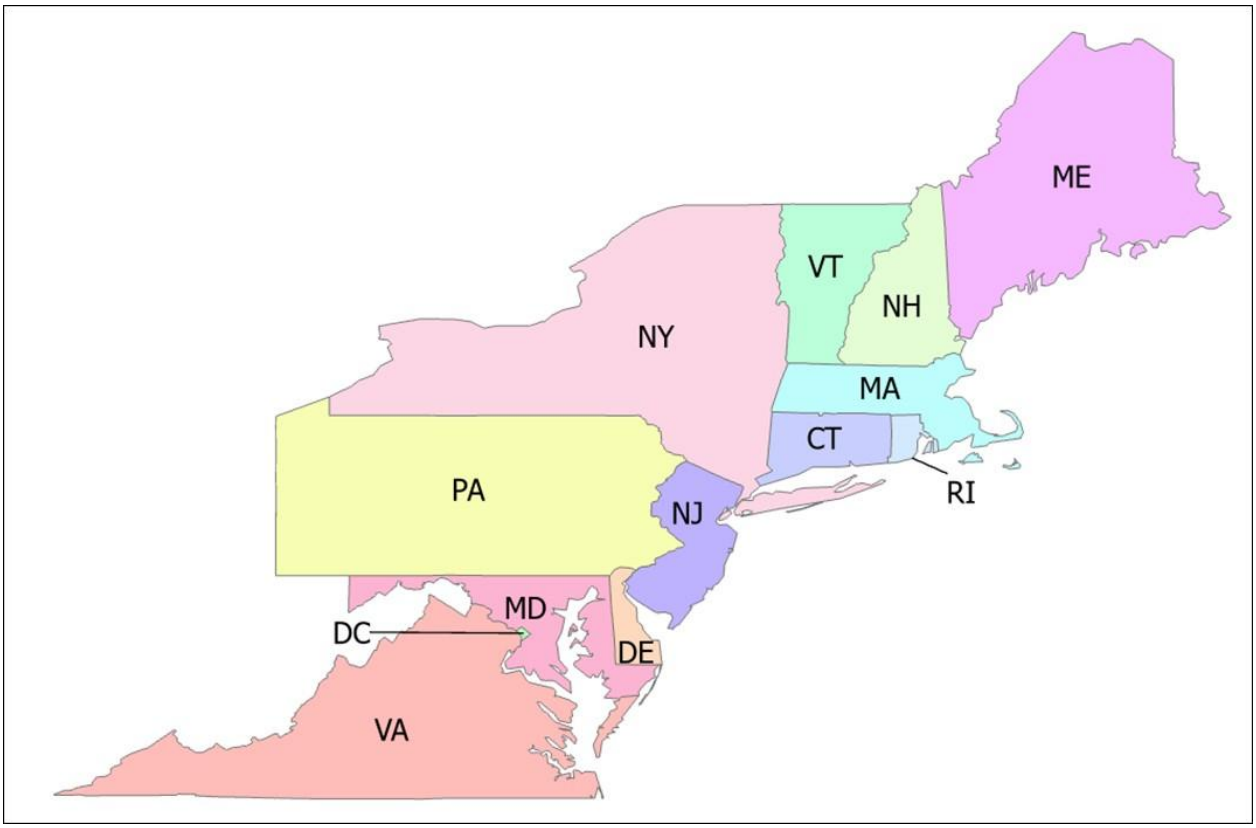

Figure 1: Member States of the Ozone Transport Region

The Ozone Transport Commission (OTC) is a multi-state organization created under the authority of 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.

1.1.3 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[17] attained the standard by

[15] 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.

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 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 the monitoring requirements of 40 CFR 58 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 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 parts per million (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 CFR 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 (or a portion thereof) 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. In some cases, EPA is not able to determine an area's status after evaluating the available information and those areas are designated "unclassifiable." A designated NAA can include portions of two or more states rather than falling entirely within a single state. 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.

1.1.4 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.[18] 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 4th highest daily maximum 8-hour average ozone concentration may not exceed 0.070 ppm.

Prior to EPA making the attainment or nonattainment 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 nonattainment and Delaware believes it is necessary to establish nonattainment boundaries that encompass enough of these emissions to make attainment feasible and possible*

[18] 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.

> *goal for the area. To this end Delaware hereby recommends that the nonattainment 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 nonattainment area that is consistent with science to solve the problem, Delaware requests EPA establish New Castle County as a stand-alone nonattainment area under the 2015 8-hour ozone NAAQS."*

The EPA rejected Delaware's recommendation to either establish a larger nonattainment area or establish New Castle County as a stand-alone NAA. On June 4, 2018 EPA designated New Castle County as nonattainment for ozone[19] 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 2.

[19] Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards. EPA Final Rule. 83 FR 255776. June 4, 2018. https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf.

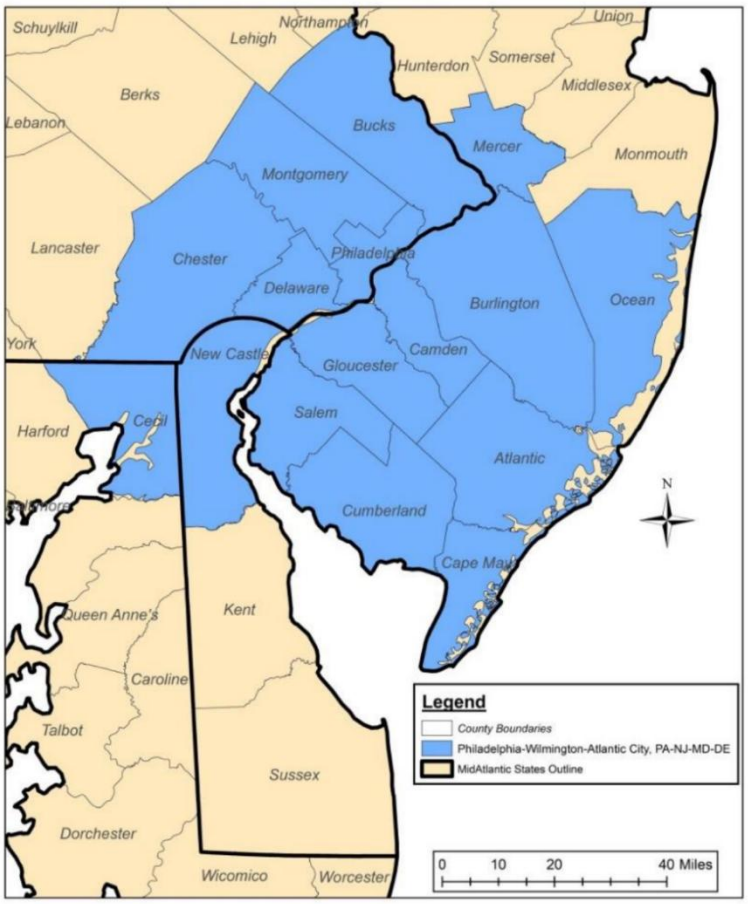

Figure 2: Previous Philadelphia NAA

1.1.5 Non-Attainment Area for the 8-Hour Ozone NAAQS

In a final rule dated June 4, 2018,[20] the EPA designated 51 areas in the country as nonattainment for the 2015 8-hour ozone NAAQS. In the same final rule, Kent and Sussex Counties, in Delaware were designated as attainment. The EPA made the designations of all three Delaware counties based on their 2014-2016 design values,[21] 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

[20] 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.
[21] 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).

classified as marginal nonattainment 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).

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 the 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.

On October 7, 2022,[22] 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 nonattainment 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 be reclassified by operation of law to ‘‘moderate’’ nonattainment 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. Effective November 7, 2022, Delaware was required to submit a revised SIP for moderate nonattainment, with a new attainment date of August 3, 2024.

[22] 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.

On May 6, 2024, Delaware submitted an exceptional event demonstration, in order to meet the requirements for a 1-year extension of the moderate attainment date. This request was to remove monitoring data impacted by Canadian wildfires on June 1, 2023. Subsequently, the request for the extension became moot, as the preliminary 2024 design values for the Philadelphia-Wilmington-Atlantic City nonattainment area did not attain the standard. With impending moderate attainment deadline of August 3, 2024 approaching; on July 18, 2024, Delaware voluntarily requested EPA reclassify or "bump up" the attainment status from moderate to serious nonattainment. Therefore, as the event no longer had regulatory significance, EPA officially deferred Delaware's exceptional events request on August 14, 2024.

On July 30, 2024, EPA released the final rule (89 Federal Register [FR] 61025), which reclassified the nonattainment area as serious for the 2015 8-hour ozone NAAQS, with a new attainment date of August 3, 2027.[23] The NAA was required to demonstrate attainment by the end of the last full ozone season prior to the designated date, which was the end of the 2026 ozone season.

Delaware's designation to serious nonattainment was the result of air quality monitors in the Philadelphia-Wilmington-Atlantic City recording ozone design value data for 2021-2023 above the 2015 ozone NAAQS. One monitor in Pennsylvania, recorded design values for the 3-year period 2021-2023 that was greater than the standard, the Bristol monitor in Buck County (Table 1). Thereby, EPA determined that the NAA failed to meet the standard and redesignated it from moderate nonattainment to serious nonattainment.

[23] Designations of Areas for Air Quality Planning Purposes; Pennsylvania, New Jersey, Maryland, Delaware; Philadelphia-Wilmington-Atlantic City 2015 8-hour Ozone Nonattainment Area, Reclassification to Serious. EPA Final Rule. 89 FR 61025. July 30, 2024. https://www.govinfo.gov/content/pkg/FR-2024-07-30/pdf/2024-16568.pdf.

Table 1: Philadelphia-Wilmington-Atlantic City NAA 2021-2023 Design Values - Serious Reclassification

State Name	County Name	Local Site Name	Valid 2021-2023 Design Value (ppm) [1,2]	2021 4th Highest Daily Max. Value (ppm)	2022 4th Highest Daily Max. Value (ppm)	2023 4th Highest Daily Max. Value (ppm)
Delaware	New Castle	Lums Pond	0.066	0.063	0.064	0.072
Delaware	New Castle	Brandywine Creek State Park	0.066	0.065	0.064	0.070
Delaware	New Castle	Bellefonte II	0.066	0.064	0.065	0.069
Delaware	New Castle	MLK	0.066	0.066	0.065	0.069
Maryland	Cecil	Fair Hill	0.067	0.070	0.063	0.070
New Jersey	Atlantic	Brigantine	0.059	0.059	0.060	0.058
New Jersey	Camden	Camden Spruce Street	0.067	0.068	0.062	0.071
New Jersey	Camden	Ancora State Hospital	0.063	0.062	0.062	0.067
New Jersey	Cumberland	Milleville	0.065	0.068	0.061	0.068
New Jersey	Gloucester	Clarksboro	0.070	0.067	0.069	0.074
New Jersey	Mercer	Rider University	0.069	0.071	0.068	0.070
New Jersey	Mercer	Washington Crossing	0.067	0.067	0.065	0.071

State Name	County Name	Local Site Name	Valid 2021-2023 Design Value (ppm) [1,2]	2021 4th Highest Daily Max. Value (ppm)	2022 4th Highest Daily Max. Value (ppm)	2023 4th Highest Daily Max. Value (ppm)
New Jersey	Ocean	Colliers Mills	0.070	0.068	0.069	0.073
Pennsylvania	Bucks	Bristol	0.073	0.077	0.070	0.073
Pennsylvania	Chester	Chester County Transport	0.069	0.067	0.066	0.074
Pennsylvania	Delaware	New Garden	0.063	0.062	0.058	0.070
Pennsylvania	Montgomery	Norristown	0.069	0.071	0.066	0.066
Pennsylvania	Philadelphia	Air Management Services Laboratory	0.064	0.068	0.061	0.064
Pennsylvania	Philadelphia	North East Airport (NEA)	0.070	0.072	0.068	0.072
Pennsylvania	Philadelphia	North East Waste (New)	0.070	0.073	0.066	0.071

Notes:
1. The level of the 2015 8-hour ozone NAAQS is 0.070 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 AQS as of July 25, 2025.
3. These values do not address any data excluded for possible granted Exceptional Events.

1.1.6 Boundary Revision to Philadelphia NAA

On August 15, 2025, Delaware formally requested, under Section 107(d)(3)(D) of the Clean Air Act, that the EPA revise the boundaries of the Philadelphia NAA for the 2008 and 2015 Ozone NAAQS. Delaware requested the creation of a stand-alone NAA for New Castle County, Delaware, removing Delaware from the existing Philadelphia NAA (Figure 2). At this time Maryland also submitted a similar request for Cecil County.

On June 4, 2026, EPA issued a final rule[24] to split the current Philadelphia NAA into three separate nonattainment areas; that together cover the same geographic area as the previous Philadelphia NAA, as shown in Figure 3. The revised nonattainment boundary for Delaware encompasses all of New Castle County, DE; which includes the Lum's Pond, Martin Luther King (MLK), Brandywine Creek State Park, and Bellefonte II monitors.

[24] Revisions of the Nonattainment Designation for the 2008 and 2015 Ozone Standards and Clean Data Determinations for the 2008 and 2015 Ozone Standards: Cecil County, MD and New Castle County, DE. EPA Final Rule. 91 FR 33610. June 4, 2026. https://www.govinfo.gov/content/pkg/FR-2026-06-04/pdf/2026-11169.pdf.

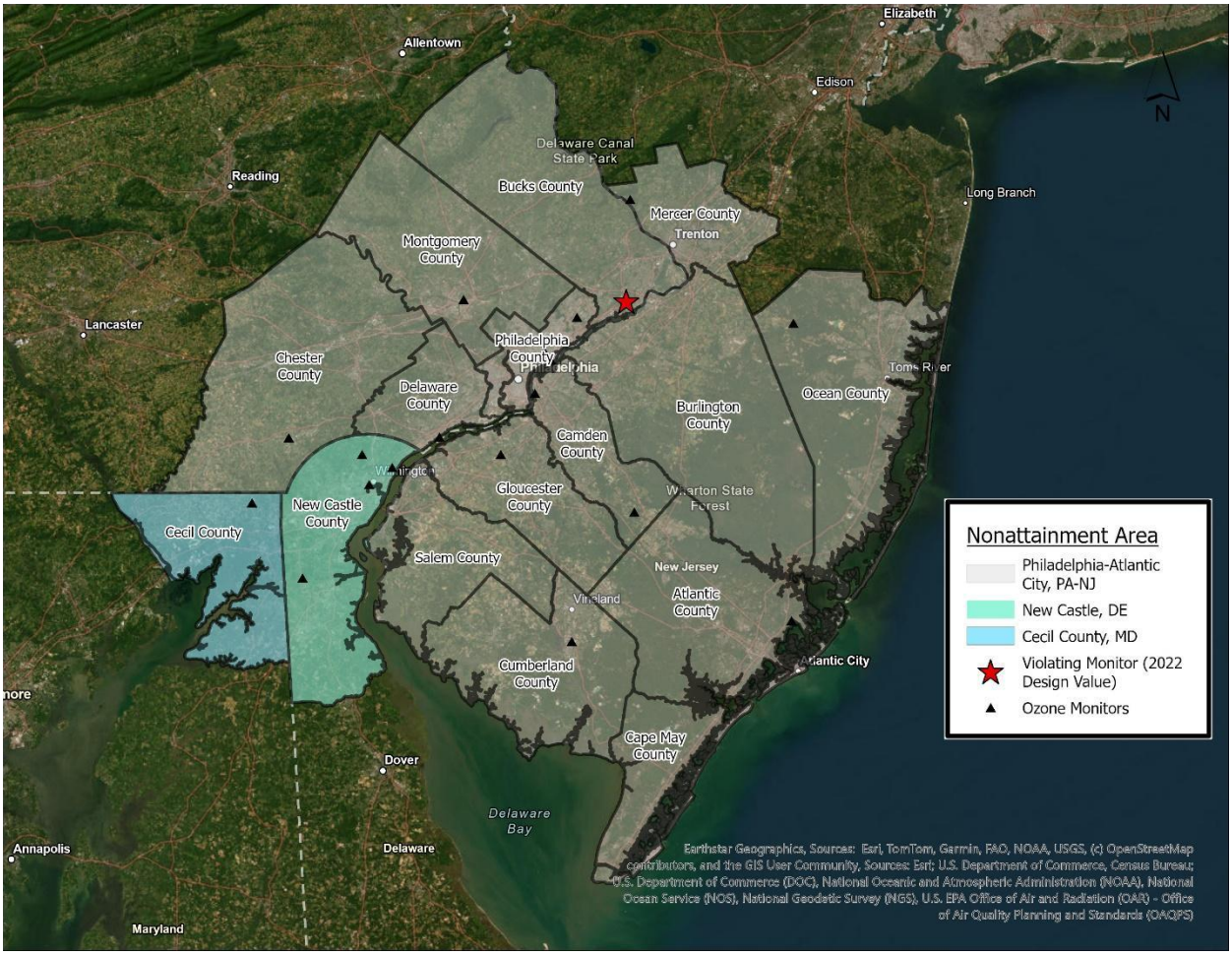

Figure 3: New Nonattainment Boundaries for the Cecil County, MD; New Castle County, DE; and Philadelphia-Atlantic City, PA-NJ Nonattainment Areas

1.1.7 Clean Data Determination for New Castle County

In addition, in its June 4, 2026 final action, EPA issued two CDDs for the new standalone New Castle County NAA, for the 2008 and 2015 ozone NAAQS; pursuant to regulations 40 CFR 51.1118 and 51.1318.

In designated NAAs where monitored data demonstrate that the NAAQS have been achieved, EPA interprets certain requirements of the CAA as no

longer applicable for so long as air quality continues to meet the standard. This interpretation of the CAA is known as the Clean Data Policy (CDP).[25]

Under the CDP, EPA may issue a determination of attainment (known informally as a Clean Data Determination) after notice and comment rulemaking determining that a specific area is attaining the relevant standard. A CDD is based on three complete, consecutive calendar years of quality assured air quality data for all monitoring sites in the NAA.

For such areas, the requirement to submit to EPA those SIP elements related to attaining the NAAQS is suspended for so long as the area continues to attain the standard.

The planning elements that are suspended include:

- Reasonable Further Progress (RFP) requirements;
- Attainment demonstrations;
- Reasonably Available Control Measures; and
- Contingency measures.

1.1.8 Serious SIP Submittal

Even though New Castle County received CDDs, in accordance with EPA's January 17, 2025 Final Rule,[26] the original redesignation to serious non-attainment still requires Delaware to submit a revision of the SIP. This document contains Delaware's SIP revision for meeting the serious classification requirements for the New Castle County, DE NAA associated with the 2015 8-hour ozone NAAQS. Specifically, this SIP revision includes the following:

- Delaware's updated 2017 Base Year Inventory which provides a comprehensive and detailed estimate of annual total air emissions;

[25] U.S Environmental Protection Agency. (1995, May 10). Reasonable further progress, attainment demonstration, and related requirements for ozone nonattainment areas meeting the national ambient air quality standard: Clean data policy memorandum. U.S. Environmental Protection Agency. https://www.epa.gov/sites/default/files/2016-03/documents/clean_data_policy_signed_05101995.pdf

[26] State Implementation Plan Submittal Deadlines and Implementation Requirements for Reclassification Requirements for Reclassified Nonattainment Areas Under the Ozone National Ambient Air Quality Standards. EPA Final Rule. 90 FR 5651. January 17, 2025. https://www.govinfo.gov/content/pkg/FR-2025-01-17/pdf/2025-00336.pdf

- Previously approved Control Measures, including Clean Fuels Vehicle Program, and Alternative Control Measures;
- Reasonable available control technology for facilities that are technologically feasible and economically viable;
- Delaware's previously approved 2009 mobile source budgets for transportation conformity determination; and
- Ozone Air Quality Status and Trends Analysis.

A detailed list of the elements that are required to be included in the plan for serious classification requirements are outlined in Table 2.

Table 2: Ozone Implementation Plan SIP Revision Elements – 40 CFR 51.1308 – 51.1316 and CAA 182(c)

Source:	Required Element:	Location in SIP:
51.1308(d)	*Implementation of control measures. For each nonattainment area for which an attainment demonstration is required…the state must provide for implementation of all control measures needed for attainment as expeditiously as practicable…*	Section 3 – Control Measures and Emission Reductions for Attainment
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 4 – Reasonably Available Control Technology (RACT)
51.1314	*…the state shall submit a nonattainment New Source Review plan or plan revision for a specific ozone NAAQS…*	Section 6 – Other SIP Requirements
51.1315(a)	*…the state shall submit a base year inventory 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*	Section 2 – Delaware 2017 Base Year Emission Inventory

Source:	Required Element:	Location in SIP:
51.1315(b)	*…the state shall submit a periodic emissions inventory of emissions sources in the area…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 2 – Delaware 2017 Base Year Emission Inventory
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 4 – Reasonably Available Control Technology (RACT)
182(c)(1)	*Enhanced monitoring…the State shall commence such actions as may be necessary to adopt and implement a program based on such rules, to improve monitoring for ambient concentrations of ozone, oxides of nitrogen and volatile organic compounds and to improve monitoring of emissions of oxides of nitrogen and volatile organic compounds.*	Section 7 – Ozone Air Quality Status and Trends Analysis
182(c)(3)	*Enhanced vehicle inspection and maintenance program* *(A) Requirement for submission....the State shall submit a revision to the applicable implementation plan to provide for an enhanced program to reduce hydrocarbon emissions and NOx emissions from in-use motor vehicles registered in each urbanized area (in the nonattainment area)...*	Section 3 – Control Measures and Emission Reductions for Attainment

Source:	Required Element:	Location in SIP:
182(c)(4)	*Clean-fuel vehicle programs. (A)…the State shall submit…a revision to the applicable implementation plan…to include such measures as may be necessary to ensure the effectiveness of the applicable provisions of the clean-fuel vehicle program…*	Section 3 – Control Measures and Emission Reductions for Attainment

2.0 Delaware 2017 Base Year Emissions Inventory

40 CFR 51.1315(a) and 51.1315(b) require a base year inventory (BYI) to ss \be submitted for the 2015 8-hour ozone NAAQS SIP. While Delaware already has an approved BYI (originally submitted to EPA on November 6, 2020) for the 2015 8-hour ozone NAAQS SIP, this section contains a revision of Delaware's 2017 base year inventory.

Delaware used the 2017 National Emission Inventory (NEI) as the basis for their 2017 base year emission inventory as it includes emission estimates from all sources within a state or local area for all criteria pollutants and their precursors. The NEI is made up of emissions estimates submitted by state, local, and tribal air agencies supplemented with EPA's specific estimates. The EPA compiles and releases the NEI on a triennial basis. The two most recent NEI years are 2017 and 2020. As such, the revision to the originally submitted base year inventory includes methodology updates from the most recent NEIs.

2.1 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 carbon monoxide (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, which can be referenced in Appendix A.

This SIP revision updates the revised 2017 base year inventory submitted to the EPA on March 4, 2024 for the moderate nonattainment plan. The updates include emission estimates using the most recent and EPA mandated model for the Onroad and Nonroad sector (see Sections 2.3.3 and 2.3.4). Additional updates are to the Nonpoint sector (see section 2.3.2).

Delaware's emission inventories are broken down into four major sectors:

- Point sources represent large sources of emissions located at a discrete geographic point. Examples include power plants, factories, industries, and large institutional facilities. Point sources typically hold a federal/state/tribal/local air permit and report their emissions to the state/tribal/local air agency and/or EPA directly.
- Nonpoint sources (also called area sources) are those that are too widespread or numerous to be accounted for individually. There are many Nonpoint subcategories, but a handful of examples include residential fuel combustion, consumer solvent use, commercial cooking, animal husbandry, and agricultural tilling.
- Nonroad sources are equipment and vehicles that do not primarily travel on roadways. Examples include construction equipment, recreational vehicles, and lawn & garden equipment.
- Onroad sources are vehicles that primarily travel on roadways such as cars, trucks, buses, and motorcycles.

2.2 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 nonattainment). This inventory is referred to as the base year inventory. A base year inventory acts as a reference point for comparing current or future emission reductions to determine the effectiveness of control measures. Base year inventories are comprised of data from Point sources, Area sources, Onroad, Nonroad, and sometimes Biogenetic sources.

Delaware has previously been designated nonattainment 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[27] – 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 for attainment plans with the latest emission estimates as needed. This SIP revision updates the Onroad and Nonroad emissions to include emission estimates using the latest available EPA Motor Vehicle Emissions Simulator (MOVES), version 5 (MOVES5). The EPA mandated use of MOVES5 for SIPs and Transportation Conformity in their December 11, 2024 Notice of Availability.[28]

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*

[27] 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.
[28] Official Release of the MOVES5 Motor Vehicle Emissions Model for SIPs and Transportation Conformity. EPA Notice of Availability. 89 FR 99862. December 11, 2024. https://www.govinfo.gov/content/pkg/FR-2024-12-11/pdf/2024-29073.pdf.

Haze Regulations[29] (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".

2.3 Delaware Adjusted 2017 Base Year Emission Inventory Summary

The Adjusted 2017 Base Year Inventory for New Castle County is summarized in Table 3 by source sector emissions, which include Point, Nonpoint, Nonroad, and Onroad. Each sector will be described in detail in the following subsections. Throughout Section 2.0 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.

Table 3: 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	3,088	1,435	3,312	3.77	2.45	9.52
Nonroad	23,844	3,152	2,259	92.89	9.27	7.68
Onroad	26,406	5,251	1,755	83.36	16.43	5.53
All Sectors	**55,105**	**12,342**	**8,074**	**190.45**	**42.69**	**25.85**

2.3.1 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.

[29] 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.

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.

2.3.2 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 4. 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 4: 2017 Demographic Data for New Castle County

Demographic Parameter	New Castle County
Population[30]	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 5 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).

[30] 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 5: 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

2.3.2.1 Nonpoint Sources Emission Revisions

Delaware evaluated the Nonpoint emissions from the Original 2017 Base Year Inventory and identified revisions needed to align with EPA's more recent inventory methodologies from the 2020 NEI. 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 base year 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*, (Appendix B, tab “Nonpoint Categories”).

In addition to small corrections, Delaware included several categories that were inadvertently omitted from the Original 2017 Base Year Emissions Inventory to be consistent with the categories provided in EPA’s 2017 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”). These omitted categories include animal cremation, animal husbandry, human cremation, Publicly Owned Treatment Works, and residential grilling.

To further align with EPA’s recent methodologies, Delaware added Nonpoint categories that were new to the 2020 NEI to the Adjusted 2017 Nonpoint Inventory. The categories include Lighter Fluid (from the Consumer & Commercial Products category), Hot Mix Asphalt (from the Asphalt category), and Compost. Delaware used the EPA’s modeling platform data and growth rates to calculate these emissions for 2017. The calculation details are included in the *Adjusted 2017 Nonpoint Inventory* (Appendix B, tab “Calculations”).

Two additional revisions were made to Residential Wood Combustion and Graphic Arts to account for a new methodology that was implemented in the 2020 NEI. These revisions are also included in the Adjusted 2017 Nonpoint Inventory (Appendix B tab, “Calculations”).

Table 6 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 6: 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
Compost[1]	-	-	-	-	-	180
Graphic Arts	-	-	257	-	-	128
Hot Mix Asphalt[1]	-	-	-	-	-	159
Human Cremation[1]	-	-	-	<1	<1	<1
Lighter Fluid (C&CP[2]) [1]	-	-	-	-	-	12
POTWs[1,3]	-	-	-	-	-	12
Residential Grilling[1]	-	-	-	150	3	8
Residential Wood Fuel	2,385	40	353	1795	30	271
Retail Gasoline Stations	-	-	402	-	-	240
Total	**2,385**	**40**	**1,561**	**1,945**	**33**	**1,487**

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

Table 7 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: Original vs Adjusted 2017 Base Year Inventory Nonpoint SSWD Category Totals

Source Categories	Original 2017 Base Year Inventory			Adjusted 2017 Base Year Inventory		
	SSWD Emissions (tpd)			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]	-	-	-	-	-	0.1
Commercial Fuel	0.43	0.73	0.04	0.43	0.52	0.03
Compost[1]	-	-	-	-	-	0.52
Graphic Arts	-	-	0.99	-	-	0.5
Hot Mix Asphalt[1]	-	-	-	-	-	0.47
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	0.1	0.22	0.01
Residential Wood Fuel	5.15	0.09	0.76	1.46	0.02	0.19
Retail Gasoline Stations	-	-	3.38	-	-	0.78
Total	**5.7**	**1.1**	**5.84**	**2.65**	**0.77**	**3.25**

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 8. The Adjusted 2017 Base Year Inventory shows reductions in emissions compared to the Original 2017 Base Year Inventory. These reductions are

a result of correcting errors, adding previously omitted categories, adding categories that are new to the 2020 NEI, and updating methodologies.

Table 8: 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	3,088	1,435	3,312	3.77	2.45	9.52

2.3.3 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 (i.e., for fuel data). 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 original Onroad methodology see Delaware's *2017 Base Year Emissions Inventory* (Appendix A). The revised Onroad emissions and methodology is discussed below in Section 2.3.3.1.

2.3.3.1 Onroad Sources Emission Revisions

This SIP revision updates the Onroad emissions to include emission estimates using the latest available EPA MOVES model, MOVES5, as mandated by EPA for SIPs and Transportation Conformity in their December 11, 2024 Notice of Availability.[31] The MOVES 2014b input database was converted to MOVES3 in the previous SIP revision submitted to EPA on March 4, 2024. The MOVES3 input database was then converted to MOVES5 formatting using the MOVES3 to MOVES5 conversion tool and guidance. [32]

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 9 lists the updated inputs and assumptions for MOVES5 used to calculate the mobile emissions for the Adjusted 2017 Base Year Inventory.

Table 9: Onroad Adjusted 2017 Base Year Inputs and Assumptions

Data Item	2017 Newcastle County Inputs and Assumptions
MOVES RunSpec	
Emission Model	MOVES5.0.0(default database: MOVESDB20241112)
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, Diesel, Electricity, Ethanol (E-85), Gasoline
MOVES Inputs	
SourceTypeYearVMT	Use 2017 Highway Performance Monitoring System (HPMS) data from Delaware Department of Transportation (DeLDOT). Used the distribution as was

[31] Official Release of the MOVES5 Motor Vehicle Emissions Model for SIPs and Transportation Conformity. EPA Notice of Availability. 89 FR 99862. December 11, 2024. https://www.govinfo.gov/content/pkg/FR-2024-12-11/pdf/2024-29073.pdf.
[32] MOVES5 Database Conversion Tool Help. EPA. Revised November 18, 2024. Retrieved March 2025 from Tools menu in MOVES5.0.0 Interface.

Data Item	2017 Newcastle County Inputs and Assumptions
	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 & Coordinating Research Council Project A-100 (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 New Castle County plan prior to the statewide plan that was effective in January 2023
Road Type Distribution	Used the analysis of the 2017 DelDOT tables: https://deldot.gov/Publications/reports/hpms/index.shtml As well as yielding VMT, this data also yields road type distributions
SourceTypeYear (Population)	Used Vehicle Population data (R45CAM07) for 2017
Vehicle Age Distribution	Used analysis of 2017 R45CAM07 data
Average Speed Distribution	Used the CRCA100 data set
Fuel Supply	MOVES5.0 default tables
Fuel Formulation	MOVES5.0 default tables
Fuel Usage Fraction	MOVES5.0 default tables, Set ethanol Fraction to 0
Alternative Vehicle Fuels and Technologies (AVFT)	MOVES5.0 default tables
ZoneMonthHour	Average hourly data by month from years 2015, 2016 and 2017 meteorological datasets maintained by the National Oceanic and Atmospheric Administration (NOAA).
MOVES Inputs - Advanced	
Early National Low Emission Vehicle (NLEV) and CARB's Low Emission Vehicle standards (LEVIII)	Used MOVE5_LEV_IN table and MOVES5_early_nlev_in. Added as an advanced feature in the MOVES5 interface. This was developed per EPA guidance and when applied, replaces the EmissionRateByAge table.

The Onroad emissions from the MOVES5 model for the Adjusted 2017 Base Year Inventory are compared to the MOVES2014b emissions from the Original 2017 Base Year Inventory in Table 10. Detailed results of the MOVES run are shown in *Adjusted 2017 Onroad MOVES5 Output Results* (Appendix C).

As shown in Table 10, Onroad NOx emissions have increased, while VOC and CO emissions have decreased. Changes in Onroad emissions are a direct result of model changes. EPA continues to strive to model real world conditions, which is why MOVES5 has many changes compared to older versions. These changes include new vehicles standards, and new emissions and activity data; more detail on the updates to MOVES5 can be found in Section 2 of EPA's "Overview of EPA's MOtor Vehicle Emission Simulator (MOVES5)." [33]

Table 10: 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	MOVES5	26,406	5,251	1,755	83.36	16.43	5.53

2.3.4 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.

[33] Overview of EPA's MOtor Vehicle Emission Simulator (MOVES5). EPA. February 2025. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P101DQ9V.pdf on May 6, 2025.

- 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.

2.3.4.1 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 (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.

2.3.4.2 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).

2.3.4.2.1 Other Off-road Vehicles and Equipment Sources Emission Revisions

Similar to Onroad emissions, EPA mandated the use of MOVES5 for Nonroad emissions as it is the most state-of-the-art model. Delaware ran MOVES5 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 MOVES5 Output Results* (Appendix D).

As shown in Table 11, there are minimal differences in the MOVES5 Nonroad emissions compared to the Original 2017 Base Year Inventory Nonroad emissions. This is expected as there were no major changes to the Nonroad model from the previous model, aside from changes to fuel information, which resulted in a slight increase of VOC emissions.

Table 11: 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	MOVES5.0.0	23,112	1,110	2,104	90.89	3.68	7.25

3.0 Control Measures and Emission Reductions for Attainment

40 CFR 51.1308(d) requires that this SIP revision must include control measures needed for attainment. With the approval of the CDD on June 4, 2026, this requirement is suspended; however, this section describes the previously approved control measures that Delaware relies on to reduce pollutant emissions and maintain compliance with the NAAQS. This chapter is divided into six sections.

Section 3.1 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 RFP demonstration (2008). These regulations/control measures continue to be in existence and continue to reduce emissions in the region.

Section 3.2 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.

Section 3.3 describes in more detail, how the control measures in Section 3.2 reduced emissions after 2017. These controls were implemented or have effective dates after 2017 and are not accounted for in the 2017 base year inventory.

Section 3.4 describes Delaware's Enhanced Inspection and Maintenance (I/M) program, a mobile control measure required by CAA Section 182 to ensure the emission control equipment on the fleet vehicles is operating correctly. Section 3.4 also includes New Castle County's Enhanced I/M Program Performance Standard Modeling (PSM) and Certification. Performance Standard Modeling was required to demonstrate that New Castle County's existing Enhanced I/M program meets the applicable enhanced performance standard, as defined within the I/M regulations (40 CFR Part 51.351).

Section 3.5 describes how Delaware has fulfilled the Clean Fuel Vehicle Program requirements with respect to CAA 182(c)(4).

Section 3.6 describes voluntary control measures that Delaware has implemented to help reduce emissions of VOCs and NOx.

Unless otherwise noted, all Delaware regulatory actions listed below have been accepted into the Delaware SIP.

3.1 Control Measures Included in the 2017 Base Year Inventory

The following control measures were adopted and in place in New Castle County by December 31, 2017.

3.1.1 Electric Generating Units

Table 12: Delaware Specific Electric Generating Unit (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] [34]
1146	EGU Multi-Pollutant Regulation	NOx	12/11/06	August 11, 2010 [75 FR 48566] [35]
1148	Control of Stationary Combustion Turbine Electric Generating Unit Emissions	NOx	7/11/07	August 11, 2010 [75 FR 48566] [36]

[34] 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.
[35] 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.
[36] 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.

3.1.2 Non-EGUs

Table 13: 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] [37]
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] [38]

*Delaware City Refinery, enforceable emission cap for NOx

[37] 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.

[38] 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.

3.1.3 Area Sources

Table 14: 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] [39]
1124 - 11.0	Mobile Equipment Repair and Refinishing	VOC	10/11/10	August 11, 2010 [75 FR 48566] [40]
1141 - 1.0	Architectural and Industrial Maintenance Coatings	VOC	11/11/06	August 11, 2010 [75 FR 48566] [41]
1141 - 2.0	Consumer Products	VOC	4/11/09	October 20, 2010 [75 FR 64673] [42]
1141 - 3.0	Portable Fuel Containers	VOC	4/11/10	December 14, 2010 [75 FR 77758] [43]
1141 - 4.0	Adhesives and Sealants	VOC	4/11/09	December 22, 2011 [76 FR 79537] [44]

[39] 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.
[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] 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.
[42] 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.
[43] 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.
[44] 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.

3.1.4 Nonroad Sources

Federal Regulations

- Aircraft: Exhaust Emission Standards (40 CFR Part 87)
- Nonroad Compression-Ignition Engines: Exhaust Emission Standards (40 CFR 1039, 40 CFR 89.112)
- Nonroad Large Spark-Ignition Engines: Exhaust and Evaporative Emission Standards (40 CFR 1048)
- Locomotives: Exhaust Emission Standards (40 CFR 1033.101)
- Federal Marine Compression-Ignition 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 CFR 1051)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below: Exhaust Emission Standards (40 CFR Part 90 & 1054)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below, Recreational Engines and Vehicles, and Marine Spark-Ignition Engines: Evaporative Emission Standards (40 CFR Part 1045, 1051,1054, and 1060)[45]

[45] 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.

3.1.5 Onroad Sources

Table 15: Delaware Specific Onroad Controls, Pre-2017

Regulation	Title	Pollutant	Effective Date	EPA SIP Approval
1131	Low Enhanced Inspection and Maintenance Program	NOx	10/11/01	November 26, 2003 [68 FR 66343] [46]
1132	Transportation Conformity Regulation	NOx	11/11/07	August 11, 2010 [75 FR 48566] [47]
1140	Delaware Low Emission Vehicle Program	NOx	10/11/99	October 14, 2015 [80 FR 61752] [48]
1145	Excessive Idling of Heavy Duty Vehicle	NOx	4/11/05	August 11, 2010 [75 FR 48566] [49]

3.1.6 Federal Regulations

- 40 CFR Parts 80, 85, and 86 Control of Air Pollution from New Motor Vehicles: Tiers 0,1, 2, and 3 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

[46] 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.
[47] 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.
[48] 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.
[49] 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.

3.2 Control Measures Post 2017 Base Year Inventory

The following controls measures were implemented in New Castle County between January 1, 2018 through December 31, 2026.

3.2.1 Area Sources

Table 16: 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][50]
1124 - 33.0	Solvent Cleaning and Drying	VOC	8/11/21	November 3, 2022 [87 FR 60102][51]
1124 - 36.0	Vapor Emission Control at Gasoline Dispensing Facilities	VOC	4/11/21	July 11, 2022 [87 FR 35423][52]

*Stage II Vapor Recovery Decommissioning

[50] 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.
[51] 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.
[52] 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 .

3.2.2 Onroad Sources

Table 17: 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] [53]
1131	Low Enhanced Inspection and Maintenance Program – Kent and New Castle Counties	NOx	1/11/23	November 4, 2023 [89 FR 87500][54]

3.3 Details of Post-2017 Control Measures

The following control measures are credited with post-2017 emission reductions. These controls were implemented or have effective dates after 2017 and are not accounted for (or entirely accounted for) in the 2017 base year inventory. The controls contain new emission limits or standards, that resulted in emission reductions.

3.3.1 Area Sources

3.3.1.1 Solvent Cleaning – Regulation 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).

[53] 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.
[54] Air Plan Approval; Delaware; Motor Vehicle Inspection and Maintenance. EPA Final Rule. 89 FR 87500. November 4, 2023. https://www.govinfo.gov/content/pkg/FR-2024-11-04/pdf/2024-25460.pdf.

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%.

3.3.1.2 Gas Station Vapor Recovery - Regulation 1124, Sections 26.0 and 36.0

The Department updated requirements for Gasoline Dispensing Facilities (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 amendments 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 system.

The decommissioning of Stage II systems was required by December 31, 2021, and installing Stage I Enhanced Vapor Recovery 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.

3.3.1.3 Phased in Reduction of Portable Fuel Containers (PFCs) – Regulation 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 on 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.

3.3.2 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 MOVES5 model. The following regulations, along with fleet turnover, have contributed to mobile source emissions reductions in New Castle County since 2017.

3.3.2.1 Motor Vehicle Emissions Inspection Program - Kent and New Castle Counties Regulation 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 3.4.

3.3.2.2 Delaware Low Emission Vehicle – Regulation 1140

The Department has chosen to adopt California's Low Emission Vehicle (LEV) and greenhouse gas standards as part of the Delaware Code (Regulation 1140). These standards (Regulation 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 standards, Delaware joined a growing number of states, currently at 17 (including the District of Columbia), committed to reducing pollution from motor vehicles.[55]

3.3.2.4 Federal Tier 3 Motor Vehicle Emission and Fuel Standards

The Federal Tier 3 Motor Vehicle Emission and Fuel Standards program (79 FR 23414, April 28, 2014) 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.[56]

3.3.3 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 in New Castle County after the 2017 base year. These regulations include the following:

[55] Division of Air Quality (n.d) Clean Vehicles and Fuels. Retrieved on June 26, 2026 from https://dnrec.alpha.delaware.gov/air/mobile-sources/clean-vehicles-fuels/.
[56] Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards. EPA Final Rule. April 28, 2014. https://www.govinfo.gov/content/pkg/FR-2014-04-28/pdf/2014-06954.pdf

- Aircraft: Exhaust Emission Standards (40 CFR Part 87)
- Nonroad Compression-Ignition Engines: Exhaust Emission Standards (40 CFR 1039, 40 CFR 89.112)
- Nonroad Large Spark-Ignition Engines: Exhaust and Evaporative Emission Standards (40 CFR 1048)
- Locomotives: Exhaust Emission Standards (40 CFR 1033.101)
- Federal Marine Compression-Ignition 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 CFR 1051)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below: Exhaust Emission Standards (40 CFR Part 90 and 1054)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below, Recreational Engines and Vehicles, and Marine Spark-Ignition Engines: Evaporative Emission Standards (40 CFR Part 1045, 1051, 1054, and 1060)[57]

3.4 Inspection and Maintenance Program

CAA Section 182(c)(3) requires that this SIP revision must include information regarding Delaware's Motor Vehicle I/M program.

3.4.1 Introduction and Background

Motor vehicles are significant contributors of VOCs, 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 a third of the ozone air pollution and nearly all of the CO air pollution in United States cities.[58] Based on the significant quantity, 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.

[57] 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.
[58] Fast Facts U.S. Transportation Sector Greenhouse Gas Emissions 1990-2022. EPA. May 2024. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P101AKR0.pdf.

Major malfunctions in the emission control system can cause emissions to increase above the vehicle emissions standards. As a result, 10 to 30 percent of cars are causing the majority of the vehicle-related pollution problem. Unfortunately, it is rarely obvious which cars fall into this category, as the emissions themselves may not be noticeable and emission control malfunctions do not necessarily affect vehicle drivability. Effective I/M programs, however, can identify these problem cars and assure their repair.

I/M programs produce emission reduction results soon after the program is put in place. 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 nonattainment areas, plus marginal ozone areas with existing or previously required I/M programs, fall under the ‘‘basic’’ I/M requirements. Serious or worse ozone nonattainment areas, as well as areas within an OTR, require “enhanced” I/M requirements.

‘‘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 more of the vehicles in operation, 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 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 more flexibility by relaxing the testing requirements of the High Enhanced Standard to reduce the costs and technical burden while still providing adequate emissions reductions.

Nonattainment areas that are required to implement enhanced I/M programs and have met the CAA’s requirements for RFP (referred to as 15% plans) can elect to meet the Low Enhanced Performance Standard. Delaware has an approved 15% plan for the 1979 1-hr NAAQS (64 FR

55139, October 12, 1999),[59] and therefore has elected to meet the Low Enhanced Performance Standard.

Delaware's I/M program for New Castle County was implemented on January 1, 1983, due to New Castle County being designated nonattainment 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 the following January.

3.4.2 Delaware's Inspection & Maintenance Program

The State of Delaware is covered by an emission inspection program that tests approximately 293,000 vehicles each year. The purpose of Delaware's emissions testing program is to identify vehicles that exceed tailpipe exhaust and evaporative emissions standards and prevent registration or renewals until vehicles meet emission standards. The inspections are performed by the State's Department of Transportation Division of Motor Vehicles (DMV). The New Castle County I/M program is regulated by Regulation 1131. New Castle County meets the Low Enhanced I/M requirements due to prior NAAQS designation for ozone.

On January 11, 2023, Delaware implemented the amended Regulation 1131 in New Castle County. The amendments to Delaware's Vehicle Inspection and Maintenance Program included:

- expanding the model year exemption from five to seven years;
- expanding the vehicles covered by the program to include vehicles weighing 8,501 pounds to 14,000 pounds gross vehicle weight beginning with model year 2008;
- changing the older vehicle testing requirements to include curb idle and gas cap tests; and
- dropping the two speed idle test from New Castle County.

[59] Approval and Promulgation of Air Quality Implementation Plans; Delaware; 15 Percent Rate of Progress Plan. EPA Direct Final Rule. 64 FR 55139. October 12, 1999. 99-26195.pdf.

The current I/M Program as of January 11, 2023 is detailed below in Table 18.

Table 18: Delaware I/M Program

I/M Program	Vehicle (Model Years)	I/M Test	Regulation 1131
Vehicles weighing up to 8,500 lb. GVWR	1968 – 1995	Unloaded Idle test	Yes
		Two Speed Idle test	NA
	1975 – 1995	Gas Cap Testing	Yes
	1996 and newer	OBD-II testing	Yes
Vehicles weighing between 8,501 and 14,000 lb. GVWR	2008 and newer	OBD-II testing	Yes
Vehicle inspections exemption years			7

The I/M Program in Delaware is a centralized system operated and administered by the DMV. Delaware's I/M Program is implemented at four testing facilities located in Wilmington, Delaware City, Dover, and Georgetown. The program utilizes 31 total inspection lanes, and 51 DMV inspection associates. The I/M program inspection schedule is biennial, requiring vehicles to pass an emissions inspection every two years. The current regulations provide an exemption for vehicles less than 7 years old.[60] A vehicle must either pass inspection or be granted a waiver before its registration can be renewed.

3.5 Clean Fuel Vehicles Program

CAA section 182(c)(4) requires states with ozone nonattainment areas classified as serious or above with 1980 populations greater than 250,000 submit a SIP revision to either "include such measures as may be necessary to ensure the effectiveness of the applicable provisions of the clean-fuel vehicle program prescribed under part C of subchapter II of this

[60] Delaware State Code Title 21 § 2143 was amended on 9/21/2017 to change the exemption for new vehicles from 5 to 7 years.

chapter" or to provide "a substitute for all or a portion of the clean-fuel vehicle program prescribed under part C of subchapter II of this chapter."[61]

CAA 182(c)(4):

> *"A) Except to the extent that substitute provisions have been approved by the Administrator under subparagraph (B), the State shall submit to the Administrator… a revision to the applicable implementation plan for each area described under part C of subchapter II of this chapter to include such measures as may be necessary to ensure the effectiveness of the applicable provisions of the clean-fuel vehicle program prescribed under part C of subchapter II of this chapter, including all measures necessary to make the use of clean alternative fuels in clean-fuel vehicles (as defined in part C of subchapter II of this chapter) economic from the standpoint of vehicle owners. Such a revision shall also be submitted for each area that opts into the clean fuel-vehicle program as provided in part C of subchapter II of this chapter.*
>
> *(B) The Administrator shall approve, as a substitute for all or a portion of the clean-fuel vehicle program prescribed under part C of subchapter II of this chapter, any revision to the relevant applicable implementation plan that in the Administrator's judgment will achieve long-term reductions in ozone-producing and toxic air emissions equal to those achieved under part C of subchapter II of this chapter, or the percentage thereof attributable to the portion of the clean-fuel vehicle program for which the revision is to substitute.…Where the Administrator approves such revision for any area, the State need not submit the revision required by subparagraph (A) for the area with respect to the portions of the Federal clean-fuel vehicle program for which the Administrator has approved the revision as a substitute.*
>
> *(C) If the Administrator determines, under section 7509 of this title, that the State has failed to submit any portion of the program required under subparagraph (A), then, in addition to any sanctions available under section 7509 of this title, the State may not receive credit, in*

[61] Guidance for Fulfilling the Clean Fuel Fleets Requirement of the Clean Air Act. EPA. June 2022. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P10155SA.pdf.

> *any demonstration of attainment or reasonable further progress for the area, for any emission reductions from implementation of the corresponding aspects of the Federal clean-fuel vehicle requirements established in part C of subchapter II of this chapter."*

According to EPA's June 2022 Guidance, *Guidance for Fulfilling the Clean Fuel Fleets Requirement of the Clean Air Act*, with the implementation of EPA's Tier 3 light-duty vehicle standards and the continued implementation of the current heavy-duty vehicle standards, the CAA's Clean Fuel Fleets emission standards are either less stringent than or equivalent to the standards that apply to light- and heavy-duty vehicles and engines generally. As a result, EPA revised the Clean Fuel Fleets regulations in 40 CFR part 88 to include a compliance option where vehicles and engines certified to current standards under 40 CFR part 86 and part 1036 would be deemed to comply with the Clean Fuel Fleets standards as Ultra Low-Emission Vehicles. Therefore, states can address the Clean Fuel Fleets requirement by describing in a SIP that any new light- or heavy-duty vehicle purchased today meet EPA's standards or CARB's current LEV III standards.

Delaware has fulfilled its clean fuel requirements with respect to CAA 182(c)(4)(B) through the promulgation of Regulation 1140 – *Delaware Advanced Clean Car Program* (CARB's LEV III standards). More detail about this regulation is found in Section 3.3.2.2. Delaware submitted amendments to 1140 for inclusion into its SIP on August 28, 2014. These amendments were approved by EPA on October 14, 2015. Therefore, Delaware is proposing to use these SIP approved amendments to Regulation 1140 to fulfill the requirements of CAA 182(c)(4).

3.6 Alternative Control Measures

Control measures in this section are not being relied on to meet any required SIP milestones but support the States goal of ozone attainment.

3.6.1 Division of Climate, Coastal & Energy - DNREC

3.6.1.1 Renewable Energy

- Green Energy Program – Provides rebates for residential and small-

scale renewable energy systems.

- Renewable Energy Portfolio Standards – Mandates that Delaware's utilities derive 25% of their energy portfolios from renewable sources by 2025.
- Offshore Wind Power Working Group – Identifies ways Delaware can benefit economically and environmentally from offshore wind power.
- Delaware Renewable Energy Taskforce –Provide recommendations on establishing renewable energy trading mechanisms to support the growth of renewable energy.

3.6.1.2 Energy Efficiency

- Delaware Energy Efficiency Advisory Council – Helps reduce energy loss and cost by developing statewide programs to increase energy efficiency, reduce energy usage, and lower consumer energy costs.
- The Delaware Energy Efficiency Investment Fund – Helps commercial and industrial customers replace aging, inefficient equipment and systems with energy efficient alternatives.
- Weatherization Assistance Program – Free program that helps homeowners and renters cut their energy bills by weatherproofing and improving the energy efficiency of their homes.

3.6.1.3 Clean Fuel and Transportation Initiatives

- Electric Vehicle Rebates – Offers clean vehicle and charging station rebates.
- Propane and Natural Gas Vehicles – Delaware offers rebates for clean, bi-fuel and heavy- duty vehicle rebates.
- Delaware Clean Cities Coalition – Helps Delaware residents, businesses, and fleet operators work together to reduce the use of petroleum, develop regional economic opportunities, and improve air quality.

3.6.1.4 Green Infrastructure

- Green Infrastructure Primer – Provides an introduction to green infrastructure projects and their benefits, as well as information on selecting, building, and maintaining them.

3.6.2 DelDOT

- Routes 1, 13, and 113 were designated Alternative Fuel Corridor designations in 2018. The U.S. Department of Transportation establishes Alternative Fuel Corridors to support alternative-fueling stations, including electric, hydrogen, propane and natural gas fueling infrastructure at strategic locations along major national highways.
- Congestion Mitigation and Air Quality Improvement Program – Supports completion of a statewide network of pedestrian and bicycle pathways, bicycle routes and pedestrian connections, and promotes travel by non-motorized modes for reduced congestion, active transportation choices, access to recreation, and reduced vehicle emissions.
- Pedestrian Council – Assists DelDOT with re-evaluation, implementation, and recommendations regarding the Statewide Pedestrian Action Plan and prioritization of pedestrian infrastructure improvements.
- First State Trails and Pathways Initiative – Public outreach for bicycling, walking, and providing safe and convenient ways to reach local work, shops, schools, recreational sites and transit.
- RideShare – Delaware Authority for Regional Transit - Aids commuters with finding and using alternative modes of transportation.

3.6.3 State of Delaware – Office of Management and Budget

- Fleet Link – Statewide commuter program for State employees. Vanpools operate on a statewide basis and provide a shared-cost alternative to commuting to work in privately owned vehicles.

3.6.4 Electric Utilities

3.6.4.1 Delmarva Power

- Peak Energy Savings Credit – Customers earn a credit off their bill for every kilowatt hour they save below their baseline average energy use.
- Delaware Energy Wise Rewards ™ Program – During the peak electricity demand times in the summer, Delmarva Power automatically cycles off and on participating central air conditioners

and heat pumps to help reduce the region's demand for electricity. Customers earn a one-time installation credit and a choice of a programmable thermostat or outside switch and an annual participation credit.

3.6.4.2 Delaware Electric Cooperative (DEC)

- Beat the Peak – Member-owners receive text alerts when DEC is approaching a period when the price for energy is expected to be high. Encourages voluntary energy- conservation measures. Customers can also sign up to have an in-home "Beat the Peak" indicator installed.
- LED Roadway Area Lighting – DEC is in the process of converting existing outdoor lighting fixtures to the more efficient, energy saving LED lighting.
- Solar Grants – Grants for home or business solar systems.
- Geothermal Grants – Grants for home or business for installation of energy efficient geothermal HVAC systems.
- Heat Pump Water Heater Grants – Grants for member-owners installing high efficient heat pump water heaters.
- Beat the Peak with Nest – Members agree to allow DEC to adjust their thermostats a few degrees during summer Beat the Peak alerts
- Beat the Peak with Electric Vehicles – DEC is offering a billing credits for electric vehicle (EV) owners who do not use their EV chargers during Beat the Peak alerts. A WIFI signal is sent to the charger that regulates the flow of power during Beat the Peak alerts.
- Commercial EV Program - Availability is limited to those Members who have a commercial interest and wish to install at least two commercial type vehicle chargers on a property they own or lease.

3.6.4.3 Delaware Municipal Electric Corporation (DEMEC)

- Power Savers Business - When the potential for a demand response event is found DEMEC uses sophisticated models to determine when customers should be asked to reduce the electric load. Forecasts are typically given about 24 hours in advance of an upcoming peak and preparations are made to notify customers that have registered to reduce their electric load by a certain

amount. DEMEC uses a combination of municipal notification systems, contractor support, website and social media to notify business customers.

- Power Savers - DEMEC sends out alerts to municipal customers through social media, municipal notification systems, and radio commercials on days that large increases in electric usage are expected. DEMEC encourages people to voluntarily avoid activities during certain hours in order to decrease energy consumption.
- DEMEC Energy Efficiency Program - DEMEC helps member communities, and their residential and business customers use less energy and save money through a program that provides technical assistance and financial incentives. They offer multiple options, including advanced technical support and financial incentives.
    - LED Markdown Program
    - Appliance Rebates
    - Small Business Solutions
    - Large Business Solutions
- Municipal Green Energy Fund- Program designed for DEMEC member communities to invest in and maintain renewable energy infrastructure and energy efficiency measures that reduce emissions and provide long-term energy savings. Customer grants are also given for residential solar and geothermal.
- McKees Community Solar - 230 kilowatt solar facility located on a brownfield in the City of Newark designed to allow City of Newark electric customers the opportunity to invest in renewable energy and receive a discount on their electric rate.
- Holiday LED Light Discount - Coupon that discounts holiday LED lighting for all Delawareans. Promoted on social media, website, radio, and in local communities' customer service centers.
- University of Delaware Wind Turbine Partnership - DEMEC purchases 100% of the renewable energy credits generated by the University of Delaware's 2 MW wind turbine located in their Lewes campus. In addition, DEMEC supports student research fellowships on wind energy in the University's College of Earth, Ocean, and Environment.
- DEMEC Delaware Solar Development - 26 MW of utility-owned

solar generation has been installed in DEMEC member service territories, the latest being a 1.5 MW facility located in the Town of Smyrna in 2018.

3.6.5 Delaware Sustainable Energy Utility (DESEU)

- In August 2019, New Castle County Council passed an ordinance to adopt Delaware Voluntary Property Assessed Clean Energy Financing (D-PACE) program for projects in New Castle County. This program establishes a clean energy financing program for the installation of energy efficiency technologies and clean energy systems for qualifying commercial properties. Each county in Delaware must adopt the program. The DESEU will serve as the statewide administrator of the D-PACE program. https://www.delawarecpace.org/
- Energize Delaware – Energy savings programs for Delaware's homes, businesses, non- profits, farms and schools.
    - The Low-Interest Revolving Loan Fund encourages the adoption and installation of end-use energy efficiency measures and customer-sited renewable generation and greenhouse gas reduction measures.
    - In 2019, Energize Delaware Launched the Home Energy Checkup and Counseling Program. The program will bring energy-savings education and counseling to families most in need while also providing them with an energy efficiency checkup of their home and the installation of energy savings measures such as LED Lightbulbs and efficient flow shower heads and faucet aerators.

3.6.6 Delaware Transit Corporation

The Delaware Transit Corporation (DTC) received 3.4 million dollars in grants from the Federal Transit Administration since 2016. In total, DTC is operating 26 electric buses: 14 in New Castle Count, six in Kent County and six in Sussex County. The state is already operating six electric buses in Kent County.

3.6.7 Department of Education

The Department of Education's Green Ribbons Schools program honors schools for their innovative efforts to reduce environmental impact and

utility costs, improve health and wellness, and ensure effective sustainability education.

3.6.8 Green Building United

Green Building United provides grants, support, and resources to K-12 schools in the state of Delaware. Projects have a positive impact on the environment by reducing greenhouse gas emissions, saving energy, and helping cultivate a generation of good environmental stewards in K-12 students.

4.0 Reasonably Available Control Technology (RACT)

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

4.1 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.[62] 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, the EPA was required to issue several guidance documents on RACT controls by certain timeframes to 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.

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

[62] 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.

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.

4.2 RACT SIP Certification

As a result of reclassification to serious, the New Castle County portion of the Philadelphia NAA is subject to a reduction of the major source applicability threshold of 50 tpy for both NOx and VOC. Delaware certifies that the RACT SIP requirements were met with the submittal of the RACT SIP for the 2015 ozone NAAQS to EPA on August 3, 2020 (See Appendix F). It is important to note that the universe of sources applicable to RACT has not changed since the 2020 RACT submittal as New Castle County has retained a 25 tpy major source threshold carried over from the 1-hour ozone NAAQS SIP requirements.

A summary of Delaware's VOC and NOx RACT controls is found below in Sections 4.2.1 and 4.2.2.

4.2.1 VOC RACT Controls

Delaware's VOC RACT controls are contained in Regulation 1124, "Control of Volatile Organic Compound Emissions". 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 Control Technique Guidance (CTG)/Alternative Control Technique (issued by EPA) covered sources with applicability cut-off levels consistent with the "Blue Book"[63] are covered by adequate RACT controls in the corresponding Regulation 1124 sections. More details on the VOC RACT Controls can be found in the RACT SIP for the 2015 ozone NAAQS (See Appendix F).

4.2.2 NOx RACT Controls

Delaware's NOx RACT controls are applicable to specific groups of

[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/default/files/2016-08/documents/voc_bluebook_25may1988.pdf

sources in Regulation 1112, "Control of Nitrogen Oxides Emissions," which forms the basic NOx RACT framework. Within this framework, other rules are developed and implemented for relevant subgroups, including:

- Regulation 1142 "Specific Emission Control Requirements";
- Regulation 1144 "Control of Stationary Generator Emissions;
- Regulation 1146 "Electric Generating Units (EGUs) Multi-Pollutant Regulation"; and
- Regulation 1148 "Control of Stationary Combustion Turbine Electric Generating Unit (EGU) Emissions."

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)[64] and the 2008 8-hour ozone NAAQS (82 FR 57849, December 2017). Delaware has certified that the framework of Regulation 1112, including Regulations 1112, 1142, 1144, 1146 and 1148 contains adequate NOx RACT controls under the 2015 8-hour ozone NAAQS. More details on the NOx RACT Controls can be found in the RACT SIP for the 2015 ozone NAAQS (See Appendix F).

[64] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Reasonably Available Control Technology Under the 8-Hour Ozone National Ambient Air Quality Standard. EPA Final Rule. 73 FR 42681. July 23, 2008. https://www.govinfo.gov/content/pkg/FR-2008-07-23/pdf/E8-16833.pdf

5.0 Transportation Conformity

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

5.1 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.

Transportation conformity is a way to ensure that federal funding and approval are given to those transportation activities that are consistent with air quality goals. Transportation activities should not worsen air quality or interfere with an area's continued compliance in regard to the 2015 ozone NAAQS. The federal transportation conformity rule in 40 CFR Part 93, subpart A, titled *Determining Conformity of Federal Actions to State or Federal Implementation Plans*, applies to areas in nonattainment for one or more NAAQS or that have been redesignated to attainment with federally approved air quality maintenance plans.

New Castle County's Metropolitan Planning Organization, the Wilmington Area Planning Council, 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 applicable transportation emission budgets. 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.[65]

5.2 Motor Vehicle Emissions Budget

The motor vehicle emissions budget (or 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 RFP 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."

In EPA's final rule (91 FR 33610), effective June 4, 2026, New Castle County, Delaware received a Clean Data Determination for both the 2008 and 2015 ozone NAAQS (as discussed in Section 1). According to EPA's May 1995 Memorandum, entitled "Reasonable Further Progress, Attainment Demonstration, and Related Requirement for Ozone Nonattainment Areas Meeting the Ozone National Ambient Air Quality Standard," SIP requirements related to the attainment demonstration and RFP provisions no longer apply once an area has attained the standard.[66] Since MVEBs are created "for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS," no new MVEBs can be set in this SIP revision.

However, this does not impact the requirement for transportation conformity or how conformity is demonstrated. In addition, as indicated in the EPA's May 1995 Memorandum, new budgets will be required for a maintenance plan or if the area were to monitor a violation of the standard prior to a redesignation.

New Castle County remains subject to the MVEB for the ozone precursors, NOx and VOC, approved in EPA's final rule (77 FR 60914, October 5,

[65] 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. March, 2023. Retrieved on April 9, 2025 from https://www.wilmapco.org/Aq/NCCo_Conformity_3-9-23.pdf

[66] U.S Environmental Protection Agency. (1995, May 10). Reasonable further progress, attainment demonstration, and related requirements for ozone nonattainment areas meeting the national ambient air quality standard: Clean data policy memorandum. U.S. Environmental Protection Agency. https://www.epa.gov/sites/default/files/2016-03/documents/clean_data_policy_signed_05101995.pdf

2012), *Attainment Demonstration Portion of the Attainment Plan of the 1997 8-hour Ozone National Ambient Air Quality Standard for the Philadelphia-Wilmington-Atlantic City Moderate Nonattainment Area.*[67]

[67] Approval and Promulgation of Air Quality Implementation Plans; Delaware; Attainment Demonstration for the 1997 8-Hour Ozone National Ambient Air Quality Standard for Philadelphia-Wilmington-Atlantic City Moderate nonattainment Area. EPA Final Rule. 77 FR 60914. October 5, 2012. https://docs.regulations.justia.com/entries/2012-10-05/2012-24526.pdf

6.0 Other SIP Requirements

6.1 Non-Attainment New Source Review (NNSR) Certification

40 CFR 51.1314 requires that states shall submit an 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. The requirements necessary to appropriately implement Delaware's NNSR program are included in Table 28. Delaware's NNSR SIP submittal[68] was approved by EPA, effective June 14, 2021.

[68] Delaware Nonattainment New Source Review Requirements for 2015 8-hour Ozone National Ambient Ari Quality Standard. Final Rule. 86 FR 26179. May 13, 2021. https://www.govinfo.gov/content/pkg/FR-2021-05-13/pdf/2021-10039.pdf

Table 19: 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	Regulation 1125 Section 2.2.
(a)(1)(iv)(A)(*3*): Change constitutes a major source by itself	Regulation 1125 Section 2.2.3.
(a)(1)(v)(E): Significant net emissions increase of NOx is significant for ozone	Regulation 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	Regulation 1125 Section 1.9, Definitions – "Significant".
(a)(3)(ii)(C)(*1*)-(*2*): Provisions for emissions reduction credits	Regulation 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	Regulation 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)]*	Regulation 1125 Section 2.4.3.

40 CFR 51.165 Permit Requirements	Delaware Requirements
(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.

7.0 Ozone Air Quality Status and Trends Analysis

7.1 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 to meet the then-upcoming 8-hour ozone standard. The current network for monitoring ambient air quality for ozone contains 7 monitors, with 4 monitors in New Castle County, as shown in Figure 4.

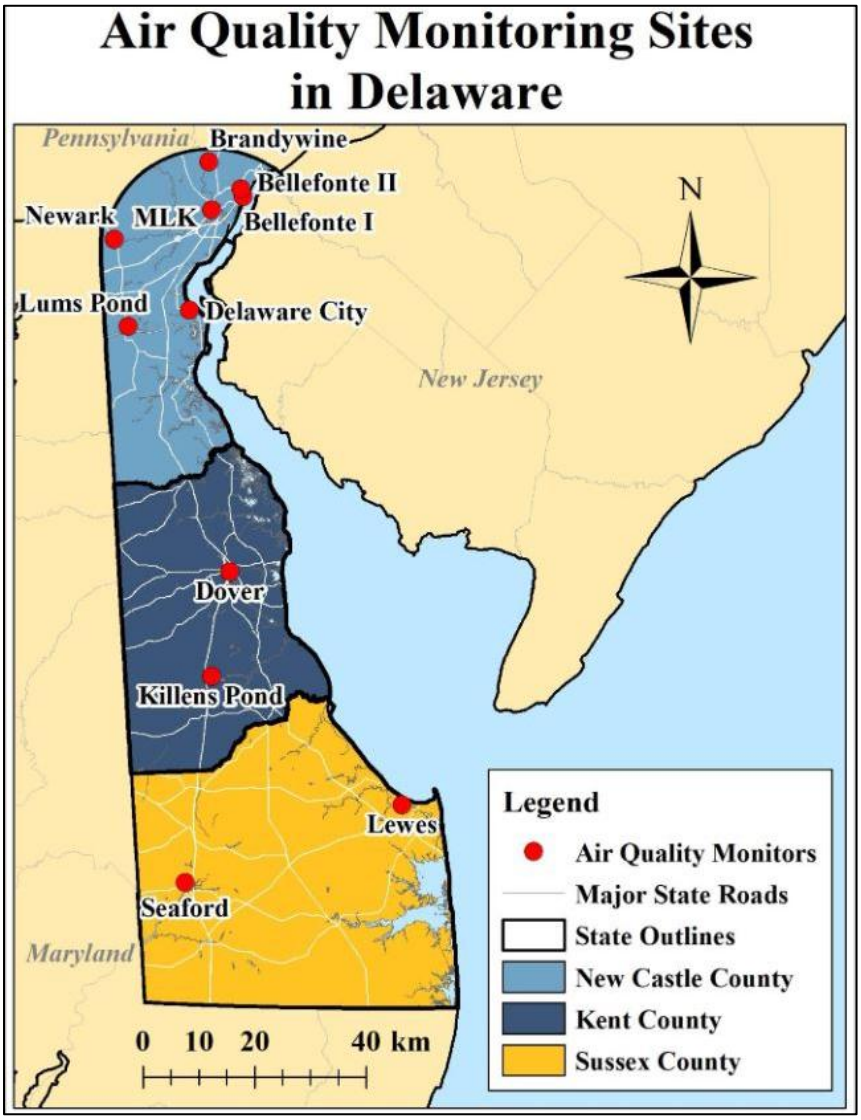

Figure 4: Delaware Ozone Monitoring Network for 8-Hour Ozone NAAQS

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.

7.2 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 5 summarizes the 8-hour ozone design values of New Castle County in Delaware from 1999 to 2025. Figure 6 summarizes the 8-hour ozone design values for each individual monitor in New Castle County. The increase in 2023 is linked to exceedances that occurred due to transport of wildfire smoke from outside of the state or outside of the United States. Approximately 270 individual wildfires burned across Saskatchewan, Alberta southern Northwest Territories and northeast British Columbia in west-central Canada, starting in mid-May of 2023.

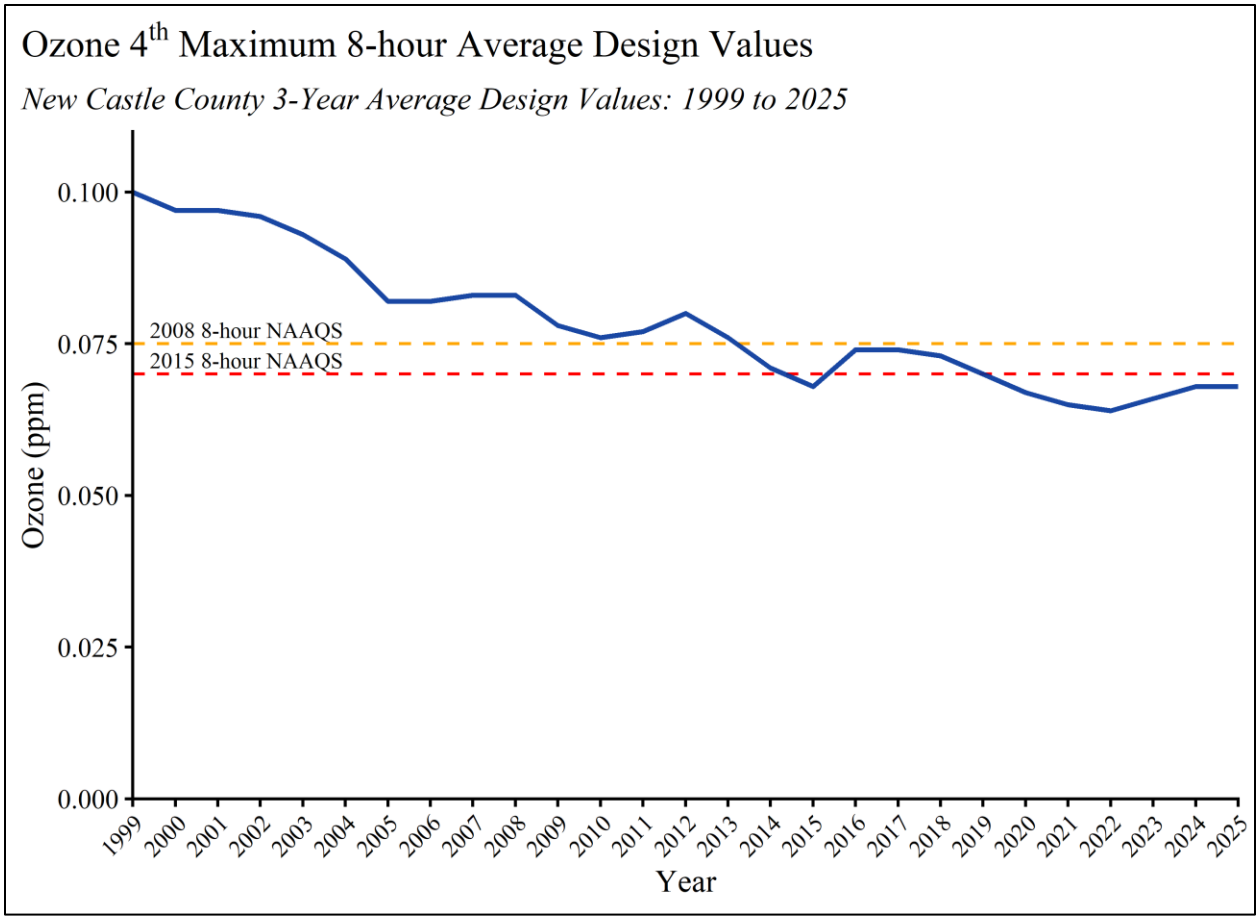

Figure 5: Delaware 8-Hour Ozone Design Values for New Castle County

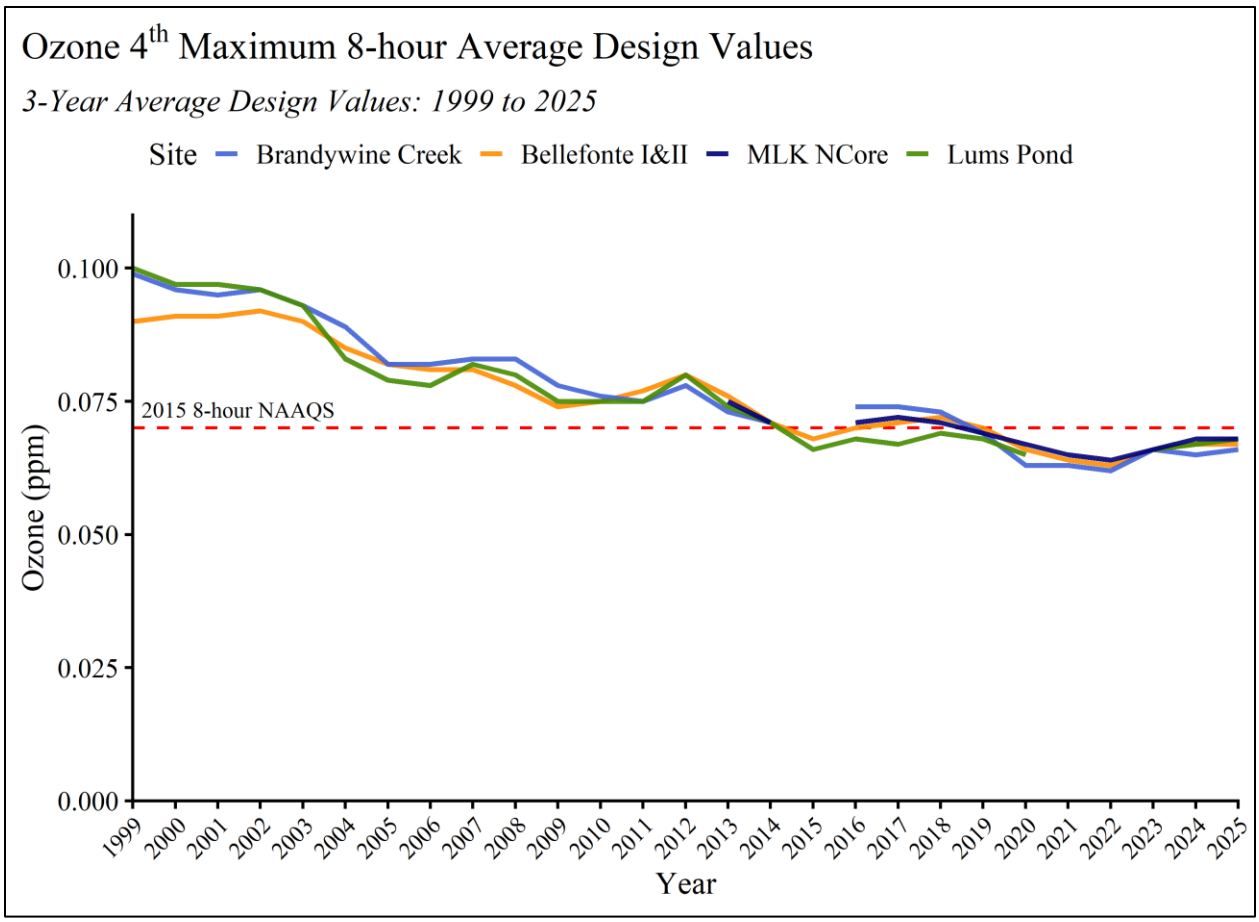

Figure 6: Delaware 8-Hour Ozone Design Values at Individual New Castle County Monitors

7.3 Ozone Exceedances at Delaware Monitors

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 7 summarizes the number of exceedances at all Delaware monitors from 1999 to 2025. Figure 8 summarizes the number of exceedances for each individual monitor in New Castle County. Both Figures show 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.

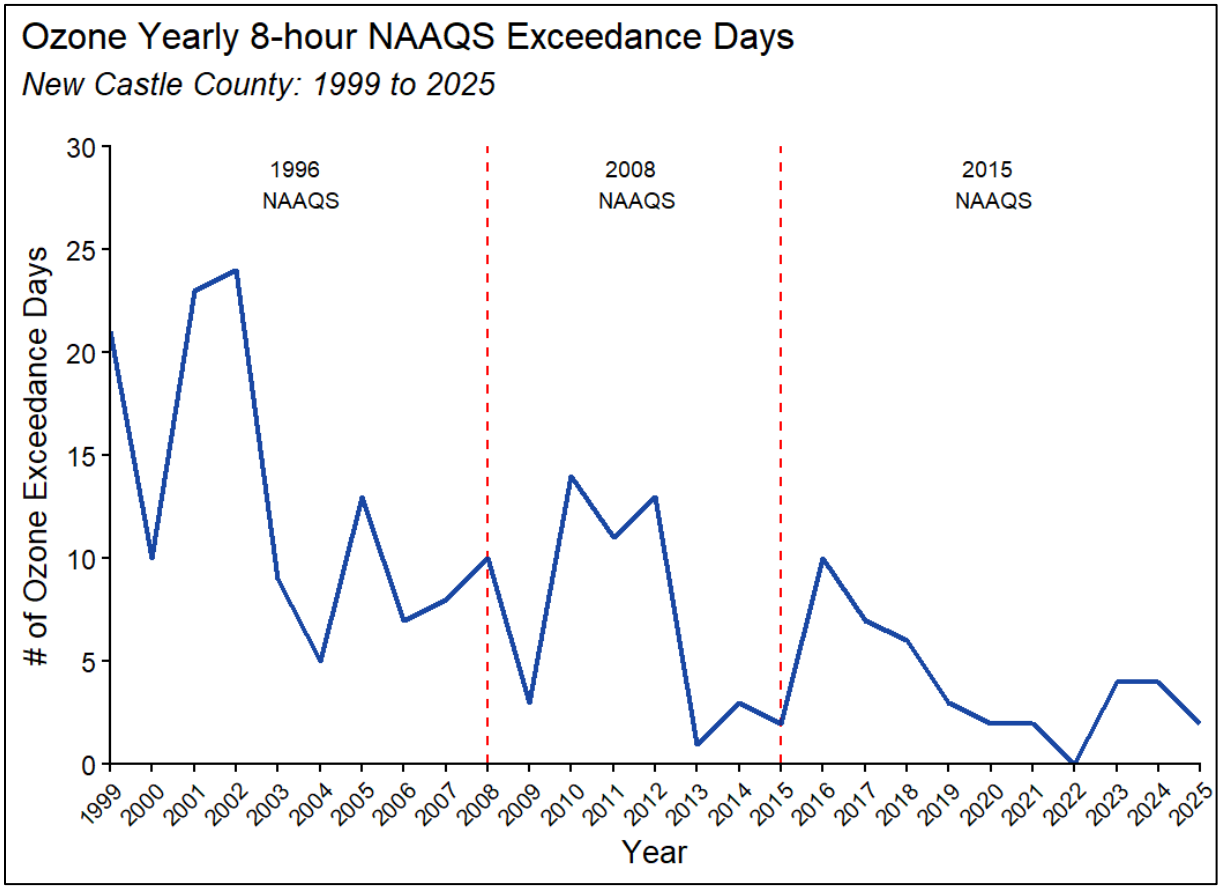

Figure 7: Delaware 8-hour Ozone Exceedance Days for New Castle County

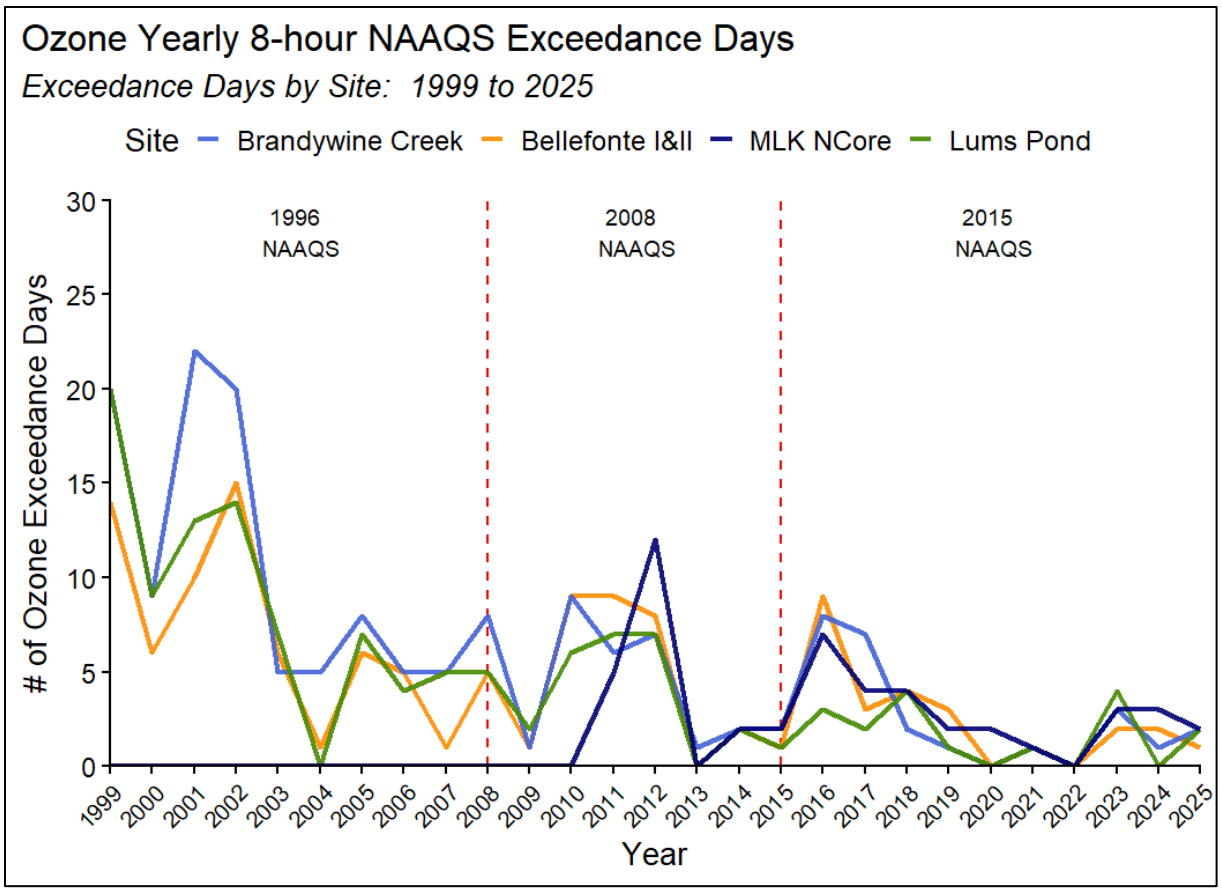

Figure 8: Delaware 8-hour Ozone Exceedance Days at Individual New Castle County Monitors

7.4 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 generally improving.

In summary:

1) Ambient ozone concentrations recorded at New Castle County monitors show a clear decreasing trend (Figures 5 and 6).
2) The number of 8-hour ozone exceedances at New Castle County monitors show a clear decreasing trend (Figures 7 and 8).

7.5 Enhanced Monitoring Program

States with moderate or above ozone nonattainment areas, or that are in the OTR as defined in 40 CFR Part 51, were required to develop and implement an Enhanced Monitoring Plan (EMP) no later than October 1, 2019. Delaware is part of the OTR and voluntarily sought a serious nonattainment designation for the 2015 ozone NAAQS. AQ has worked towards development and implementation of the four required activities listed below that are part of the EMP. Full implementation is in progress with one planned new deployment and one redeployment in 2026:

1. **Additional O_3 monitoring beyond what is minimally required based on population and location as defined in 40 CFR Part 58, Appendix D.**
   Delaware currently meets this requirement. Delaware operates one additional ozone analyzer in New Castle and one additional ozone analyzer in Sussex counties beyond what is required in 40 CFR Part 58, Appendix D.
2. **Additional NO_x or reactive nitrogen compounds monitoring beyond what is minimally required in 40 CFR Part 58, Appendix D.**
   Delaware meets this requirement by operating an additional NO_x analyzer at the Lewes air quality monitoring site.
3. **Additional speciated VOC measurements, either at additional locations or during periods outside of what is required in 40 CFR Part 58, Appendix D.**
   Delaware plans to meet this requirement by operating a VOC canister sampler at the National Core multipollutant monitoring network site in Wilmington, DE year-round, which includes sample collection outside of peak ozone season in our region.
4. **Enhanced upper air measurements of meteorology or pollution concentrations.**
   Delaware meets this requirement by operating a ceilometer to measure mixing layer height, an upper air meteorological measurement, year-round at the Photochemical Assessment Monitoring Station site in Wilmington, DE.

8.0 Enhanced I/M Program Certification

On July 30, 2024, New Castle County NAA was reclassified to serious and is required by CAA Section 182(c)(3) to implement an Enhanced I/M program or certify that its current approved program meets all the Enhanced I/M requirements of CAA Section 182(c)(3) and 40 CFR 51, Subpart S. Delaware's current Enhanced I/M Program was last amended on January 11, 2023 in 7 **DE Admin. Code** 1131 (as discussed in Section 3.4). EPA approved the I/M SIP revisions in their final rule, 89 FR 87500,[69] published on November 4, 2024. In the approval, the EPA indicated that Delaware's revised Enhanced I/M program met the applicable I/M requirements in 40 CFR 51, Subpart S and the performance standards of 40 CFR 51.351.

With this submittal to EPA, Delaware is again certifying that its current I/M Program for New Castle County meets the SIP submittal requirements listed in 40 CFR 51.372(a) to satisfy the serious SIP revision requirement listed in CAA Section 182(c)(3). As part of the certification, this submittal includes an updated analysis to demonstrate the program meets the Enhanced I/M performance standard as required by 40 CFR 51.372(a)(2).

The performance standard analysis is detailed below in Section 8.1, followed by the Enhanced I/M Program certification in Section 8.2.

8.1 Performance Standard Modeling

The following analysis details how Delaware determined that it meets the Enhanced I/M performance standard.

8.1.1 Performance Standard Modeling Introduction

Delaware followed EPA's October 2022 modeling guidance for the analysis that was used to verify its Enhanced I/M Program performance standard - *Performance Standard Modeling for New and Existing Vehicle Inspection and Maintenance (I/M) Programs Using the MOVES Mobile Source*

[69] Air Plan Approval; Delaware; Motor Vehicle Inspection and Maintenance Program. EPA Final Rule. 89 FR 87500. November 4, 2024. https://www.govinfo.gov/content/pkg/FR-2024-11-04/pdf/2024-25460.pdf

Emissions Model,[70] ("*EPA's PSM Analysis Guidance*"). PSM is used to demonstrate that a proposed or existing vehicle emission inspection and maintenance program meets the applicable performance standard, as defined within the I/M regulations (40 CFR Part 51, subpart S). The performance standard provides a gauge by which EPA can evaluate the effectiveness of a state's I/M program. States are required to demonstrate and certify that their I/M programs achieve emission levels that are equal to, or lower than, those which would be achieved by the implementation of the performance standard model program.

EPA's PSM Analysis Guidance states that the PSM analysis is required for an area meeting the criteria for an Enhanced I/M program upon its reclassification as serious or higher for the 2015 or subsequent ozone NAAQS, regardless of whether the area already operates an existing I/M program under a prior NAAQS. EPA's PSM Analysis Guidance further indicates that states with existing I/M programs would need to conduct and submit a PSM analysis as well as make any necessary program revisions as part of their serious area SIP submissions to ensure that I/M programs are operating at or above the Enhanced I/M performance standard level for the 2015 ozone NAAQS.

Therefore, Delaware is required to certify that it has met the performance standard for their nonattainment area (which is New Castle County) for the 2015 ozone NAAQS. The performance modeling is fulfilled in this section of the report following *EPA's PSM Analysis Guidance*.

8.1.2 Performance Standard Modeling Procedures

Delaware used EPA's latest version of MOVES, MOVES5, for the PSM. When determining the appropriate analysis year, Delaware followed EPA's guidance for nonattainment classifications of serious or higher, which required analysis years of "6 years after the effective date of designation and classification, AND the attainment date." In consultation with EPA Region III, the appropriate analysis years that meet the guidance

[70] Performance Standard Modeling for New and Existing Vehicle Inspection and Maintenance (I/M) Programs Using the MOVES Mobile Source Emissions Model. EPA. January 2014. Retrieved from https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=P100HHMP.pdf.

requirements are 2023 and 2026.[71] The analysis requires modeling two scenarios: Delaware's New Castle County existing I/M program and EPA's Enhanced I/M performance standard. The first scenario ("New Castle") was representative of New Castle's I/M program, and the second scenario was the Enhanced performance standard benchmark ("Enhanced Performance Standard"), which represents the EPA requirements defined in 40 CFR 50.351(i).

For both scenarios, Delaware developed a MOVES RunSpec, created a separate input database, and executed the MOVES run. The RunSpec is used to define key elements such as analysis year, geographical area, source types, and pollutants/processes modeled. The RunSpec also directs the model to the respective input/output databases. Delaware followed Section 3.1 of *EPA's PSM Analysis Guidance* for selecting the appropriate parameters. This process was repeated for year 2023 and 2026.

Unique input databases were created for the different scenario types; New Castle County Plan and the Enhanced Performance Standard (Appendix E). The input database includes the county specific parameters of the Onroad fleet such as vehicle miles traveled, age distribution of 13 EPA vehicle types, fuel types, and the I/M program data. Tables 20 and 21 show all the RunSpec parameters along with the key assumptions for the input databases used for both scenarios for year 2023 and year 2026, respectively.

Table 20: 2023 Modeling for Performance Standard Modeling-Inputs and Assumptions

Data Item	**2023 Modeling for Performance Standard Modeling - Inputs and assumptions**
MOVES RunSpec	
Emission Model	MOVES5.0.0 (default database:MOVESDB20241112)

[71] Pursuant to email correspondence with Brian Rehn, EPA Region III, on January 27, 2025, entitled, "RE: DE IM Performance Standard Modeling Question for the 2015 Serious Area Certification SIP."

Data Item	2023 Modeling for Performance Standard Modeling - Inputs and assumptions
Scale/Calculation Type	County Scale Inventory Run
Analysis Years	2026
Analysis Months	July
Analysis Days	Weekdays
Analysis Hours	All
Geographic Bounds	New Castle, DE (10003)
Pollutants	VOC, NOx, Total Gaseous Hydrogen Carbons, and Non-methane Hydrocarbons
Fuel Types	All
County Database Inputs	
Source Type Year VMT	2023 NEI VMT from DelDOT HPSM report apportioned to MOVES source types.
Month VMT Fractions	Used the month VMT from the EPA's 2022v1 Emissions Modeling Platform.
Day VMT Fractions	Used the day VMT from the EPA's 2022v1 Emissions Modeling Platform.
Hourly VMT Fractions	Used the hourly VMT from the EPA's 2022v1 Emissions Modeling Platform.
I/M Parameters – New Castle County Plan Scenario	Used Delaware's unified statewide I/M program that became effective January 11, 2023 (Regulation 1131).
I/M Parameters – Enhanced Performance Standard Scenario	EPA's default IM program coverage for the Enhanced standard (40 CFR 51.351(i)).

Data Item	2023 Modeling for Performance Standard Modeling - Inputs and assumptions
Road Type Distribution	Used road type distribution from 2023 Motor Vehicle Emissions Budget (MVEB).
Source Type Year (Population)	2023 NEI population from DMV's mid-year report pulled July, 1 2023. Mapped to source types using the 2023 DVM registration fleet data. Long haul source types use EPA default.
Vehicle Age Distribution	2023 NEI age distribution from analysis of DMV's 2023 mid-year report, R45CAM07.
Average Speed Distribution	Used distribution from EPA's 2022v1 Emissions Modeling Platform.
Fuel Supply	MOVES5.0.0 default tables
Fuel Formulation	MOVES5.0.0 default tables
Fuel Usage Fraction	MOVES5.0.0 default tables
AVFT	Used Delaware's 2023 registered fleet database. EPA default used for long haul single/combination trucks.[72]
ZoneMonthHour	Average hourly data by month from 2023 meteorological datasets maintained by NOAA.
MOVES Inputs - Advanced	
N/A	Not applicable as indicated in following *EPA's PSM Analysis Guidance.*

[72] According to EPA's MOVES5 Technical Guidance, there are two options for actual AVFT inputs. Delaware used Option 1: "Where available, agencies should use their own data, for example, based on vehicle registration records for light-duty vehicles, or based on information from large fleet owners, and include this local information about fuel type distribution in the AVFT Table." However, for long haul single/combinations trucks, Delaware relied on Option 2: "If such data are not available, modelers can use the most recent AVFT information that EPA has compiled as inputs for the National Emissions Inventory (NEI)."

Table 21: 2026 Modeling for Performance Standard Modeling-Inputs and Assumptions

Data Item	**2026 Modeling for Performance Standard Modeling - Inputs and assumptions**
MOVES RunSpec	
Emission Model	MOVES5.0.0 (default database:MOVESDB20241112)
Scale/Calculation Type	County Scale Inventory Run
Analysis Years	2026
Analysis Months	July
Analysis Days	Weekdays
Analysis Hours	All
Geographic Bounds	New Castle, DE (10003)
Pollutants	VOC, NOx, Total Gaseous Hydrogen Carbons, and Non-methane Hydrocarbons
Fuel Types	All
Traffic Data	
Vehicle Miles Traveled (VMT) Growth Forecast	Used the Federal Highway Administration forecast growth rate for 2019 to 2040 (1.0062). Applied this to the 2021 data to get the projected 2026 VMT. https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.cfm
County Database Inputs	
Source Type Year VMT	Grew the 2021 VMT data to 2026, using a growth factor of 1.0062 per annum. Used linear relationship to grow county VMT distributions for 2026. Allocated the VMT to 13

Data Item	2026 Modeling for Performance Standard Modeling - Inputs and assumptions
	MOVES source types by the MOVES5 default distribution for New Castle.
Month VMT Fractions	Used the month VMT from the EPA's 2022v1 Emissions Modeling Platform.
Day VMT Fractions	Used the day VMT from the EPA's 2022v1 Emissions Modeling Platform.
Hourly VMT Fractions	Used the hourly VMT from the EPA's 2022v1 Emissions Modeling Platform.
I/M Parameters - New Castle County Plan Scenario	Used Delaware's unified statewide I/M program that became effective January 11, 2023 (Regulation 1131).
I/M Parameters – Enhanced Performance Standard Scenario	EPA's default IM program coverage for the Enhanced standard (40 CFR 51.351(i)).
Road Type Distribution	Used road type distribution from 2023 MVEB.
Source Type Year (Population)	Used Vehicle Population data from DMV Mid-year report R45CAM07 collected from years 2017 to 2024. Projected this data forward to 2026 using a linear regression. Distributed to MOVES source types based on Delaware's 2023 registration data profile.
Vehicle Age Distribution	Analysis of 2024 DMV Mid-year Report R45CAM07 to acquire age distribution of "complete" 2023 model year. The distribution was grown to 2026 using the EPA's spreadsheet tool:moves5-age-distribution-projection-tool-2024-11. MOVES5 EPA Default for long haul single/combination trucks.

Data Item	2026 Modeling for Performance Standard Modeling - Inputs and assumptions
Average Speed Distribution	Used EPA's 2022v1 Emission Modeling Platform speed profile- pulled from 2026 inputs.
Fuel Supply	MOVES5.0.0 default tables
Fuel Formulation	MOVES5.0.0 default tables
Fuel Usage Fraction	MOVES5.0.0 default tables
AVFT	Used Delaware Registration database as of 12/31/23 to create local profile of alternative fuels for each source type. Projected to 2026 using EPA's MOVES5 AVFT Tool's "proportional" setting. 2022 was used as the last "complete" model year for forecasting. Long haul trucks used national average fuel profiles.[73]
ZoneMonthHour	Average hourly data by month from years 2022, 2023 and 2024 meteorological datasets maintained by NOAA.
MOVES Inputs - Advanced	
N/A	Not applicable as indicated in following *EPA's PSM Analysis Guidance*

For the Enhanced Performance Standard scenarios, Delaware used the performance standard input table template developed by EPA for the Enhanced I/M Standard referenced in Section 3.2 of *EPA's PSM Analysis*

[73] According to EPA's MOVES5 Technical Guidance, there are four options for projecting AVFT inputs. Delaware used Option 1, the proportional method: "This method projects future fuel type distributions based on proportional differences between the local and the national distributions in the last complete model year in the input data. This preserves differences between local conditions and the national average, while still accounting for expected changes in national fuel type distribution trends." However, for single and long-haul trucks, as recommended by EPA guidance, Delaware used Option 2, the national average.

Guidance. The standard includes all the program elements required by I/M regulation 40 CFR 50.351(i). Tables 22 and 23 show the Enhanced Performance Standard I/M Coverage Input Tables.

Table 22: 2023 Enhanced I/M Performance Standard - I/M Coverage Input Table

Pollutant Process ID	State ID	County ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspection Frequency	Test Standards ID	Beginning Model Year ID	Ending Model Year ID	Use IM Parameter Y (yes) or N (no)	Compliance Factor
101	10	10003	2023	21	1	111	1	11	1968	2000	y	95.7696
101	10	10003	2023	31	1	111	1	11	1968	2000	y	93.15509
101	10	10003	2023	32	1	111	1	11	1968	2000	y	73.0722
102	10	10003	2023	21	1	111	1	11	1968	2000	y	95.7696
102	10	10003	2023	31	1	111	1	11	1968	2000	y	93.15509
102	10	10003	2023	32	1	111	1	11	1968	2000	y	73.0722
301	10	10003	2023	21	1	111	1	11	1968	2000	y	95.7696
301	10	10003	2023	31	1	111	1	11	1968	2000	y	93.15509
301	10	10003	2023	32	1	111	1	11	1968	2000	y	73.0722
302	10	10003	2023	21	1	111	1	11	1968	2000	y	95.7696
302	10	10003	2023	31	1	111	1	11	1968	2000	y	93.15509
302	10	10003	2023	32	1	111	1	11	1968	2000	y	73.0722
101	10	10003	2023	21	1	151	1	51	2001	2022	y	95.7696
101	10	10003	2023	31	1	151	1	51	2001	2022	y	93.15509
101	10	10003	2023	32	1	151	1	51	2001	2022	y	73.0722
102	10	10003	2023	21	1	151	1	51	2001	2022	y	95.7696
102	10	10003	2023	31	1	151	1	51	2001	2022	y	93.15509
102	10	10003	2023	32	1	151	1	51	2001	2022	y	73.0722
301	10	10003	2023	21	1	151	1	51	2001	2022	y	95.7696
301	10	10003	2023	31	1	151	1	51	2001	2022	y	93.15509
301	10	10003	2023	32	1	151	1	51	2001	2022	y	73.0722
302	10	10003	2023	21	1	151	1	51	2001	2022	y	95.7696
302	10	10003	2023	31	1	151	1	51	2001	2022	y	93.15509
302	10	10003	2023	32	1	151	1	51	2001	2022	y	73.0722

Pollutant Process ID	State ID	County ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspection Frequency	Test Standards ID	Beginning Model Year ID	Ending Model Year ID	Use IM Parameter Y (yes) or N (no)	Compliance Factor
112	10	10003	2023	21	1	143	1	43	2001	2022	y	95.7696
112	10	10003	2023	31	1	143	1	43	2001	2022	y	93.15509
112	10	10003	2023	32	1	143	1	43	2001	2022	y	73.0722
101	10	10003	2023	21	5	111	1	11	1968	2000	y	95.7696
101	10	10003	2023	31	5	111	1	11	1968	2000	y	95.7696
101	10	10003	2023	32	5	111	1	11	1968	2000	y	95.7696
102	10	10003	2023	21	5	111	1	11	1968	2000	y	95.7696
102	10	10003	2023	31	5	111	1	11	1968	2000	y	95.7696
102	10	10003	2023	32	5	111	1	11	1968	2000	y	95.7696
301	10	10003	2023	21	5	111	1	11	1968	2000	y	95.7696
301	10	10003	2023	31	5	111	1	11	1968	2000	y	95.7696
301	10	10003	2023	32	5	111	1	11	1968	2000	y	95.7696
302	10	10003	2023	21	5	111	1	11	1968	2000	y	95.7696
302	10	10003	2023	31	5	111	1	11	1968	2000	y	95.7696
302	10	10003	2023	32	5	111	1	11	1968	2000	y	95.7696
101	10	10003	2023	21	5	151	1	51	2001	2022	y	95.7696
101	10	10003	2023	31	5	151	1	51	2001	2022	y	95.7696
101	10	10003	2023	32	5	151	1	51	2001	2022	y	95.7696
102	10	10003	2023	21	5	151	1	51	2001	2022	y	95.7696
102	10	10003	2023	31	5	151	1	51	2001	2022	y	95.7696
102	10	10003	2023	32	5	151	1	51	2001	2022	y	95.7696
301	10	10003	2023	21	5	151	1	51	2001	2022	y	95.7696
301	10	10003	2023	31	5	151	1	51	2001	2022	y	95.7696
301	10	10003	2023	32	5	151	1	51	2001	2022	y	95.7696
302	10	10003	2023	21	5	151	1	51	2001	2022	y	95.7696

Pollutant Process ID	State ID	County ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspection Frequency	Test Standards ID	Beginning Model Year ID	Ending Model Year ID	Use IM Parameter Y (yes) or N (no)	Compliance Factor
302	10	10003	2023	31	5	151	1	51	2001	2022	y	95.7696
302	10	10003	2023	32	5	151	1	51	2001	2022	y	95.7696
112	10	10003	2023	21	5	143	1	43	2001	2022	y	95.7696
112	10	10003	2023	31	5	143	1	43	2001	2022	y	95.7696
112	10	10003	2023	32	5	143	1	43	2001	2022	y	95.7696

Table 23: 2026 Enhanced I/M Performance Standard - I/M Coverage Input Table

Pollutant Process ID	State ID	County ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspection Frequency	Test Standards ID	Beginning Model Year ID	Ending Model Year ID	Use IM Parameter Y (yes) or N (no)	Compliance Factor
101	10	10003	2026	21	1	111	1	11	1968	2000	y	95.7696
101	10	10003	2026	31	1	111	1	11	1968	2000	y	93.15509
101	10	10003	2026	32	1	111	1	11	1968	2000	y	73.0722
102	10	10003	2026	21	1	111	1	11	1968	2000	y	95.7696
102	10	10003	2026	31	1	111	1	11	1968	2000	y	93.15509
102	10	10003	2026	32	1	111	1	11	1968	2000	y	73.0722
301	10	10003	2026	21	1	111	1	11	1968	2000	y	95.7696
301	10	10003	2026	31	1	111	1	11	1968	2000	y	93.15509
301	10	10003	2026	32	1	111	1	11	1968	2000	y	73.0722
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101	10	10003	2026	21	1	151	1	51	2001	2025	y	95.7696
101	10	10003	2026	31	1	151	1	51	2001	2025	y	93.15509
101	10	10003	2026	32	1	151	1	51	2001	2025	y	73.0722

Pollutant Process ID	State ID	County ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspection Frequency	Test Standards ID	Beginning Model Year ID	Ending Model Year ID	Use IM Parameter Y (yes) or N (no)	Compliance Factor
102	10	10003	2026	21	1	151	1	51	2001	2025	y	95.7696
102	10	10003	2026	31	1	151	1	51	2001	2025	y	93.15509
102	10	10003	2026	32	1	151	1	51	2001	2025	y	73.0722
301	10	10003	2026	21	1	151	1	51	2001	2025	y	95.7696
301	10	10003	2026	31	1	151	1	51	2001	2025	y	93.15509
301	10	10003	2026	32	1	151	1	51	2001	2025	y	73.0722
302	10	10003	2026	21	1	151	1	51	2001	2025	y	95.7696
302	10	10003	2026	31	1	151	1	51	2001	2025	y	93.15509
302	10	10003	2026	32	1	151	1	51	2001	2025	y	73.0722
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112	10	10003	2026	31	1	143	1	43	2001	2025	y	93.15509
112	10	10003	2026	32	1	143	1	43	2001	2025	y	73.0722
101	10	10003	2026	21	5	111	1	11	1968	2000	y	95.7696
101	10	10003	2026	31	5	111	1	11	1968	2000	y	95.7696
101	10	10003	2026	32	5	111	1	11	1968	2000	y	95.7696
102	10	10003	2026	21	5	111	1	11	1968	2000	y	95.7696
102	10	10003	2026	31	5	111	1	11	1968	2000	y	95.7696
102	10	10003	2026	32	5	111	1	11	1968	2000	y	95.7696
301	10	10003	2026	21	5	111	1	11	1968	2000	y	95.7696
301	10	10003	2026	31	5	111	1	11	1968	2000	y	95.7696
301	10	10003	2026	32	5	111	1	11	1968	2000	y	95.7696
302	10	10003	2026	21	5	111	1	11	1968	2000	y	95.7696
302	10	10003	2026	31	5	111	1	11	1968	2000	y	95.7696
302	10	10003	2026	32	5	111	1	11	1968	2000	y	95.7696
101	10	10003	2026	21	5	151	1	51	2001	2025	y	95.7696
101	10	10003	2026	31	5	151	1	51	2001	2025	y	95.7696

Pollutant Process ID	State ID	County ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspection Frequency	Test Standards ID	Beginning Model Year ID	Ending Model Year ID	Use IM Parameter Y (yes) or N (no)	Compliance Factor
101	10	10003	2026	32	5	151	1	51	2001	2025	y	95.7696
102	10	10003	2026	21	5	151	1	51	2001	2025	y	95.7696
102	10	10003	2026	31	5	151	1	51	2001	2025	y	95.7696
102	10	10003	2026	32	5	151	1	51	2001	2025	y	95.7696
301	10	10003	2026	21	5	151	1	51	2001	2025	y	95.7696
301	10	10003	2026	31	5	151	1	51	2001	2025	y	95.7696
301	10	10003	2026	32	5	151	1	51	2001	2025	y	95.7696
302	10	10003	2026	21	5	151	1	51	2001	2025	y	95.7696
302	10	10003	2026	31	5	151	1	51	2001	2025	y	95.7696
302	10	10003	2026	32	5	151	1	51	2001	2025	y	95.7696
112	10	10003	2026	21	5	143	1	43	2001	2025	y	95.7696
112	10	10003	2026	31	5	143	1	43	2001	2025	y	95.7696
112	10	10003	2026	32	5	143	1	43	2001	2025	y	95.7696

The output database houses the modeling results for both scenarios after MOVES5 is executed. The structure of the output database is determined in the RunSpec and is important for post processing. Delaware selected the key output database parameters suggested in Section 4.1 of *EPA's PSM Analysis Guidance*, so the output data was in a format that made it easier to calculate the emission rates. Tables 24 and 25 list the two MOVES run scenarios along with the RunSpec file and input and output[74] databases associated with each run. The MOVES RunSpec (.mrs) files can be found in Appendix E.

Table 24: 2023 Input/Output Database and RunSpec for New Castle County

2023 Scenario	New Castle County Plan	Enhanced Performance Standard
Output Database	c10003y2023_psm_20250331_out	c10003y2023_psm_20250331_out
Input Database	c10003y2023_psm_existing_20250331_in	c10003y2023_psm_benchmark_20250331_in
RunSpec	c10003y2023_psm_existing_20250331.mrs	c10003y2023_psm_benchmark_20250331.mrs

Table 25: 2026 Input/Output Database and RunSpec for New Castle County

2026 Scenario	New Castle County Plan	Enhanced Performance Standard
Output Database	c10003y2026_psm_20250328_out	c10003y2026_psm_20250328_out
Input Database	c10003y2026_psm_existing_20250328_in	c10003y2026_psm_benchmark_20250328_in
RunSpec	c10003y2026_psm_existing_20250328.mrs	c10003y2026_psm_benchmark_20250328.mrs

[74] Both Scenario runs were directed to the same output database to assist with post processing as recommended by the *EPA's PSM Analysis Guidan*ce.

8.1.3 Performance Standard Modeling Analysis Results

The pollutants analyzed by this modeling include NOx and VOCs. NOx refers to nitric oxide (NO) and NO_2. Since NOx includes NO_2, NO_2 does not need to be reviewed separately. NOx and VOC are shown as emission rates in grams per mile for an ozone summer season (July) weekday. These rates were calculated by dividing the mass of pollutants by the distance traveled.

An I/M program has met the performance standard if the grams per mile emission rate for VOCs and NOx are equal to, or less than the emission rate calculated for the relevant performance standard. For the Enhanced I/M program, there is a 0.02 g/mile allowance for exceeding the performance standard, that is, the existing program's emission rates must not be more than 0.02 g/mile higher than the performance standard benchmark. The modeling analysis results for years 2023 and 2026 are shown in Table 26. More detail can be found in Appendix E.

Table 26: Performance Standard Modeling Analysis Results

Year	Equations:	A	B	(B+0.02) - A	Is (B+0.02) - A >= 0?
	Pollutant	New Castle County Plan Emission Rate	Enhanced Performance Std. Emission Rate	Difference*	Meets Enhanced Performance Std
		g/mile	g/mile	g/mile	Yes/No
2023	**VOC**	0.2473	0.2432	0.0159	Yes
2023	**NOx**	0.4354	0.4345	0.0192	Yes
2026	**VOC**	0.2135	0.2100	0.0165	Yes
2026	**NOx**	0.3445	0.3440	0.0195	Yes

*0.02 g/mile is added to the Enhanced Performance Standard Emission Rate to account for the allowance

The 2023 and 2026 analyses show New Castle County emission rates are within the 0.02 g/mile allowance of the performance standard for NOx and VOC. As a result, Delaware's current I/M program meets the enhanced performance standard.

8..1.4 Performance Standard Modeling Conclusion

As indicated in *EPA's PSM Analysis Guidance*, "States may determine through the PSM analysis that an existing SIP-approved program would meet the performance standard for purposes of the 2015 ozone NAAQS without modification. In this case, the state could submit a SIP revision with the associated PSM and a written statement certifying their determination in lieu of submitting new revised regulations."

For the purposes of the 2015 ozone NAAQS, the PSM analysis shows New Castle's I/M program meets the Enhanced performance standard without modification or revision required of the regulation. Table 27 provides program performance information and compares New Castle's existing I/M program found in Regulation 1131 to the enhanced federal requirements found in 40 CFR 51.351(i).

Table 27: Performance Standards: Federal I/M compared to New Castle County Program

I/M Program Parameter	**Enhanced I/M per 40 CFR 51.351 (i)**	**New Castle County I/M Program**
Network Type	Centralized testing.	Centralized testing.
Start Date	4 years after the effective date of designation and classification under the 8-hour ozone standard.	New Castle - 1983.
Test Frequency	Annual testing.	Biennial.
Model Year Coverage	Testing of 1968 and newer vehicles.	Testing of 1968 and newer with 7 year new model exemption.
Vehicle Type Coverage	Light duty vehicles, and light duty trucks, rated up to 8,500 pounds GVWR.	Light Duty Vehicles and Medium Duty Vehicles from 8,501 up to 14,000 pounds GVWR.

I/M Program Parameter	Enhanced I/M per 40 CFR 51.351 (i)	New Castle County I/M Program
Emission Test Type	Idle testing (as described in appendix B of this subpart) for 1968-2000 vehicles; onboard diagnostic checks on 2001 and newer vehicles.	Curb idle test 1968-1995 vehicles; OBD test, 1996 and newer with 7 year new model exemption, and 2008 or newer for vehicles up to 14,000 pounds GVWR.
Emission Standards	Those specified in 40 CFR part 85, subpart W.	1981 and newer 1.2% CO 1981 and newer 220 ppm HC.
Emission Control Device Inspection	Visual inspection of the positive crankcase ventilation valve on all 1968 through 1971 model year vehicles, inclusive, and of the exhaust gas recirculation valve on all 1972 and newer model year vehicles.	1981 and newer Catalytic converter.
OBD II	None.	1996 and newer with 7 year new model exemption, and 2008 or newer for vehicles up to 14,000 pounds GVWR.
Evaporative System Function Checks	None, with the exception of those performed by the OBD system on vehicles so-equipped and only for model year 2001 and newer vehicles.	1975-1995 gas cap pressure check.
Stringency	20% emission test failure rate among pre-1981 model year vehicles.	NA

I/M Program Parameter	Enhanced I/M per 40 CFR 51.351 (i)	New Castle County I/M Program
Waiver Rate	A 3% waiver rate, as a percentage of failed vehicles.	3%
Compliance Rate	A 96% compliance rate.	See Appendix A spreadsheets in *Motor Vehicle Emissions Inspection Program; Plan for Implementation (PFI) for Regulation 1126 and Regulation 1131.*
Evaluation Date	Enhanced I/M program areas subject to the provisions of this paragraph (i) shall be shown to obtain the same or lower emission levels for HC and NOX as the model program described in this paragraph assuming an evaluation date set 6 years after the effective date of designation and classification under the 8-hour ozone standard (rounded to the nearest July) to within ±0.02 gpm. Subject programs shall demonstrate through modeling the ability to maintain this percent level of emission reduction (or better) through their applicable attainment date for the 8-hour ozone standard, also rounded to the nearest July.	2023 and 2026 (fulfilled in this report).

8.2 Enhanced I/M Program Requirements and Certification

The following statement certifies that the existing SIP-approved program meets the performance standard and all applicable I/M requirements in 40 CFR 50, Subpart S for purposes of the 2015 ozone NAAQS without modification:

Department of Natural Resource and Environmental Control Division of Air Quality attests that Delaware's current I/M SIP (*Motor Vehicle Emissions Inspection Program; Plan for Implementation (PFI) for Regulation 1126 and Regulation 1131*) meets the I/M regulations at 40 CFR 51.372 required elements outlined in (a)(1)-(8). A summary of the addressed elements is shown below in Table 28.

Table 28: I/M Program Regulatory Requirements

40 CFR 51.372	Regulatory Requirements of I/M Program	Satisfied Element (yes/no)	Reference to Elements
(a)(1)	A schedule for I/M program implementation and interim milestones leading to mandatory testing; (i) Passage of enabling statutory or other legal authority; (ii) Proposal of draft regulations and promulgation of final regulations; (iii) Issuance of final specifications and procedures; (iv) Issuance of final Request for Proposals (if applicable); (v) Licensing or certifications of stations and inspectors; (vi) The date mandatory testing will begin for each model year to be covered by the program; (vii) The date full-stringency cutpoints will take effect; (viii) All other relevant dates;	**Yes**	**Motor Vehicle Emissions Inspection Program; Plan for Implementation (PFI) for Regulation 1126 and Regulation 1131: *Section 1 -Applicability (c)* & *Section 2 - Low Enhanced I/M Performance Standard (b).*** 5. Motor Vehicle Emissions Inspection Program; Plan for Implementation (PFI) for Regulation 1126 and Regulation 1131: *Section 1 -Applicability (c)* per 40 CFR 51.350: "Delaware has an approved rate of progress plan for ozone per 40 CFR 51.350 (b) and the low-enhanced program was approved by EPA on October 17, 1983 [48 FR 26986]." 6. Refer to - 7 **DE Admin. Code** 1131 7. Refer to - PFI Section 7 -Test procedures and standards per 40 CFR 51.357 8. NA 9. Refer to - PFI Section 17 - Motor Vehicle Technician Associate training and certification per 40 CFR 51.367 10. Refer to - Table 18 of this Report 11. Refer to - Table 18 of this Report 12. Refer to - Table 18 of this Report

40 CFR 51.372	Regulatory Requirements of I/M Program	Satisfied Element (yes/no)	Reference to Elements
(a)(2)	A Performance Standard Modeling analysis of the proposed I/M program;	**Yes**	Fulfilled in this report (Section 8.1)
(a)(3)	The geographic applicability of the I/M program;	**Yes**	**Motor Vehicle Emissions Inspection Program; PFI for Regulation 1126 and Regulation 1131: *Section 1 – Applicability (a) & (b):*** "The following analysis portrays the tests of the EPA Rule 40 CFR 51.350 (a)(1)(9), first for classification and population criteria and then for extent of area of coverage. For both analyses, various criteria are used to determine applicability. Following each criteria is an analysis which identifies the areas of Delaware where each criteria may or may not apply. The rule language is shown in italics. (a) Nonattainment area classification and population criteria. *(1) States or areas within an ozone transport region shall implement enhanced I/M programs in any metropolitan statistical area (MSA), or portion of an MSA, within the state or area with a 1990 population of 100,000 or more as defined by the Office of Management and Budget (OMB) regardless of the area's attainment classification. In the case of a multi-state MSA, enhanced I/M shall be implemented in all ozone transport region portions if the sum of these portions has a population of 100,000 or more, irrespective of the population of the portion in the individual ozone transport region state or area…."*
(a)(4)	A detailed discussion of each of the required design elements;	**Yes**	**Motor Vehicle Emissions Inspection Program; PFI for Regulation 1126 and Regulation 1131: *Section 2 – Low Enhanced I/M Performance Standard* per 40 CFR 51.351 (b)(d) and (g).** Refer to - Table 26 in this report
(a)(5)	Legal authority requiring or allowing implementation of the I/M program and providing either	**Yes**	**Motor Vehicle Emissions Inspection Program; PFI for Regulation 1126 and Regulation 1131: *Section 6 – Vehicle coverage*:**

40 CFR 51.372	Regulatory Requirements of I/M Program	Satisfied Element (yes/no)	Reference to Elements
	broad or specific authority to perform all required elements of the program;		"Section 6 – Vehicle Coverage per 40 CFR 51.365: The legal authority for establishing which vehicles are required to be inspected by this program are contained in 7 Del.C. §6708 and 21 Del.C. §2143 and as described in Appendix F – "Legal Authority for the I/M Program." The inspection requirements for vehicles covered by 7 **DE Admin. Code** 1131, will apply to all of the subject vehicles registered in Kent and New Castle counties."
(a)(6)	Legal authority for I/M program operation until such time as it is no longer necessary;	**Yes**	**Motor Vehicle Emissions Inspection Program; PFI for Regulation 1126 and Regulation 1131: *Section 6 – Vehicle coverage* & *Appendix F*.** Appendix F: "This LEIM program shall remain in effect if the area is redesignated to attainment status, until approval of a Maintenance Plan, under Section 175A of the Clean Air Act, which demonstrates that the area can maintain the relevant standard for the maintenance period (10 years) without benefit of the emission reductions attributable to the continuation of the LEIM program…"
(a)(7)	Implementing regulations, interagency agreements, and memoranda of understanding; and,	**Yes**	***7 Title DE Code Section 6701. Emissions standards require for inspection and Section 6708. Implementation; Department's standards.*** 7 DE Code Section 6701 ":Any motor vehicle which is subject to inspection by the Division of Motor Vehicles, or any other duly authorized body, shall, as a condition of compliance with the inspection, pass such tests as may be required to demonstrate that the motor vehicle complies with any standards and requirements, rules or regulations for the control of air contaminants established by the Department of Natural Resources and Environmental Control which are applicable to such motor vehicle." 7 DE Code Section 6701: "The Division of Motor Vehicles, after consultation with the Department of Natural Resources and Environmental Control, shall institute such

40 CFR 51.372	Regulatory Requirements of I/M Program	Satisfied Element (yes/no)	Reference to Elements
			testing procedures recommended by Department of Natural Resources and Environmental Control to effectively demonstrate that the emissions from motor vehicles passing through the inspection lanes are in accordance with the standards, codes, rules or regulations of the Department of Natural Resources and Environmental Control."
(a)(8)	Evidence of adequate funding and resources to implement all aspects of the program.	**Yes**	**Motor Vehicle Emissions Inspection Program; PFI for Regulation 1126 and Regulation 1131: *Section 4 - Adequate tools and resources* per 40 CFR 51.354:** "Section 4 - Adequate tools and resources per 40 CFR 51.354. (a) Administrative resources. The program maintains the administrative resources necessary to perform all of the program functions including quality assurance, data analysis and reporting, and the holding of hearings and adjudication of cases when necessary. (1) The establishment of an I & M Fund by the Delaware Legislature is stated in the following paragraphs of 29 Del. C. §6102(o)(1)-(4): *"(o)(1) Notwithstanding other provisions of this chapter, there shall be established a special fund of the State to be known as the "Inspection and Maintenance Fund" (referred to in this subsection as "the I & M Fund").* *(2) The Secretary of Finance shall, commencing at the beginning of each fiscal year, cause to be deposited into the I & M Fund amounts received as payments of costs assessed by the Justice of the Peace Courts relating to traffic and criminal cases under §9801(2) of Title 10, until the amount deposited in said fiscal year shall equal $2,800,000.* *(3) The purpose of the I & M Fund is to provide operating expenses associated with the Delaware Motor Vehicle Enhanced Inspection and* *Maintenance Program. Any balance in the I & M Fund as of the last day of the fiscal year in excess of $250,000 shall be deposited into the General* *Fund…."*

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

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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:

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

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

Facility Name	Annual (tpy)			SSWD (tpd)		
	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

	Annual (tpy)			SSWD (tpd)		
Facility Name	**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:

$$emissionQuant \times (DayID / 7) \times DaysInMonth$$

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:

$$E_p = Yd \times FC_{Yd} \times EF_{\boldsymbol{p}}$$

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:

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

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 39º30' 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 39º30', 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 39º30'. 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

		Annual (tpy)			SSWD (tpd)		
SCC	**Category Description**	**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:

$$emissionQuant \times DayID / 7 \times DaysInMonth$$

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.
2017 Inventory	The 2017 inventory by SCC.
Summary	Pivot table of the 2017 adjusted byi.
Calculations	Lighter fluid, hot mix asphalt, and compost calculation from EPA EMP Modeling Platform.

Nonpoint Categories

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.
Graphic Arts	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Residential Wood Fuel	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.

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 (2460309	Calculated EPA 2017 value and grew to 2023 with DE Population. SSWD calculated internally; higher emissions in summer.
Compost	Calculated EPA 2017 from EPA 2022v1, backcalculated with EPA growth factor. SSWD used EPA's 2022v1 temporal allocation.
Hot Mix Asphalt	Calculated EPA 2017 from EPA 2022v1, backcalculated with EPA growth factor. SSWD used EPA's 2022v1 temporal allocation.

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
New SCC	Compost[1]	-	-	-	-	-	180
Methodology Change	Graphic Arts	-	-	257	-	-	128
New SCC	Hot Mix Asphalt[1]	-	-	-	-	-	159
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
Methodology Change	Residential Wood Fuel	2,385	40	353	1795	30	271
VOC Double Count	Retail Gasoline Stations	-	-	402	-	-	240
	Total	**2385**	**40**	**1561**	**1945**	**33**	**1487**

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
New SCC	Compost[1]	-	-	-	-	-	0.52
Methodology Change	Graphic Arts	-	-	0.99	-	-	0.5
New SCC	Hot Mix Asphalt[1]	-	-	-	-	-	0.47
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
Methodology Change	Residential Wood Fuel	5.15	0.09	0.76	1.46	0.02	0.19
Use Internal SSWD	Retail Gasoline Stations	-	-	3.38	-	-	0.78
	Total	**5.7**	**1.1**	**5.84**	**2.65**	**0.77**	**3.25**

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.

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	0.0027473	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0036667	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0027473	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	0.0044308	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	0.0044308	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	0.0044308	2	2	2	10	16	16	16	16	10	5	3	2	100	5	5	5	5	20	30	30	100
Commercial & Consumer Product:	2460030999	VOC	0.0044308	2	2	2	10	16	16	16	16	10	5	3	2	100	5	5	5	5	20	30	30	100
Hot Mix Asphalt	2461021000	VOC	0.0029684	* Same as 2026 (2022v1 EMP)																				
Compost	2680003000	VOC	0.0029164	* Same as 2026 (2022v1 EMP)																				

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	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103004001	VOC	0.0001768	0.197734	0.144251	0.165504	0.05013	0.033548	0.004588	0.004588	0.004588	0.007624	0.036818	0.132573	0.218053	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103004002	VOC	0.0001768	0.197734	0.144251	0.165504	0.05013	0.033548	0.004588	0.004588	0.004588	0.007624	0.036818	0.132573	0.218053	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103005000	VOC	0.0009578	0.177663	0.107213	0.121884	0.026199	0.021621	0.052435	0.017538	0.004588	0.013953	0.096622	0.150192	0.210093	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103006000	VOC	0.0015696	0.14104	0.112533	0.126674	0.056192	0.053947	0.041975	0.037336	0.042873	0.048784	0.062551	0.10954	0.166554	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103007000	VOC	0.0005779	0.182615	0.1362	0.154644	0.054518	0.040128	0.014995	0.014995	0.014995	0.01763	0.042965	0.126066	0.200248	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103001000	NOX	0	0.204399	0.1478	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103004001	NOX	0.0001768	0.197734	0.144251	0.165504	0.05013	0.033548	0.004588	0.004588	0.004588	0.007624	0.036818	0.132573	0.218053	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103004002	NOX	0.0001768	0.197734	0.144251	0.165504	0.05013	0.033548	0.004588	0.004588	0.004588	0.007624	0.036818	0.132573	0.218053	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103005000	NOX	0.0009578	0.177663	0.107213	0.121884	0.026199	0.021621	0.052435	0.017538	0.004588	0.013953	0.096622	0.150192	0.210093	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103006000	NOX	0.0015696	0.14104	0.112533	0.126674	0.056192	0.053947	0.041975	0.037336	0.042873	0.048784	0.062551	0.10954	0.166554	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103007000	NOX	0.0005779	0.182615	0.1362	0.154644	0.054518	0.040128	0.014995	0.014995	0.014995	0.01763	0.042965	0.126066	0.200248	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103001000	CO	0	0.204399	0.1478	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103004001	CO	0.0001768	0.197734	0.144251	0.165504	0.05013	0.033548	0.004588	0.004588	0.004588	0.007624	0.036818	0.132573	0.218053	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103004002	CO	0.0001768	0.197734	0.144251	0.165504	0.05013	0.033548	0.004588	0.004588	0.004588	0.007624	0.036818	0.132573	0.218053	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103005000	CO	0.0009578	0.177663	0.107213	0.121884	0.026199	0.021621	0.052435	0.017538	0.004588	0.013953	0.096622	0.150192	0.210093	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103006000	CO	0.0015696	0.14104	0.112533	0.126674	0.056192	0.053947	0.041975	0.037336	0.042873	0.048784	0.062551	0.10954	0.166554	1	167	167	167	167	167	167	0	1000
Commercial Fuel	2103007000	CO	0.0005779	0.182615	0.1362	0.154644	0.054518	0.040128	0.014995	0.014995	0.014995	0.01763	0.042965	0.126066	0.200248	1	167	167	167	167	167	167	0	1000
Gasoline Marketing	2501060051	VOC	0.0034323	0.081145	0.071113	0.067163	0.082633	0.098419	0.086432	0.080106	0.101179	0.070968	0.098055	0.079922	0.082865	1	166.7	166.7	166.7	166.7	166.7	166.7	0	
Gasoline Marketing	2501060053	VOC	0.0034323	0.081145	0.071113	0.067163	0.082633	0.098419	0.086432	0.080106	0.101179	0.070968	0.098055	0.079922	0.082865	1	166.7	166.7	166.7	166.7	166.7	166.7	0	
Gasoline Marketing	2501060201	VOC	0.0029419	0.081145	0.071113	0.067163	0.082633	0.098419	0.086432	0.080106	0.101179	0.070968	0.098055	0.079922	0.082865		142.86	142.86	142.86	142.86	142.86	142.86	142.86	
Gasoline Marketing	2505030120	VOC	0.0034323	0.081145	0.071113	0.067163	0.082633	0.098419	0.086432	0.080106	0.101179	0.070968	0.098055	0.079922	0.082865	1	166.7	166.7	166.7	166.7	166.7	166.7	0	
Gasoline Marketing - PFCs	2501011011	VOC	0.0034137	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 - PFCs	2501011012	VOC	0.0034137	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 - PFCs	2501011013	VOC	0.0034137	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 - PFCs	2501011014	VOC	0.0034137	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 - PFCs	2501011015	VOC	0.0034137	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 - PFCs	2501012011	VOC	0.0037863	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 - PFCs	2501012012	VOC	0.0037863	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 - PFCs	2501012013	VOC	0.0037863	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 - PFCs	2501012014	VOC	0.0037863	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 - PFCs	2501012015	VOC	0.0037863	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	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104004000	VOC	0.0001971	0.195722	0.14318	0.164059	0.050714	0.034424	0.005973	0.005973	0.005973	0.008956	0.037636	0.131707	0.215683	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104006000	VOC	0.0005736	0.19715	0.141168	0.170675	0.061843	0.035368	0.020918	0.015259	0.015966	0.017381	0.025162	0.096302	0.202809	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104007000	VOC	0.0007502	0.171373	0.130214	0.14657	0.057781	0.04502	0.022733	0.022733	0.022733	0.02507	0.047536	0.121227	0.18701	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104011000	VOC	0	0.204399	0.1478	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104002000	NOX	0	0.204399	0.1478	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104004000	NOX	0.0001971	0.195722	0.14318	0.164059	0.050714	0.034424	0.005973	0.005973	0.005973	0.008956	0.037636	0.131707	0.215683	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104006000	NOX	0.0005736	0.19715	0.141168	0.170675	0.061843	0.035368	0.020918	0.015259	0.015966	0.017381	0.025162	0.096302	0.202809	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104007000	NOX	0.0007502	0.171373	0.130214	0.14657	0.057781	0.04502	0.022733	0.022733	0.022733	0.02507	0.047536	0.121227	0.18701	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104011000	NOX	0	0.204399	0.1478	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104002000	CO	0	0.204399	0.1478	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104004000	CO	0.0001971	0.195722	0.14318	0.164059	0.050714	0.034424	0.005973	0.005973	0.005973	0.008956	0.037636	0.131707	0.215683	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104006000	CO	0.0005736	0.19715	0.141168	0.170675	0.061843	0.035368	0.020918	0.015259	0.015966	0.017381	0.025162	0.096302	0.202809	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104007000	CO	0.0007502	0.171373	0.130214	0.14657	0.057781	0.04502	0.022733	0.022733	0.022733	0.02507	0.047536	0.121227	0.18701	1	143	143	143	143	143	143	143	1000
Residential Fuel	2104011000	CO	0	0.204399	0.1478	0.170292	0.048196	0.030648	0	0	0	0.003213	0.034108	0.135442	0.225902	1	143	143	143	143	143	143	143	1000
Residential Wood Combustion	2104009000	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008100	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008510	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008530	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008620	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008610	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008630	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008700	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008230	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008220	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008210	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008330	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008320	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008310	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008400	VOC	0.0006939	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104009000	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008100	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008510	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008530	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008620	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008610	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008630	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008700	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008230	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008220	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008210	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008330	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008320	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008310	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104008400	NOx	0.0008178	* Same as 2026 (2022v1 EMP)																				
Residential Wood Combustion	2104009000	CO	0.0008128	* Same as 2026 (2022v1 EMP)																				

Residential Wood Combustion	2104008100	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008510	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008530	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008620	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008610	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008630	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008700	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008230	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008220	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008210	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008330	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008320	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008310	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Residential Wood Combustion	2104008400	CO	0.0008128	* Same as 2026 (2022v1 EMP)
Graphic Arts	2425000000	VOC	0.0029684	* Same as 2026 (2022v1 EMP)

2017 Inventory

Category	State FIPS	County FIPS	SCC	Pollutant Code	2017 Emission TON Value Annual	2017 SSWD (tpd)	2017 Data Source	Notes
Ag Burning	10	003	2801500600	CO	8.4	0.00	BYI	
Ag Burning	10	003	2801500600	NOX	0.2	0.00	BYI	
Ag Burning	10	003	2801500600	VOC	0.6	0.00	BYI	
AIM Coatings	10	003	2401002000	VOC	271.1	1.00	ADJUSTED ANNUEL, SSWD BYI	SSWD from byi, annual value corrected
AIM Coatings	10	003	2401003000	VOC	106.2	0.39	ADJUSTED ANNUEL, SSWD BYI	SSWD from byi, annual value corrected
AIM Coatings	10	003	2401100000	VOC	13.2	0.06	ADJUSTED ANNUEL, SSWD BYI	SSWD from byi, annual value corrected
Animal Husbandry	10	003	2805002000	VOC	2.8	0.01	ADJUSTED BYI	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	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	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	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	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	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	method and show complete emissions.
Animal Husbandry	10	003	2805040000	VOC	0.1	0.00	ADJUSTED BYI	method and show complete emissions.
Animal Husbandry	10	003	2805045000	VOC	0.2	0.00	ADJUSTED BYI	method and show complete emissions.
Asphalt Paving	10	003	2461021000	VOC	0.0	0.00	BYI	
Asphalt Paving	10	003	2461022000	VOC	0.0	0.00	BYI	
Auto Refinishing	10	003	2401005000	VOC	21.8	0.08	ADJUSTED ANNUEL, SSWD BYI	

Commercial & Consumer Products	10	003	2460100000	VOC	331.3	0.91	BYI	
Commercial & Consumer Products	10	003	2460200000	VOC	361.7	0.99	BYI	
Commercial & Consumer Products	10	003	2460400000	VOC	97.0	0.27	BYI	
Commercial & Consumer Products	10	003	2460500000	VOC	85.2	0.23	BYI	
Commercial & Consumer	10	003	2460600000	VOC	32.9	0.09	BYI	
Commercial & Consumer Products	10	003	2460800000	VOC	87.0	0.33	BYI	
Commercial & Consumer Products	10	003	2460900000	VOC	122.6	0.34	BYI	
Commercial Fuel	10	003	2103001000	VOC	0.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103004001	VOC	0.3	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103004002	VOC	2.3	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103005000	VOC	0.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103006000	VOC	17.9	0.03	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103007000	VOC	0.2	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103001000	NOX	0.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103004001	NOX	20.4	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103004002	NOX	32.4	0.01	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103005000	NOX	0.6	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103006000	NOX	326.0	0.51	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103007000	NOX	4.8	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103001000	CO	0.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.

Commercial Fuel	10	003	2103004001	CO	5.1	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103004002	CO	7.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103005000	CO	0.1	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103006000	CO	273.9	0.43	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Commercial Fuel	10	003	2103007000	CO	2.8	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Dry Cleaners	10	003	2420010370	VOC	1.4	0.01	BYI	
Gasoline Marketing	10	003	2501060051	VOC	0.7	0.00	ADJUSTED BYI	SSWD/annual different than byi; EPA projected value
Gasoline Marketing	10	003	2501060053	VOC	136.7	0.47	ADJUSTED BYI	SSWD/annual different than byi; EPA projected value with DE controls
Gasoline Marketing	10	003	2501060201	VOC	94.3	0.28	ADJUSTED BYI	SSWD/annual different than byi; EPA projected value with DE controls
Gasoline Marketing	10	003	2505030120	VOC	8.8	0.03	ADJUSTED BYI	SSWD/annual different than byi; Use EPA GF for this scc
Gasoline Marketing - aircraft refueling	10	003	2501080050	VOC	1.6	0.01	BYI	EPA projected value
Gasoline Marketing - aircraft refueling	10	003	2501080100	VOC	1.1	0.00	BYI	EPA projected value
Gasoline Marketing - aircraft refueling	10	003	2501080201	VOC	0.4	0.00	BYI	EPA projected value
Gasoline Marketing - PFCs	10	003	2501011011	VOC	7.4	0.03	ANNUAL BYI, SSWD ADJUSTED	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	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	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	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	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	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	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	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	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	SSWD different than byi; controls calculated from DE internal documents.
Graphic Arts	10	003	2425000000	VOC	128.3	0.50	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Industrial Adhesives	10	003	2440020000	VOC	106.9	0.41	BYI	
Industrial Fuel	10	003	2102002000	VOC	0.0	0.00	BYI	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	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	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	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	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	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	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	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	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	BYI doesn't match NEI/EPA; therefore, use EPA growth factors, not emission values.
Industrial Fuel	10	003	2102006000	NOX	227.2	0.70	BYI	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	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	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	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	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	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	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	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	
Industrial Surface	10	003	2401020000	VOC	2.0	0.01	BYI	
Industrial Surface	10	003	2401025000	VOC	0.6	0.00	BYI	
Industrial Surface	10	003	2401030000	VOC	12.9	0.05	BYI	
Industrial Surface	10	003	2401040000	VOC	0.0	0.00	BYI	
Industrial Surface	10	003	2401045000	VOC	1.2	0.00	BYI	
Industrial Surface	10	003	2401055000	VOC	12.9	0.05	BYI	
Industrial Surface	10	003	2401060000	VOC	0.0	0.00	BYI	
Industrial Surface	10	003	2401065000	VOC	0.0	0.00	BYI	
Industrial Surface	10	003	2401070000	VOC	4.8	0.02	BYI	
Industrial Surface	10	003	2401075000	VOC	2.5	0.01	BYI	
Industrial Surface	10	003	2401080000	VOC	3.9	0.02	BYI	
Industrial Surface	10	003	2401085000	VOC	0.0	0.00	BYI	
Industrial Surface	10	003	2401090000	VOC	35.0	0.13	BYI	
Land Clearing	10	003	2610000500	VOC	0.0	0.00	BYI	
Land Clearing	10	003	2610000500	NOx	0.0	0.00	BYI	
Land Clearing	10	003	2610000500	CO	0.0	0.00	BYI	
Prescribed Burning	10	003	2811015001	NOX	0.3	0.00	BYI	
Prescribed Burning	10	003	2811015002	NOX	4.2	0.00	BYI	
Prescribed Burning	10	003	2811015002	VOC	47.2	0.00	BYI	
Residential Fuel	10	003	2104002000	VOC	0.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104004000	VOC	2.5	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104006000	VOC	19.7	0.01	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.

Residential Fuel	10	003	2104007000	VOC	0.9	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104011000	VOC	0.1	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104002000	NOX	0.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104004000	NOX	64.5	0.01	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104006000	NOX	336.6	0.19	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104007000	NOX	23.9	0.02	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104011000	NOX	1.4	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104002000	CO	0.0	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104004000	CO	17.9	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104006000	CO	143.2	0.08	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104007000	CO	13.8	0.01	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Fuel	10	003	2104011000	CO	0.4	0.00	ANNUAL BYI, SSWD ADJUSTED	Adjust SSWD fraction to match internal data SSWD calculation.
Residential Open Burning	10	003	2610000100	CO	0.3	0.00	BYI	
Residential Open Burning	10	003	2610000400	CO	12.9	0.00	BYI	
Residential Open Burning	10	003	2610030000	CO	2.2	0.00	BYI	
Residential Open Burning	10	003	2610000100	NOX	0.0	0.00	BYI	
Residential Open Burning	10	003	2610000400	NOX	0.5	0.00	BYI	
Residential Open Burning	10	003	2610030000	NOX	0.2	0.00	BYI	
Residential Open Burning	10	003	2610000100	VOC	0.1	0.00	BYI	
Residential Open Burning	10	003	2610000400	VOC	1.8	0.00	BYI	
Residential Open Burning	10	003	2610030000	VOC	0.2	0.00	BYI	
Solvent Cleaning	10	003	2415000000	VOC	91.0	0.29	BYI	DE Control
Structure Fires	10	003	2810030000	VOC	2.5	0.01	BYI	
Structure Fires	10	003	2810035000	VOC	0.2	0.00	BYI	
Structure Fires	10	003	2810030000	NOX	0.3	0.00	BYI	

Structure Fires	10	003	2810035000	NOX	0.0	0.00	BYI	
Structure Fires	10	003	2810030000	CO	13.5	0.03	BYI	
Structure Fires	10	003	2810035000	CO	1.2	0.00	BYI	
Traffic Markings	10	003	2401008000	VOC	2.3	0.01	BYI	
Vehicle Fires	10	003	2810050000	NOX	0.1	0.00	BYI	
Vehicle Fires	10	003	2810050000	CO	3.1	0.01	BYI	
Vehicle Fires	10	003	2810050000	VOC	0.8	0.00	BYI	
Fuel Comb - Residential - Wood	10	003	2104008100	CO	242.0	0.20	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008210	CO	85.1	0.07	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008220	CO	59.8	0.05	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008230	CO	30.7	0.02	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008310	CO	227.9	0.19	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008320	CO	160.1	0.13	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008330	CO	82.3	0.07	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008400	CO	6.8	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008510	CO	50.3	0.04	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008530	CO	0.4	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008610	CO	95.7	0.08	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008620	CO	61.1	0.05	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008630	CO	0.1	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008700	CO	654.2	0.53	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104009000	CO	38.5	0.03	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.

Fuel Comb - Residential - Wood	10	003	2104008100	NOX	4.2	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008210	NOX	1.0	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008220	NOX	0.8	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008230	NOX	0.7	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008310	NOX	2.8	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008320	NOX	2.2	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008330	NOX	1.8	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008400	NOX	1.6	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008510	NOX	0.5	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008530	NOX	0.1	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008610	NOX	0.5	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008620	NOX	0.3	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008630	NOX	0.0	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008700	NOX	11.4	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104009000	NOX	2.4	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008100	VOC	30.7	0.02	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008210	VOC	19.5	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008220	VOC	5.9	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008230	VOC	5.0	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.

Fuel Comb - Residential - Wood	10	003	2104008310	VOC	52.3	0.04	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008320	VOC	15.7	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008330	VOC	13.4	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008400	VOC	0.9	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008510	VOC	3.2	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008530	VOC	0.0	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008610	VOC	17.9	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008620	VOC	11.4	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008630	VOC	0.0	0.00	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104008700	VOC	83.0	0.06	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Fuel Comb - Residential - Wood	10	003	2104009000	VOC	12.2	0.01	Adjusted BYI	Methodology change. Updated to reflect 2020 NEI methodology. Backcalculated from 2022v1 emissions and growth factor.
Ag. Pesticides	10	003	2461850000	VOC	30.4	0.11	ADJUSTED BYI	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	
Commercial Cooking	10	003	2302003000	VOC	4.3	0.01	BYI	
Commercial Cooking	10	003	2302003200	VOC	0.1	0.00	BYI	
Commercial Cooking	10	003	2302002200	VOC	21.0	0.06	BYI	
Commercial Cooking	10	003	2302002100	VOC	6.3	0.02	BYI	
Commercial Cooking	10	003	2302002100	CO	20.9	0.06	BYI	
Commercial Cooking	10	003	2302002200	CO	68.8	0.19	BYI	
Commercial Cooking	10	003	2302003100	CO	5.8	0.02	BYI	
Prescribed Burning	10	003	2811015001	VOC	17.5	0.00	BYI	
Prescribed Burning	10	003	2811015002	CO	198.3	0.00	BYI	
Prescribed Burning	10	003	2811015001	CO	74.9	0.00	BYI	
CMV Evap	10	003	2505020030	VOC	84.8	0.23	BYI	
CMV Evap	10	003	2505020060	VOC	0.0	0.00	BYI	
CMV Evap	10	003	2505020090	VOC	0.3	0.00	BYI	

CMV Evap	10	003	2505020120	VOC	29.2	0.08	BYI	
CMV Evap	10	003	2505020150	VOC	3.1	0.01	BYI	
Wildfires	10	003	2810001001	CO	0.0	0.00	BYI	
Wildfires	10	003	2810001002	CO	0.0	0.00	BYI	
Wildfires	10	003	2810001001	NOX	0.0	0.00	BYI	
Wildfires	10	003	2810001002	NOX	0.0	0.00	BYI	
Wildfires	10	003	2810001001	VOC	0.0	0.00	BYI	
Wildfires	10	003	2810001002	VOC	0.0	0.00	BYI	
Human Cremation	10	003	2810060100	CO	0.3	0.00	ADJUSTED BYI	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	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	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	2017 NEI SCC Not included in BYI:
Animal Cremation	10	003	2810060200	NOX	0.000100	0.00000027	ADJUSTED BYI	2017 NEI SCC Not included in BYI:
Animal Cremation	10	003	2810060200	VOC	0.000008	0.00000002	ADJUSTED BYI	2017 NEI SCC Not included in BYI:
POTW	10	003	2630020000	VOC	11.6	0.03	ADJUSTED BYI	2017 NEI SCC Not included in BYI:
Res Grilling	10	003	2810025000	CO	150.0	0.66	ADJUSTED BYI	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	2017 NEI SCC Not included in BYI:
Res Grilling	10	003	2810025000	VOC	8.2	0.04	ADJUSTED BYI	2017 NEI SCC Not included in BYI:
Commercial & Consumer Products	10	003	2460030999	VOC	12.3	0.05	ADJUSTED BYI	New SCCs: Backcalculated from EPA 2016v3 data
Compost	10	004	2680003000	VOC	179.8644758	0.52454916	ADJUSTED BYI	Calculated EPA 2017 from EPA 2022v1, backcalculated with EPA growth factor. SSWD used EPA's 2022v1 temporal allocation.
Hot Mix Asphalt	10	005	2461025100	VOC	158.7990451	0.47137834	ADJUSTED BYI	Calculated EPA 2017 from EPA 2022v1, backcalculated with EPA growth factor. SSWD used EPA's 2022v1 temporal allocation.

Summary

	Pollutant Code	Values				
	CO		NOX		VOC	
Category	Sum of 2017 Emission TON Value Annual	Sum of 2017 SSWD (tpd)	Sum of 2017 Emission TON Value Annual	Sum of 2017 SSWD (tpd)	Sum of 2017 Emission TON Value Annual	Sum of 2017 SSWD (tpd)
Ag Burning	8.362134246	0	0.247400421	0	0.573968978	0
Ag. Pesticides					30.40494	0.11148478
AIM Coatings					390.4797406	1.451999871
Animal Cremation	8.25241E-05	2.26715E-07	0.000099701	2.73904E-07	8.37377E-06	2.30049E-08
Animal Husbandry					35.02167339	0.098852834
Asphalt Paving					0.02471877	6.25906E-05
Auto Refinishing					21.81083704	0.083887835
CMV Evap					117.3614506	0.322421568
Commercial & Consumer Products					1129.972707	3.22341361
Commercial Cooking	95.557175	0.262782231			34.5754691	0.09508254
Commercial Fuel	288.7860704	0.43365527	384.3485858	0.524480063	20.73333279	0.028725404
Dry Cleaners					1.43	0.0055
Fuel Comb - Residential - Wood	1795.064736	1.458969456	30.38930343	0.024853481	271.204975	0.188178877
Gasoline Marketing					240.4514205	0.779060473
Graphic Arts					128.2713902	0.5
Human Cremation	0.3146659	0.000864467	0.380162	0.001044401	0.03192934	8.7718E-05
Industrial Adhesives					106.8589894	0.410996113
Industrial Fuel	268.336505	0.798286276	584.5350112	1.662176282	36.33729501	0.102665348
Industrial Surface					79.07955211	0.304152123
Land Clearing	0	0	0	0	0	0
POTW					11.58427	0.031824918
Prescribed Burning	273.17285	0	4.492396	0	64.663517	0
Res Grilling	150.0404374	0.664794553	3.102729841	0.01374748	8.226366533	0.036449132
Residential Fuel	175.2820089	0.095998926	426.3133517	0.223642203	23.17428778	0.01247721
Solvent Cleaning					90.95825634	0.292115939
Structure Fires	14.72089141	0.033848909	0.343487466	0.000789808	2.698830092	0.006205633
Traffic Markings					2.27737129	0.009055508
Vehicle Fires	3.078125	0.008456387	0.0985	0.000270604	0.788	0.002164835
Wildfires	0	0	0	0	0	0
Gasoline Marketing - aircraft refueling					3.088817563	0.009852513
Gasoline Marketing - PFCs					119.7483254	0.420158045
Residential Open Burning	15.4820293	0.009038594	0.636775605	0.000487517	2.003195689	0.000933336
Compost					179.8644758	0.524549164
Hot Mix Asphalt					158.7990451	0.47137834
Grand Total	**3088.197711**	**3.766695296**	**1434.887803**	**2.451492113**	**3312.499157**	**9.523736281**

Calculations:

Category	region_cd	scc	poll	EPA 2023 tpy	Calculated 2017 (tpy)	2016-2017 annual gf	Notes	EMP
Lighter Fluid	10003	2460030999	VOC	12.70	12.27	1.01	Adjusted BYI	2026v2
Category	**region_cd**	**scc**	**poll**	**EPA 2026 tpy**	**Calculated 2017 (tpy)**	**2022-2026 annual GF**	Notes	EMP
Compost	10003	2680003000	VOC	191.54	179.86	1.007	ADJUSTED BYI	2022v1
Category	**region_cd**	**scc**	**poll**	**EPA 2022 tpy**	**Calculated 2017 (tpy)**	**2022-2026 annual GF**	**Notes**	**EMP**
Hot Mix Asphalt	10003	2461025100	VOC	166.30	158.80	1.009	ADJUSTED BYI	2022v1
Category	**region_cd**	**scc**	**poll**	**EPA 2022 tpy**	**Calculated 2017 (tpy)**	**2022-2026 annual GF**	**Notes**	**EMP**
Graphic Arts	10003	2425000000	VOC	132.89	128.27	1.007	Adjusted BYI	2022v1
Category	**region_cd**	**scc**	**poll**	**EPA 2026 tpy**	**Calculated 2017 (tpy)**	**2022-2026 annual GF**	**Notes**	**EMP**
Residential Wood Combustion	10003	2104008100	CO	241.98	241.98	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008100	NOX	4.22	4.22	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008100	VOC	30.69	30.69	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008210	CO	85.09	85.09	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008210	NOX	1.03	1.03	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008210	VOC	19.54	19.54	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008220	CO	59.78	59.78	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008220	NOX	0.82	0.82	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008220	VOC	5.85	5.85	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008230	CO	30.74	30.74	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008230	NOX	0.67	0.67	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008230	VOC	4.99	4.99	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008310	CO	227.91	227.91	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008310	NOX	2.76	2.76	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008310	VOC	52.34	52.34	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008320	CO	160.12	160.12	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008320	NOX	2.20	2.20	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008320	VOC	15.67	15.67	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008330	CO	82.33	82.33	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008330	NOX	1.78	1.78	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008330	VOC	13.38	13.38	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008400	CO	6.85	6.85	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008400	NOX	1.64	1.64	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008400	VOC	0.95	0.95	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008510	CO	50.27	50.27	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008510	NOX	0.49	0.49	1	ADJUSTED BYI	2022v1

Residential Wood Combustion	10003	2104008510	VOC	3.20	3.20	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008530	CO	0.35	0.35	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008530	NOX	0.08	0.08	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008530	VOC	0.05	0.05	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008610	CO	95.70	95.70	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008610	NOX	0.53	0.53	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008610	VOC	17.92	17.92	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008620	CO	61.14	61.14	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008620	NOX	0.34	0.34	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008620	VOC	11.45	11.45	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008630	CO	0.12	0.12	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008630	NOX	0.03	0.03	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008630	VOC	0.02	0.02	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008700	CO	654.16	654.16	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008700	NOX	11.41	11.41	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104008700	VOC	82.98	82.98	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104009000	CO	38.53	38.53	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104009000	NOX	2.37	2.37	1	ADJUSTED BYI	2022v1
Residential Wood Combustion	10003	2104009000	VOC	12.19	12.19	1	ADJUSTED BYI	2022v1

Appendix C

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Tab SSWD - Adjusted 2017 Onroad MOVES5 Output Results, Summer Season Weekday Average
Tab PIVOT Annual - Adjusted 2017 Onroad MOVES5 Output Results, Summer Season Weekday Average

SSWD:

SSWD

Output_Database	**c10003y2017_byi_20250122_m5_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	87.5	17.3	5.7
7	81.1	15.6	5.4
8	81.5	16.4	5.5
SSWD Average	83.4	16.4	5.5

Pivot Annual

TimeAggregation_Input	24-hr

Sum of Daily Emission		Pollutant		
monthID	dayID	Carbon Monoxide (CO)	Oxides of Nitrogen (NOx)	Volatile Organic Compounds
1	2	494.3	68.5	34.0
	5	1735.0	339.6	116.3
2	2	487.0	76.5	30.8
	5	1583.9	338.1	101.6
3	2	505.6	74.8	32.7
	5	1742.4	369.2	111.7
4	2	497.3	84.9	32.3
	5	1443.1	361.0	100.4
5	2	508.3	82.0	35.9
	5	1601.5	358.8	115.0
6	2	566.9	80.0	36.9
	5	1874.8	371.1	121.2
7	2	691.9	92.4	41.5
	5	1795.4	345.1	120.7
8	2	579.1	77.2	37.9
	5	1805.0	362.9	121.7
9	2	472.1	74.5	33.9
	5	1581.8	342.9	111.8
10	2	436.1	73.5	30.9
	5	1530.6	365.6	105.5
11	2	543.0	91.1	33.3
	5	1655.2	368.9	105.4
12	2	529.7	80.8	33.1
	5	1745.9	371.8	110.7
Grand Total		**26406.1**	**5251.4**	**1755.2**

Appendix D

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Tab SSWD & Annual - Adjusted 2017 Nonroad MOVES5 Output Results for Summer Season Weekday Averages and Annual Emissions

SSWD & Annual

Annual Totals (Tons)

Database	(All)
Table	(All)
outputTimePeriod	(All)
MOVESRunID	2

* Use Run 2. It includes the correct met data file. Run 1 is just default.

Sum of Daily Emission	**Pollutant**		
monthID	**VOC**	**NOx**	**CO**
1	54.7	48.9	660.3
2	62.3	48.5	664.8
3	157.7	92.1	1,890.4
4	166.3	88.5	1,930.6
5	163.3	88.0	1,937.4
6	311.8	142.5	3,179.5
7	315.8	141.6	3,204.8
8	310.0	142.7	3,174.1
9	171.1	87.6	1,960.2
10	174.6	88.8	1,945.1
11	163.8	91.9	1,907.4
12	52.8	49.1	657.7
Grand Total	**2,104.3**	**1,110.4**	**23,112.3**

SSWD

Database	c10003y2017_20250121_nonroad_out
Table	movesoutput
outputTimePeriod	Day
dayID	5
MOVESRunID	2

* Use Run 2. It includes the correct met data file. Run 1 is just default.

Sum of emissionQuant		**Pollutant**		
FuelType	**monthID**	**VOC**	**NOx**	**CO**
#N/A	6	7.38	3.77	92.67
	7	7.27	3.63	90.49
	8	7.09	3.65	89.51
#N/A Total		**21.75**	**11.05**	**272.67**
SSWD Average		**7.25**	**3.68**	**90.89**

Appendix E

2023 Enhanced Performance Standard – Run Specification (MRS): c10003y2023_PSM_Benchmark_20250331

New Castle County, Weekdays, Summer.

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Benchmark IM Program]]></description>
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2023 New Castle County Plan – Run Specification (MRS): c10003y2023_psm_existing_20250331_in New Castle County, Weekdays, Summer.

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2026 Enhanced Performance Standard – Run Specification (MRS): c10003y2026_PSM_Benchmark_20250328

New Castle County, Weekdays, Summer.

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EPA Benchmark Standard 2026]]></description>
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	<donotexecute>

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2026 New Castle County Plan – Run Specification (MRS): c10003y2026_PSM_Existing_20250328

New Castle County, Weekdays, Summer.

```
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Existing Program 2026]]></description>
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		<month id="7"/>
		<day id="5"/>
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<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
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<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
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sourcetypename="Combination Long-haul Truck"/>
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processkey="15" processname="Crankcase Running Exhaust"/>
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processkey="2" processname="Start Exhaust"/>
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processkey="16" processname="Crankcase Start Exhaust"/>
                <pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons"
processkey="90" processname="Extended Idle Exhaust"/>
                <pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons"
processkey="17" processname="Crankcase Extended Idle Exhaust"/>
                <pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons"
processkey="91" processname="Auxiliary Power Exhaust"/>
                <pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons"
processkey="11" processname="Evap Permeation"/>
                <pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons"
processkey="12" processname="Evap Fuel Vapor Venting"/>
                <pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons"
processkey="13" processname="Evap Fuel Leaks"/>
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processkey="18" processname="Refueling Displacement Vapor Loss"/>
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<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="91" processname="Auxiliary Power Exhaust"/>
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<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="13" processname="Evap Fuel Leaks"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="18" processname="Refueling Displacement Vapor Loss"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="19" processname="Refueling Spillage Loss"/>
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<emissionprocess selected="false"/>
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<sector selected="false"/>
<engtechid selected="false"/>
<hpclass selected="false"/>
<regclassid selected="false"/>
</outputemissionsbreakdownselection>
<outputdatabase servername="" databasename="c10003y2026_psm_benchmark_20250328_out" description=""/>
<outputtimestep value="24-Hour Day"/>
<outputvmtdata value="true"/>
<outputsho value="false"/>
<outputsh value="false"/>
<outputshp value="false"/>
<outputshidling value="false"/>
<outputstarts value="false"/>
<outputpopulation value="false"/>
<scaleinputdatabase servername="localhost" databasename="c10003y2026_psm_existing_20250328_in" description=""/>
<pmsize value="0"/>
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<timefactors selected="true" units="Days"/>

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		<distancefactors selected="true" units="Miles"/>
		<massfactors selected="true" units="Grams" energyunits="Joules"/>
	</outputfactors>
	<savedata>

	</savedata>

	<donotexecute>

	</donotexecute>

	<generatordatabase shouldsave="false" servername="" databasename="" description=""/>
	<donotperformfinalaggregation selected="false"/>
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truncatebaserates="true"/>
	<skipdomaindatabasevalidation selected="false"/>
</runspec>
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2023 & 2026 Performance Standard Certification Modeling Analysis Results

MOVESRates:

PSM	MOVESRunID	iterationID	yearID	monthID	dayID	hourID	stateID	countyID	zoneID	linkID	pollutantID	processID	sourceTypeID	regClassID	fuelTypeID	modelYearID	roadTypeID	emissionQuant	activity	emissionRate	units
Benchmark	1	1	2026	7	5	0	10	10003	0	0	1	0	0	0	0	0	0	3731044.75	16058140	0.2323	g/mi
Benchmark	1	1	2026	7	5	0	10	10003	0	0	3	0	0	0	0	0	0	5523645.5	16058140	0.3440	g/mi
Benchmark	1	1	2026	7	5	0	10	10003	0	0	79	0	0	0	0	0	0	3196500	16058140	0.1991	g/mi
Benchmark	1	1	2026	7	5	0	10	10003	0	0	87	0	0	0	0	0	0	3371840.25	16058140	0.2100	g/mi
Existing	2	1	2026	7	5	0	10	10003	0	0	1	0	0	0	0	0	0	3791270.25	16058140	0.2361	g/mi
Existing	2	1	2026	7	5	0	10	10003	0	0	3	0	0	0	0	0	0	5531576.5	16058140	0.3445	g/mi
Existing	2	1	2026	7	5	0	10	10003	0	0	79	0	0	0	0	0	0	3250755.25	16058140	0.2024	g/mi
Existing	2	1	2026	7	5	0	10	10003	0	0	87	0	0	0	0	0	0	3428300.75	16058140	0.2135	g/mi

PSM	MOVESRunID	iterationID	yearID	monthID	dayID	hourID	stateID	countyID	zoneID	linkID	pollutantID	processID	sourceTypeID	regClassID	fuelTypeID	modelYearID	roadTypeID	emissionQuant	activity	emissionRate	units
Benchmark	1	1	2023	7	5	0	10	10003	0	0	1	0	0	0	0	0	0	3954867.5	15269620	0.2590	g/mi
Benchmark	1	1	2023	7	5	0	10	10003	0	0	3	0	0	0	0	0	0	6635233.5	15269620	0.4345	g/mi
Benchmark	1	1	2023	7	5	0	10	10003	0	0	79	0	0	0	0	0	0	3513739	15269620	0.2301	g/mi
Benchmark	1	1	2023	7	5	0	10	10003	0	0	87	0	0	0	0	0	0	3713049.25	15269620	0.2432	g/mi
Existing	2	1	2023	7	5	0	10	10003	0	0	1	0	0	0	0	0	0	4025344.5	15269620	0.2636	g/mi
Existing	2	1	2023	7	5	0	10	10003	0	0	3	0	0	0	0	0	0	6648193	15269620	0.4354	g/mi
Existing	2	1	2023	7	5	0	10	10003	0	0	79	0	0	0	0	0	0	3575265.5	15269620	0.2341	g/mi
Existing	2	1	2023	7	5	0	10	10003	0	0	87	0	0	0	0	0	0	3776362.5	15269620	0.2473	g/mi

Results:

Year:2026 New Castle County		
Sum of emissionRate	**Column Labels**	
Row Labels	**Nox**	**VOC**
Benchmark	0.3440	0.2100
Existing	0.3445	0.2135
Benchamark + .02	0.3640	0.2300
(Benchmark + .02) - Existing	0.0195	0.0165
Pass?	Pass	Pass
Year:2023 New Castle County		
Sum of emissionRate	**Column Labels**	
Row Labels	**Nox**	**VOC**
Benchmark	0.4345	0.2432
Existing	0.4354	0.2473
Benchamark + .02	0.4545	0.2632
(Benchmark + .02) - Existing	0.0192	0.0159
Pass?	Pass	Pass

MOVES Run:

Output	MOVES Run	outputTimePeriod	timeUnits	distanceUnits	massUnits	energyUnits	runSpecFileName
c10003y2026_psm_benchmark_20250328_out	1	Day	day	mi	g	J	C:\Users\Taylor.Englert\Documents\MOVES\MOVES5\PSM Enhanced IM\2026\mrs\c10003y2026_PSM_Benchmark_20250328
c10003y2026_psm_benchmark_20250328_out	2	Day	day	mi	g	J	C:\Users\Taylor.Englert\Documents\MOVES\MOVES5\PSM Enhanced IM\2026\mrs\c10003y2026_PSM_Existing_20250328.mrs
Output	**MOVES Run**	**outputTimePeriod**	**timeUnits**	**distanceUnits**	**massUnits**	**energyUnits**	**runSpecFileName**
c10003y2023_psm_benchmark_20250331_out	1	Day	day	mi	g	J	C:\Users\Taylor.Englert\Documents\MOVES\MOVES5\PSM Enhanced IM\New folder\c10003y2023_PSM_Benchmark_20250331.mrs
c10003y2023_psm_benchmark_20250331_out	2	Day	day	mi	g	J	C:\Users\Taylor.Englert\Documents\MOVES\MOVES5\PSM Enhanced IM\2023\mrs\c10003y2023_PSM_Existing_20250331

runSpecDescription	runSpecFileDateTime	runDateTime	scale	minutesDuration	defaultDatabaseUsed	masterVersion	masterComputerID	masterIDNumber	domain	domainCountyID	domainCountyName
Performance Standard Certification for NCC Enhanced IM Program. EPA Benchmark Standard 2026	3/28/2025 11:33	3/28/2025 11:33	Inv	9.30503	movesdb20241112	MOVES5.0.0	DNRECD3T91HQ2	1.06251E+19	SINGLE	10003	New Castle County
Performance Standard Certification for NCC Enhanced IM Program. Existing Program 2026	3/28/2025 13:09	3/28/2025 13:09	Inv	9.41667	movesdb20241112	MOVES5.0.0	DNRECD3T91HQ2	1.06251E+19	SINGLE	10003	New Castle County
runSpecDescription	**runSpecFileDateTime**	**runDateTime**	**scale**	**minutesDuration**	**defaultDatabaseUsed**	**masterVersion**	**masterComputerID**	**masterIDNumber**	**domain**	**domainCountyID**	**domainCountyName**
PSM 2023 for New Castle County Benchmark IM Program	3/31/2025 11:54	3/31/2025 11:55	Inv	8.82553	movesdb20241112	MOVES5.0.0	DNRECD3T91HQ2	7.10146E+18	SINGLE	10003	New Castle County
PSM 2023 for New Castle County Existing IM Program	3/31/2025 12:39	3/31/2025 12:39	Inv	8.8289	movesdb20241112	MOVES5.0.0	DNRECD3T91HQ2	7.10146E+18	SINGLE	10003	New Castle County

domainDatabaseServer	domainDatabaseName	expected	retrieved	models
localhost	c10003y2026_psm_benchmark_20250328_in	27	27	onroad
localhost	c10003y2026_psm_existing_20250328_in	27	27	onroad
domainDatabaseServer	**domainDatabaseName**	**expected**	**retrieved**	**models**
localhost	c10003y2023_psm_benchmark_20250331_in	27	27	onroad
localhost	c10003y2023_psm_existing_20250331_in	27	27	onroad

2023 MOVES Output & Activity:

MOVESRunID	iterationID	yearID	monthID	dayID	hourID	stateID	countyID	zoneID	linkID	pollutantI	proces	sourceTypeID	regClassI	fuelTypeI	fuelSubTy	modelYea	roadTypeI	SCC	engTechI	sectorID	hpID	emissionQuant	emissionQuantMean	emissionQuantSigm
1	1	2023	7	5	\N	10	10003	\N	\N	87	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3713050	\N	\N
1	1	2023	7	5	\N	10	10003	\N	\N	79	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3513740	\N	\N
1	1	2023	7	5	\N	10	10003	\N	\N	3	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	6635230	\N	\N
1	1	2023	7	5	\N	10	10003	\N	\N	1	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3954870	\N	\N
2	1	2023	7	5	\N	10	10003	\N	\N	87	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3776360	\N	\N
2	1	2023	7	5	\N	10	10003	\N	\N	79	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3575270	\N	\N
2	1	2023	7	5	\N	10	10003	\N	\N	3	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	6648190	\N	\N
2	1	2023	7	5	\N	10	10003	\N	\N	1	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	4025340	\N	\N

MOVESRunID	iterationID	yearID	monthID	dayID	hourID	stateID	countyID	zoneID	linkID	sourceTypeID	regClassID	fuelTypeID	fuelSubTypeID	modelYearID	roadTypeI	SCC	engTechID	sectorID	hpID	activityTypeID	activity	activityMean	activitySigma
1	1	2023	7	5	\N	10	10003	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	1	15269600	\N	\N
2	1	2023	7	5	\N	10	10003	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	1	15269600	\N	\N

2026 MOVES Output & Activity:

MOVESRunID	iterationID	yearID	monthID	dayID	hourID	stateID	countyID	zoneID	linkID	pollutantID	processID	sourceTypeID	regClassID	fuelTypeID	fuelSubTypeID	modelYearID	roadTypeID	SCC	engTechID	sectorID	hpID	emissionQuant	emissionQuantMean	emissionQuantSigma
1	1	2026	7	5	\N	10	10003	\N	\N	87	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3371840	\N	\N
1	1	2026	7	5	\N	10	10003	\N	\N	79	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3196500	\N	\N
1	1	2026	7	5	\N	10	10003	\N	\N	3	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	5523650	\N	\N
1	1	2026	7	5	\N	10	10003	\N	\N	1	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3731040	\N	\N
2	1	2026	7	5	\N	10	10003	\N	\N	87	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3428300	\N	\N
2	1	2026	7	5	\N	10	10003	\N	\N	79	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3250760	\N	\N
2	1	2026	7	5	\N	10	10003	\N	\N	3	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	5531580	\N	\N
2	1	2026	7	5	\N	10	10003	\N	\N	1	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	3791270	\N	\N

MOVESRunID	iterationID	yearID	monthID	dayID	hourID	stateID	countyID	zoneID	linkID	sourceTypeID	regClassID	fuelTypeID	fuelSubTypeID	modelYearID	roadTypeID	SCC	engTechID	sectorID	hpID	activityTypeID	activity	activityMe	activitySigma
1	1	2026	7	5	\N	10	10003	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	1	16058100	\N	\N
2	1	2026	7	5	\N	10	10003	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	\N	1	16058100	\N	\N

Pollutants:

pollutantID	pollutantName	energyOrMass	globalWarmingPotential	NEIPollutantCode	pollutantDisplayGroupID	shortName	isAffectedByOnroad	isAffectedByNonroad
1	Total Gaseous Hydrocarbons	mass	\N	HC	30	Total Gas HC	1	1
2	Carbon Monoxide (CO)	mass	\N	CO	36	CO	1	1
3	Oxides of Nitrogen (NOx)	mass	\N	NOX	37	NOx	1	1
5	Methane (CH4)	mass	28	CH4	35	Methane (CH4)	1	1
6	Nitrous Oxide (N2O)	mass	265	N2O	42	N2O	1	0
20	Benzene	mass	\N	71432	57	Benzene	1	1
21	Ethanol	mass	\N		58	Ethanol	1	1
23	Naphthalene particle	mass	\N	91203	65	Naphthalene P	1	1
24	1,3-Butadiene	mass	\N	106990	60	1,3-Butadiene	1	1
25	Formaldehyde	mass	\N	50000	61	Formaldehyde	1	1
26	Acetaldehyde	mass	\N	75070	62	Acetaldehyde	1	1
27	Acrolein	mass	\N	107028	63	Acrolein	1	1
30	Ammonia (NH3)	mass	\N	NH3	41	NH3	1	1
31	Sulfur Dioxide (SO2)	mass	\N	SO2	50	SO2	1	1
32	Nitrogen Oxide (NO)	mass	\N	NO	38	NO	1	0
33	Nitrogen Dioxide (NO2)	mass	\N	NO2	39	NO2	1	0
34	Nitrous Acid (HONO)	mass	\N	7782-77-6	40	HONO	1	0
35	Nitrate (NO3)	mass	\N	PM25_PRI	44	PM2.5 NO3	1	0
36	Ammonium (NH4)	mass	\N	PM25_PRI	44	PM2.5 NH4	1	0
40	2,2,4-Trimethylpentane	mass	\N	540841	64	2,2,4-Trimethylpentane	1	1
41	Ethyl Benzene	mass	\N	100414	64	Ethyl Benzene	1	1
42	Hexane	mass	\N	110543	64	Hexane	1	1
43	Propionaldehyde	mass	\N	123386	64	Propionaldehyde	1	1
44	Styrene	mass	\N	100425	64	Styrene	1	1
45	Toluene	mass	\N	108883	64	Toluene	1	1
46	Xylene	mass	\N	1330207	64	Xylene	1	1

51	Chloride	mass	\N	PM25_PRI	44	PM2.5 Cl	1	0
52	Sodium	mass	\N	PM25_PRI	44	PM2.5 Na	1	0
53	Potassium	mass	\N	PM25_PRI	44	PM2.5 K	1	0
54	Magnesium	mass	\N	PM25_PRI	44	PM2.5 Mg	1	0
55	Calcium	mass	\N	PM25_PRI	44	PM2.5 Ca	1	0
56	Titanium	mass	\N	PM25_PRI	44	PM2.5 Ti	1	0
57	Silicon	mass	\N	PM25_PRI	44	PM2.5 Si	1	0
58	Aluminum	mass	\N	PM25_PRI	44	PM2.5 Al	1	0
59	Iron	mass	\N	PM25_PRI	44	PM2.5 Fe	1	0
60	Mercury Elemental Gaseous	mass	\N	7439976	66	Hg Egas	1	1
61	Mercury Divalent Gaseous	mass	\N	7439976	66	Hg Dgas	1	1
62	Mercury Particulate	mass	\N	7439976	66	Hg Part	1	1
63	Arsenic Compounds	mass	\N	7440382	66	As	1	1
65	Chromium 6+	mass	\N	18540299	66	Cr+6	1	1
66	Manganese Compounds	mass	\N	7439965	44	Mn	1	1
67	Nickel Compounds	mass	\N	7440020	66	Ni	1	1
68	Dibenzo(a,h)anthracene particle	mass	\N	53703	65	Dibenzo(a,h)anthracene P	1	1
69	Fluoranthene particle	mass	\N	206440	65	Fluoranthene P	1	1
70	Acenaphthene particle	mass	\N	83329	65	Acenaphthene P	1	1
71	Acenaphthylene particle	mass	\N	208968	65	Acenaphthylene P	1	1
72	Anthracene particle	mass	\N	120127	65	Anthracene P	1	1
73	Benz(a)anthracene particle	mass	\N	56553	65	Benz(a)anthracene P	1	1
74	Benzo(a)pyrene particle	mass	\N	50328	65	Benzo(a)pyrene P	1	1
75	Benzo(b)fluoranthene particle	mass	\N	205992	65	Benzo(b)fluoranthene P	1	1
76	Benzo(g,h,i)perylene particle	mass	\N	191242	65	Benzo(g,h,i)perylene P	1	1
77	Benzo(k)fluoranthene particle	mass	\N	207089	65	Benzo(k)fluoranthene P	1	1
78	Chrysene particle	mass	\N	218019	65	Chrysene P	1	1

79	Non-Methane Hydrocarbons	mass	\N	NMHC	31	NMHC	1	1
80	Non-Methane Organic Gases	mass	\N	NMOG	32	NMOG	1	1
81	Fluorene particle	mass	\N	86737	65	Fluorene P	1	1
82	Indeno(1,2,3,c,d)pyrene particle	mass	\N	193395	65	Indeno(1,2,3,c,d)pyrene P	1	1
83	Phenanthrene particle	mass	\N	85018	65	Phenanthrene P	1	1
84	Pyrene particle	mass	\N	129000	65	Pyrene P	1	1
86	Total Organic Gases	mass	\N	TOG	33	TOG	1	1
87	Volatile Organic Compounds	mass	\N	VOC	34	VOC	1	1
88	NonHAPTOG	mass	\N	NHTOG	-70	NHTOG	1	1
90	Atmospheric CO2	mass	1	CO2	55	Atmospheric CO2	1	1
91	Total Energy Consumption	energy	\N		51	Total Energy	1	0
98	CO2 Equivalent	mass	\N	CO2	56	CO2 Equivalent	1	0
99	Brake Specific Fuel Consumption (BSFC)	mass	\N	\N	54	BSFC	0	1
100	Primary Exhaust PM10 - Total	mass	\N	PM10-PRI	47	PM10 Total Exh	1	1
106	Primary PM10 - Brakewear Particulate	mass	\N	PM10-PRI	48	PM10 Brakewear	1	0
107	Primary PM10 - Tirewear Particulate	mass	\N	PM10-PRI	49	PM10 Tirewear	1	0
110	Primary Exhaust PM2.5 - Total	mass	\N	PM25-PRI	43	PM2.5 Total Exh	1	1
111	Organic Carbon	mass	\N	PM25_PRI	44	PM2.5 OC	1	0
112	Elemental Carbon	mass	\N	PM25_PRI	44	PM2.5 EC	1	0
115	Sulfate Particulate	mass	\N	PM25_PRI	44	PM2.5 Sulfate	1	0
116	Primary PM2.5 - Brakewear Particulate	mass	\N	PM25-PRI	45	PM2.5 Brakewear	1	0
117	Primary PM2.5 - Tirewear Particulate	mass	\N	PM25-PRI	46	PM2.5 Tirewear	1	0
118	Composite - NonECPM	mass	\N	PM25_PRI	44	PM2.5 NonECPM	1	0
119	H2O (aerosol)	mass	\N	PM25_PRI	44	PM2.5 H2O Aero	1	0
120	Primary PM2.5 - NonECNonSO4PM	mass	\N	PM25_PRI	-1	PM2.5 NonECNonSO4	1	0
121	CMAQ5.0 Unspeciated (PMOTHR)	mass	\N	PM25_PRI	44	PM2.5 PMOTHR	1	0

122	Non-carbon Organic Matter (NCOM)	mass	\N	PM25_PRI	44	PM2.5 NCOM	1	0
130	1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin	mass	\N	19408743	67	1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin	1	1
131	Octachlorodibenzo-p-dioxin	mass	\N	3268879	67	Octachlorodibenzo-p-dioxin	1	1
132	1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin	mass	\N	35822469	67	1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin	1	1
133	Octachlorodibenzofuran	mass	\N	39001020	67	Octachlorodibenzofuran	1	1
134	1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin	mass	\N	39227286	67	1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin	1	1
135	1,2,3,7,8-Pentachlorodibenzo-p-Dioxin	mass	\N	40321764	67	1,2,3,7,8-Pentachlorodibenzo-p-Dioxin	1	1
136	2,3,7,8-Tetrachlorodibenzofuran	mass	\N	51207319	67	2,3,7,8-Tetrachlorodibenzofuran	1	1
137	1,2,3,4,7,8,9-Heptachlorodibenzofuran	mass	\N	55673897	67	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1	1
138	2,3,4,7,8-Pentachlorodibenzofuran	mass	\N	57117314	67	2,3,4,7,8-Pentachlorodibenzofuran	1	1
139	1,2,3,7,8-Pentachlorodibenzofuran	mass	\N	57117416	67	1,2,3,7,8-Pentachlorodibenzofuran	1	1
140	1,2,3,6,7,8-Hexachlorodibenzofuran	mass	\N	57117449	67	1,2,3,6,7,8-Hexachlorodibenzofuran	1	1
141	1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin	mass	\N	57653857	67	1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin	1	1
142	2,3,7,8-Tetrachlorodibenzo-p-Dioxin	mass	\N	1746016	67	2,3,7,8-Tetrachlorodibenzo-p-Dioxin	1	1
143	2,3,4,6,7,8-Hexachlorodibenzofuran	mass	\N	60851345	67	2,3,4,6,7,8-Hexachlorodibenzofuran	1	1
144	1,2,3,4,6,7,8-Heptachlorodibenzofuran	mass	\N	67562394	67	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1	1

145	1,2,3,4,7,8-Hexachlorodibenzofuran	mass	\N	70648269	67	1,2,3,4,7,8-Hexachlorodibenzofuran	1	1
146	1,2,3,7,8,9-Hexachlorodibenzofuran	mass	\N	72918219	67	1,2,3,7,8,9-Hexachlorodibenzofuran	1	1
168	Dibenzo(a,h)anthracene gas	mass	\N	53703	65	Dibenzo(a,h)anthracene G	1	1
169	Fluoranthene gas	mass	\N	206440	65	Fluoranthene G	1	1
170	Acenaphthene gas	mass	\N	83329	65	Acenaphthene G	1	1
171	Acenaphthylene gas	mass	\N	208968	65	Acenaphthylene G	1	1
172	Anthracene gas	mass	\N	120127	65	Anthracene G	1	1
173	Benz(a)anthracene gas	mass	\N	56553	65	Benz(a)anthracene G	1	1
174	Benzo(a)pyrene gas	mass	\N	50328	65	Benzo(a)pyrene G	1	1
175	Benzo(b)fluoranthene gas	mass	\N	205992	65	Benzo(b)fluoranthene G	1	1
176	Benzo(g,h,i)perylene gas	mass	\N	191242	65	Benzo(g,h,i)perylene G	1	1
177	Benzo(k)fluoranthene gas	mass	\N	207089	65	Benzo(k)fluoranthene G	1	1
178	Chrysene gas	mass	\N	218019	65	Chrysene G	1	1
181	Fluorene gas	mass	\N	86737	65	Fluorene G	1	1
182	Indeno(1,2,3,c,d)pyrene gas	mass	\N	193395	65	Indeno(1,2,3,c,d)pyrene G	1	1
183	Phenanthrene gas	mass	\N	85018	65	Phenanthrene G	1	1
184	Pyrene gas	mass	\N	129000	65	Pyrene G	1	1
185	Naphthalene gas	mass	\N	91203	65	Naphthalene G	1	1
3000	NonHAPTOG Mechanism	gmole	\N	\N	68	NonHAPTOG	1	0
123	Total Organic Matter (TOM)	mass	\N	TOM	44	TOM	1	0
124	Residual PM (NonECNonSO4NonOM)	mass	\N	RESID_PM	44	NonECNonSO4NonOMPM	1	0

Appendix F

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

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August 2020

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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.

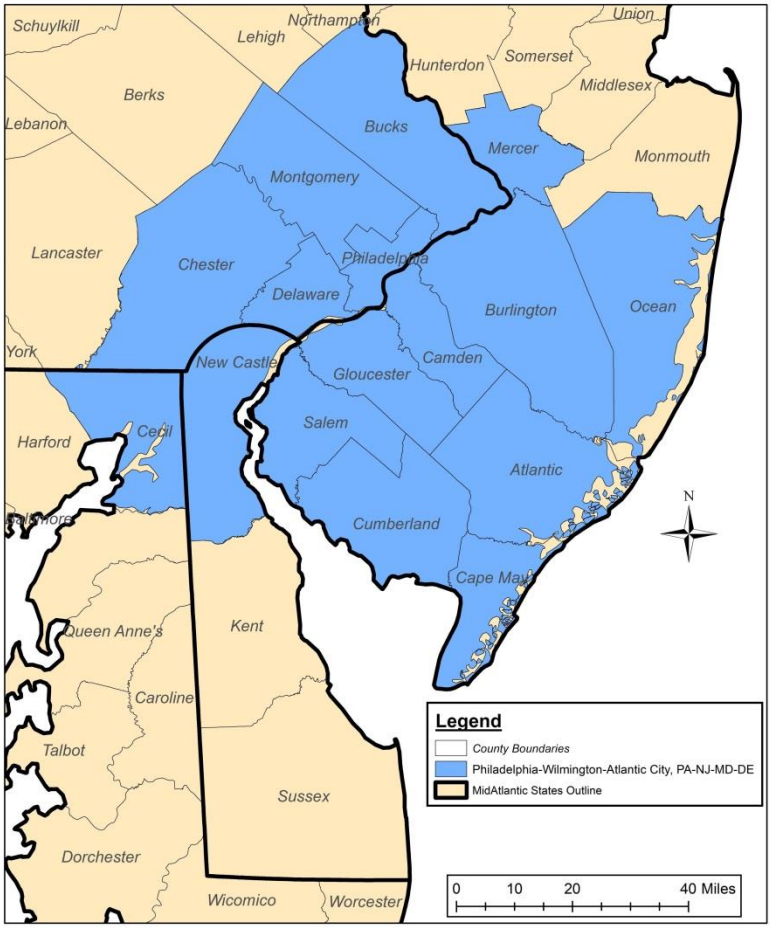

Figure 1. Map of the Philadelphia Nonattainment Area Under the 2015 8-hour ozone NAAQS.

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.

[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

[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) 03/11/2011	CTG for Industrial Cleaning Solvents. EPA 453/R-06-001, September 2006.	Final Rule Federal Register Date: 04/13/2012 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. 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. 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. 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 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 Federal Register Date: 03/24/2004 69 FR 13737	This section applies to any aerospace manufacturing and rework facility 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. This section was updated in 2002 to fully implement the RACT-level controls specified in the 1997 CTG. 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 10/11/2010	OTC Alternate Model Rule "Motor Vehicle Mobile Equipment Repair and Refinishing (MVMERR)", adopted in September 2009 and based on (1) CTG for Miscellaneous Metal and Plastic Parts Coatings (MMPPC)," EPA-453/R-08-003, September 2008. (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). 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. 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. 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. 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. 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 10/11/2011	CTG for Miscellaneous Metal and Plastic Parts Coatings (MMPPC). EPA-453/R-08-003, September 2008 ACT for Surface Coating of Automotive/Transportation and Business Machine Plastic Parts EPA-453/R-94-017, February 1994.	Final Rule Federal Register Date: 09/25/2012 77 FR 58953	This section applies to any plastic part or product coating unit. It establishes VOC content limits of various coatings, sets up requirements for control devices, testing methods and compliance certification.	Yes. 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. In 2010, it was updated to expand the applicability scope and to adopt more stringent requirements set forth in EPA's 2008 CTG. 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 03/11/2011	CTG for Automobile and Light-Duty Truck Assembly Coatings. EPA 453/R-08-006, September 2008.	Final Rule Federal Register Date: 04/13/2012 77 FR 22224	This section applies to coating operations at automobile or light-duty truck assembly plants. It establishes VOC content limits in adhesives, sealing materials, primer, coating materials used in	Yes. 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. 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. 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 There are currently no automobile assembly plants in Delaware, at the time of this SIP submission.
Section 14.0 Can Coating Section 15.0 Coil Coating Section 17.0 Fabric Coating 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 Federal Register Date: 05/03/1995 60 FR 21707	These sections apply to coating operations at any can, coil, paper, fabric, or vinyl coating unit. 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. These sections were developed in 1993 for fully implementing the 1977 CTG specified controls the targeted sources or source categories in Delaware. 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 for all above sections.	EPA-450/2-77-008, May 1977. (Group I)			in RACT control technology for these sections. 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 Paper, Film, and Foil Coating 03/11/2011	CTG for Paper, Film, and Foil Coatings. EPA 453/R-07-003, September 2007. 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 Federal Register Date: 04/13/2012 77 FR 22224	This section applies to paper, film, and foil surface coating operations. 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. 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. 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. 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 Coating of Metal Furniture	CTG for Metal Furniture Coatings.	Final Rule 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?
10/11/2011	EPA 453/R-07-005, September 2007. 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. In 2011, it was updated to implement the new requirements specified in the 2007 CTG. 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 10/11/2011	CTG for Large Appliance Coatings. EPA 453-07-004, September 2007. 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 Federal Register Date: 09/25/2012 77 FR 58953	This section applies to the coating operation of large appliances. 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. 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. In 2011, it was updated to implement the new requirements specified in the 2007 CTG. 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?
				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 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 Federal Register Date: 01/26/1996 61 FR 2419	This section applies to the coating operation of magnet wire. 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. This section was developed in 1994 to fully implement the 1977 CTG specified requirements in Delaware. 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. 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 10/11/2011	CTG for Miscellaneous Metal and Plastic Parts Coatings (MMPPC). EPA-453/R-08-003, September 2008 CTG for Control of Volatile Organic	Final Rule Federal Register Date: 09/25/2012 77 FR 58953	This section applies to any miscellaneous metal parts coating unit. It establishes VOC content limits in coating materials and other requirements such as control device, testing methods, compliance certification and recordkeeping, etc.,	Yes. 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. 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 03/11/11	CTG for Flat Wood Paneling Coatings. EPA 453/R-06-004, September 2006. 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 Federal Register Date: 04/13/2012 77 FR 22224	The section applies to coating operations of flat wood paneling. 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. 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. In 2011, it was updated to implement the new requirements specified in the 2006 CTG. 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.

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Bulk Gasoline Plants 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 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. 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. 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. 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 Bulk Gasoline Terminals 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 Federal Register Date: 01/26/1996 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. 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. This section was developed in 1994 to fully implement the 1977 CTG specified requirements in Delaware. 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. 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?
				application of control technology that is reasonably available considering current technological and economic feasibility.
Section 26.0 Gasoline Dispensing Facility Stage I Vapor Recovery 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). 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. This section was updated in 2002 to provide for better control of emissions from GDFs than the 1975 CTG specified level. 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. 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: 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?
				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 Gasoline Tank Trucks 01/11/1993	CTG for Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals. EPA-450/2-77-026, December 1977. (Group I) 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 Federal Register Date: 05/03/1995 60 FR 21707	This section applies to gasoline tank trucks equipped for gasoline vapor collection. 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. This section was developed in 1993 to fully implement the 1977/1978 CTG specified control in Delaware. 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. 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 Petroleum Refinery Sources 01/11/1993	CTG for Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds.	Final Rule Federal Register Date: 05/03/1995 60 FR 21707	This section applies to vacuum-producing systems, wastewater separators and process unit turnaround at petroleum refineries. Its requirements include (1) no uncompressed VOC emission from	Yes. 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. 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 Leaks from Petroleum Refinery Equipment 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 Federal Register Date: 01/26/1996 61 FR 2419	This section applies to equipment in VOC service in any process unit at petroleum refineries. The rule establishes standards for proper valve operations under various scenarios to prevent VOC leak emissions.	Yes. This section was developed in 1994 to fully implement the 1978 CTG specified requirements in Delaware. 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. 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: 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 30.0 Petroleum Liquid Storage in External Floating Roof Tanks 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 Federal Register Date: 01/26/1996 61 FR 2419	This section applies to petroleum liquid storage tanks with external floating roofs and with capacity of 150,000 L or greater. 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. This section was developed in 1994 for fully implementing the 1978 CTG specified controls. 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. 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 Petroleum Liquid Storage in Fixed Roof Tanks 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 Federal Register Date: 01/26/1996 61 FR 2419	This section applies to petroleum liquid storage tanks with fixed roofs and with capacity of 150,000 L or greater. 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. This section was developed in 1994 for fully implementing the 1977 CTG specified controls. 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. 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?
				source is capable of meeting by the application of control technology that is reasonably available considering current technological and economic feasibility.
Section 32.0 Leaks from Natural Gas/Gasoline Processing Equipment 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 61 FR 2419	This section applies to equipment in VOC service in any process unit at onshore natural gas/gasoline processing facilities. It establishes standards for proper valve operations under various scenarios to prevent VOC leak emissions from the covered equipment.	Yes. This section was developed in 1994 to fully implement the 1983 CTG specified requirements. 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. 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 Solvent Cleaning and Drying 11/11/2001	CTG for Industrial Cleaning Solvents: Final" EPA 453/R-06-001 September 2006 CTG for Control of Volatile Organic Emissions from	Final Rule Federal Register Date: 11/22/2002 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. This rule establishes standards for (1) batch cold cleaning machines, (2) batch vapor cleaning machines, (3) in-line cleaning machines, (4)	Yes. 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?
	Solvent Metal Cleaning. EPA-450/2-77-022, November 1977. (Group I) 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 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. 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. This section was developed in 1993 to fully implement the 1977 CTG specified requirements. 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. 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?
Pharmaceutical Products 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. 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. 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. 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 01/11/2002 (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. 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. 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. 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?
				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. 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 Graphic Arts Systems 03/11/2011	CTG for Flexible Package Printing. EPA 453/R-06-003, September 2006. CTG for Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VIII: Graphic Arts-Rotogravure and Flexography, EPA-	Final Rule Federal Register Date: 04/13/2012 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. 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. 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. 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?
	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 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 60 FR 21707	This section applies to petroleum dry cleaning facilities that consume 123,000 L or more petroleum solvent per year. It establishes emission limits or reduction requirements for fugitive emissions, leak repairs, dryers, and filtration systems at covered facilities.	Yes. This section was developed in 1993 to fully implement the 1982 CTG specified requirements. 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. 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 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: 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?
Polymer, and Resin Manufacturing Equipment 01/11/1993	from Reactor Processes and Distillation Operations in SOCMI. EPA-450/4-91-031, August 1993. 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. 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. 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. 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 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 Federal Register Date: 05/03/1995 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. It establishes requirements for VOC emission limits, reductions and combustions for the covered process sections.	Yes. This section was developed in 1993 to fully implement the 1983 CTG specified requirements. 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. 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?
				is reasonably available considering current technological and economic feasibility.
Section 42.0 Air Oxidation Processes in the Synthetic Organic Chemical Manufacturing Industry 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 Federal Register Date: 05/03/1995 60 FR 21707	This section applies to 3 special air oxidation processes in synthetic organic chemical manufacturing industry. The rule establishes requirements for VOC emission reduction and emission combustion for the covered processes.	Yes. This section was developed in 1993 to fully implement the 1984 CTG specified requirements. 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. 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 Bulk Gasoline Marine Tank Vessel Loading Facilities 08/08/1994	Non-CTG RACT control, based on CAA Section 183(f).	Final Rule Federal Register Date: 07/28/1995 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. It requires installation of a vapor collection system that is designed to collect all VOC vapors displaced from marine tank vessels during	Yes. This section was developed in 1994 to implement the CAA Section 183(f) requirements. 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?
			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 Batch Processing Operations 11/29/1994	ACT for Control of Volatile Organic Compound Emissions from Batch Processes. EPA-453/R-93-017, February 1994.	Final Rule Federal Register Date: 01/26/1996 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. It requires the affected sources to reduce VOC emissions by 90 percent by weight.	Yes. This section was developed in 1994 to implement the 1994 ACT specified requirements. 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. 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 Control of VOC Emissions- Industrial Cleaning Solvents 03/11/2011	CTG for Industrial Cleaning Solvents. EPA 453/R-06-001, September 2006	Final Rule Federal Register Date: 04/13/2012 77 FR 22224	This section applies to all sources that use organic solvents for the purpose of cleaning. It establishes standards for the affected facilities to evaluate and	Yes. 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. 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). 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 Crude Oil Lightering Operations 05/11/2007	Non-CTG RACT requirement, based on CAA Section 182(b)(2)(C).	Final Rule Federal Register Date: 09/13/2007 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. 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. 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). 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?
			conducting uncontrolled lightering operations on Ozone Action Days.	
Section 47.0 Offset Lithographic Printing and Letterpress Printing 04/11/2011	CTG for Offset Lithographic Printing and Letterpress Printing. EPA-453/R-06-002, September 2006. 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. CTG for Control of Volatile Organic Compound Emissions from Offset Lithographic Printing (CTG Draft). EPA-453/D-95-001, September 1993.	Final Rule Federal Register Date: 11/25/2011 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. 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. 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. 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. 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 Reactor Processes and Distillation Operations in the Synthetic Organic Chemical	CTG for Control of Volatile Organic Compound Emissions from Reactor Processes and	Final Rule Federal Register Date: 01/26/1996 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. 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 11/29/1994	Distillation Operations in SOCMI. EPA-450/4-91-031, November 1993.		chemical manufacturing industry (SOCMI). 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. 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 Control of VOC Emissions- Control of Volatile Organic Compound Emissions from Volatile Organic Liquid Storage Vessels 11/29/1994	ACT for Volatile Organic Liquids Storage in Floating and Fixed Roof Tanks. EPA-453/R-94-001, February 1994.	Final Rule Federal Register Date: 01/26/1996 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). It establishes the venting and sealing standards for internal and external floating roofs, and specifies alternatives to installing internal or external floating roofs.	Yes. This section was developed in 1994 to fully implement the 1994 ACT specified requirements. 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. 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: 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 Control of VOC Emissions- Other Facilities that Emit Volatile Organic Compounds (VOCs) 11/29/1994	Non-CTG RACT requirement, based on CAA Section 182(b)(2)(C).	Final Rule Federal Register Date: 03/12/1997 62 FR 11329	This section applies to any facility that is not covered by Section 10.0 through Section 49.0 of Regulation 1124. 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. 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). 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. 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;

[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. Stationary Source Committee Recommendation on NOx RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992. 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. 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. Summary of NOx Control Technologies and their Availability and Extent of Application, USEPA, February 1992. Alternative Control Techniques Document: NOx Emissions from Process Heaters (Revised), USEPA, September 1993. Alternative Control Techniques Document: NOx Emissions from	Final Rule Federal Register Date: 06/14/2001 66 FR 32231	Gas, oil and coal fired units are subject to 0.20, 0.25, or 0.38 lb/mmBTU emission limits, respectively; Or their emissions must be controlled by low NOx burner technology or flue gas circulation with excess air. And in general, equipment larger than 100 mmBTU is required to install NO_X continuous emission monitoring system (CEMS).	Yes. This provision fully implements the required NO_X controls over the targeted sources. 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. 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. See Section 3.2 of this document for details. 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. Alternative Control Techniques Document: NOx Emissions from Utility Boilers, USEPA, March 1994. 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. Status Report on NOx Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000. 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. Summary of NOx Control Technologies and their Availability and Extent of Application, USEPA, February 1992. 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. This provision fully implements the required NO_X controls over the targeted sources. 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. Alternative Control Techniques Document: NOx Emissions from Industrial-Commercial/Institutional (ICI) Boilers, USEPA, March 1994. Status Report on NO_X Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000. 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. Summary of NO_X Control Technologies and their Availability and Extent of Application, USEPA, February 1992. Alternative Control Techniques Document: NOx Emissions from Process Heaters (Revised), USEPA, September 1993. 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. This provision fully implements the required NO_X controls over the targeted sources. 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. 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. Summary of NO_X Control Technologies and their Availability and Extent of Application, USEPA, February 1992. 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). Summary of State/Local NO_X Regulations for Stationary Sources, USEPA, 2004. Alternative Control Techniques Document: NO_X Emissions from Industrial-Commercial/Institutional (ICI) Boilers, USEPA, March 1994. State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, USEPA.	Final Rule Federal Register Date: 06/14/2001 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. This provision fully implements the required NO_X controls over the targeted sources. 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. 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: 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?**
5. Gas turbines	Alternative Control Techniques Document: NO_X Emissions from Stationary Gas Turbines, USEPA, January 1993. Stationary Source Committee Recommendation on NO_X RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992. Status Report on NO_X Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000. Summary of NO_X Control Technologies and their Availability and Extent of Application, USEPA, February 1992. Summary of State/Local NO_X Regulations for Stationary Sources, USEPA, 2004.	Final Rule Federal Register Date: 06/14/2001 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. This provision fully implements the required NO_X controls over the targeted sources. 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. 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. 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. Stationary Source Committee Recommendation on NO_X RACT for Industrial Boilers, Internal Combustion Engines and Combustion Turbines, NESCAUM, 9/18/1992. Alternative Control Techniques Document: NO_X Emissions from Stationary Reciprocating Internal Combustion Engines, USEPA, 1993. NO_X Emissions from Stationary Internal Combustion Engines, USEPA, October 2003 Stationary Reciprocating Internal Combustion Engines – Updated Information on NO_X Emissions and Control Techniques – Revised Final Report, USEPA, 9/1/2000. Sourcebook: NO_X Control Technology Data, USEPA, July 1991. Status Report on NO_X Controls for Gas Turbines, Cement Kilns, Industrial Boilers, Internal Combustion Engines, NESCAUM, December 2000. Summary of State/Local NO_X Regulations for Stationary Sources, USEPA, 2004	Final Rule Federal Register Date: 06/14/2001 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. This provision fully implements the required NO_X controls over the targeted sources. 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. 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. 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. State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, USEPA.	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.	Yes. 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. 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 Federal Register Date: 06/14/2001 66 FR 32231	Regulation 1112 specifies no emissions limits or control requirements for the targeted source group.	Yes. 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. 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. Alternative Control Techniques Document: NO_X Emissions from Industrial-Commercial/Institutional (ICI) Boilers, USEPA, March 1994	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.	Yes. 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. 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. NO_X Emissions from Stationary Internal Combustion Engines, USEPA, October 2003. Stationary Reciprocating Internal Combustion Engines – Updated Information on NOx Emissions and Control Techniques – Revised Final Report, USEPA, 9/1/2000. Alternative Control Techniques Document: NOx Emissions from	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.	Yes. 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. 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. 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). 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] Delaware, however, determines that some units in this source group have high short	Yes. 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. 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. 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. 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. 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. Alternative Control Techniques Document: NOx Emissions from Stationary Reciprocating Internal Combustion Engines, USEPA, 1993. Alternative Control Techniques Document: NO_X Emissions from Stationary Gas Turbines, USEPA, January 1993. Alternative Control Techniques Document: NO_X Emissions from Process Heaters (Revised), USEPA, September 1993.		targeted source group, based on EPA's Helms Memo.[7] 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. 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. 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. 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.

[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 sets 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.

[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.
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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).
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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).

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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.
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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.
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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