

Proposal

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

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

Submitted To
U.S. Environmental Protection Agency

By

Delaware Department of Natural Resources and
Environmental Control



November 1, 2023

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Executive Summary

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

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

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

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

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

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

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

- Fulfills the federal CAA's requirements for Reasonable Further Progress (RFP) and Attainment Demonstration (AD) under the 2015 8-hour ozone NAAQS.
- Demonstrates that with all existing and proposed controls, Delaware will meet the RFP requirements on Volatile Organic Compounds (VOC) and Nitrogen Oxides (NO_x) emission reductions in 2023.
- Demonstrates that New Castle County portion of the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE moderate NAA will attain the 2015 8-hour ozone NAAQS in 2023.
- Confirms Delaware's 2023 mobile source budgets (portions of total allowable emissions that are allocated to Onroad mobile sources) for transportation conformity determination.
- Establishes Contingency Measures, specific control measures to be implemented if the area fails to make RFP, fails to meet any applicable milestone, or fails to attain the NAAQS by the applicable attainment date.

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Acronym List

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

MPO	-	Metropolitan Planning Organization
MVEB	-	Motor Vehicle Emissions Budget
NAA	-	Non-Attainment Area
NAAQS	-	National Ambient Air Quality Standard
NEI	-	National Emission Inventory
NLEV	-	National Low Emission Vehicle
NLLJ	-	Nocturnal Low-level Jet
NNSR	-	Non-attainment New Source Review
NO _x	-	Oxides of Nitrogen
NSR	-	New Source Review
O ₃	-	Ozone
OBD	-	On-Board Diagnostic
ORVR	-	On-board Refueling Vapor Recovery
OTC	-	Ozone Transport Commission
OTR	-	Ozone Transport Region
OYW	-	One Year's Worth
PFC	-	Portable Fuel Containers
PM	-	Particulate Matter
POTW	-	Publicly Owned Treatment Works
ppm	-	parts per million
ppb	-	parts per billion
PSD	-	Prevention of Significant Deterioration
PSM	-	Performance Standard Modeling
RACM	-	Reasonably Available Control Measure
RACT	-	Reasonably Available Control Technology
RFG	-	Reformulated Gasoline
RFP	-	Reasonable Further Progress
ROP	-	Rate of Progress
RRF	-	Relative Response Factor
RTP	-	Regional Long-range Transportation Plan
RVP	-	Reid Vapor Pressure
SAFE	-	Safer Affordable Fuel Efficiency
SCC	-	Source Classification Code
SIP	-	State Implementation Plan
SLAMS	-	state and local air monitoring stations
SM	-	Synthetic Minor
SSWD	-	Summer Season Weekday
TIM	-	Time-in-Mode
TIP	-	Transportation Improvement Program
tpd	-	Tons per Day
tpy	-	Tons per Year
TSD	-	Technical Supporting Document
TV	-	Title V
UST	-	Underground Storage Tanks
VRS	-	Vapor Recovery Systems
VMT	-	Vehicle Miles Traveled
VOC	-	Volatile Organic Compound
WILMAPCO	-	Wilmington Area Planning Council

1. Introduction and Background

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

1.1 Background and Requirements

Clean Air Act

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

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

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

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

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

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

Ozone Transport Region and Ozone Transport Commission

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

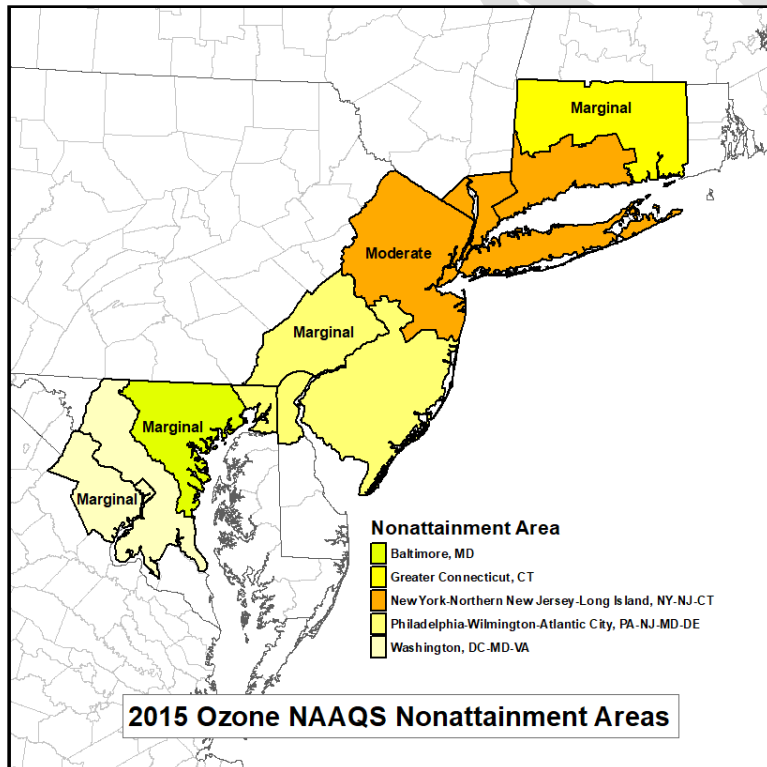


Figure 1-1. Current 2015 Ozone NAAQS Designations in the Ozone Transport Region

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

National Ambient Air Quality Standards

EPA is required by CAA Section 107(d) to designate areas throughout the nation as attaining or not attaining the NAAQS. Section 179(c)(1) of the CAA requires EPA to determine whether a NAA⁴ attained the applicable standard by the applicable attainment date based on the area's air quality as of that attainment date. A determination of whether an area's air quality meets applicable standards is generally based upon the most recent three years of complete, quality-assured data gathered at the established state and local air monitoring stations (SLAMS) in a NAA and entered into the EPA's Air Quality System (AQS) database. Data from ambient air monitors operated by state and local agencies in compliance with EPA's monitoring requirements must be submitted to AQS. Monitoring agencies annually certify that these data are accurate to the best of their knowledge.

EPA uses the certified air monitoring data to calculate design values that are used to determine the area's status in accordance with 40 CFR 50 Appendix U. Specifically, under EPA regulations in 40 CFR 50.19 and in accordance with 40 CFR 50 Appendix U, the primary and secondary NAAQS for ozone (O₃) are met at an ambient air quality monitoring site when the 3-year average of the annual fourth-highest daily maximum 8-hour average O₃ concentration (i.e., the design value) is less than or equal to 0.070 ppm. Design values are calculated by computing the annual fourth-highest daily maximum 8-hour O₃ concentration, averaged over three years, expressed in ppm. The fourth-highest daily maximum 8-hour O₃ 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 O₃ monitoring data. Design values shall be reported in ppm to three decimal places, with additional digits to the right of the third decimal place truncated.

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

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

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

2015 8-hour Ozone NAAQS

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

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

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

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

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

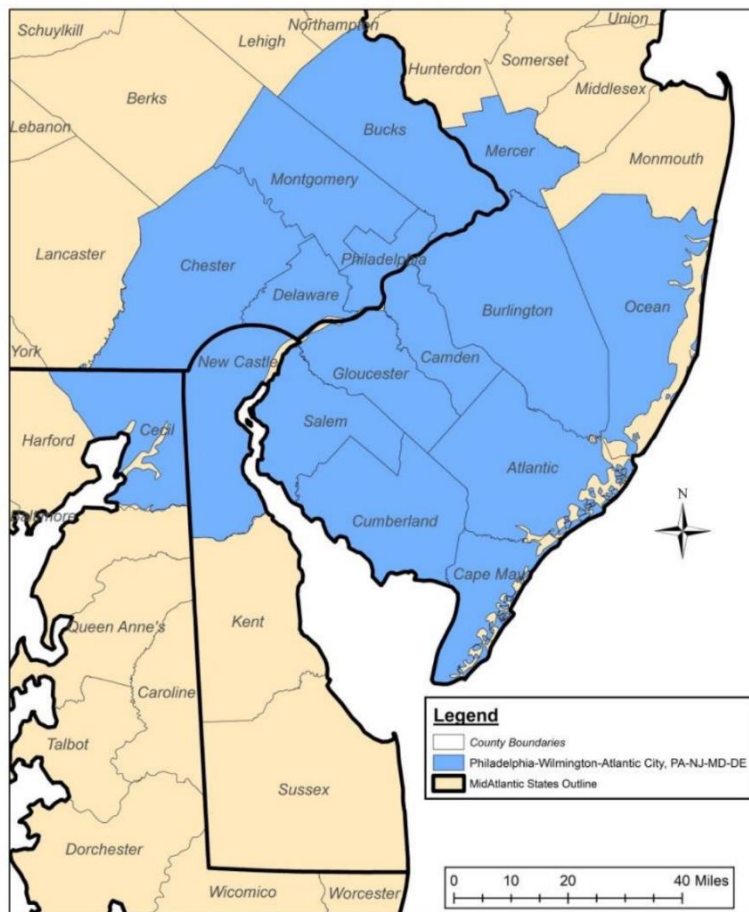


Figure 1-2. Philadelphia-Wilmington-Atlantic City, PA-DE-MD-NJ Moderate Non-Attainment Area for the 8-Hour Ozone NAAQS

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

In a final rule dated June 4, 2018,⁷ the EPA designated 51 areas (Figure 2-2) in the country as non-attainment for the 2015 8-hour ozone NAAQS. In the same final rule, Kent and Sussex Counties were designated as attainment. The EPA made the designations of all three Delaware counties based on their 2014-2016 design values,⁸ and the effective date of the designations was August 3, 2018.

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

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

The 2018-2020 design value for the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE NAA was 0.074 ppm, as shown in Table 2-1. The attainment deadline for the marginal NAAs was August 3, 2021. On October 7, 2022,⁹ the EPA finalized actions to fulfill its statutory obligation under CAA section 181 to determine whether 31 marginal ozone NAAs attained the 2015 ozone NAAQS by August 3, 2021, the applicable attainment date for such areas. Delaware's New Castle County, along with the greater Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE metropolitan statistical area was redesignated as moderate Non-attainment for the 2015 Ozone NAAQS based upon the failure of the NAA to record data below the standard.

⁷ 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>

⁸ 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)

⁹ 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>

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

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

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

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

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

Notes:

1. The level of the 2015 8-hour ozone NAAQS is 0.070 parts per million (ppm). The design value is the 3-year average of the annual 4th highest daily maximum 8-hour ozone concentration.
2. The design values shown here are computed using Federal Reference Method or equivalent data reported by State, Tribal, and Local monitoring agencies to EPA's Air Quality System (AQS) as of May 5, 2021.

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

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

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

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

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

2.0 Ozone Air Quality Status and Trends Analysis

2.1 Delaware Ozone Monitoring Network

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

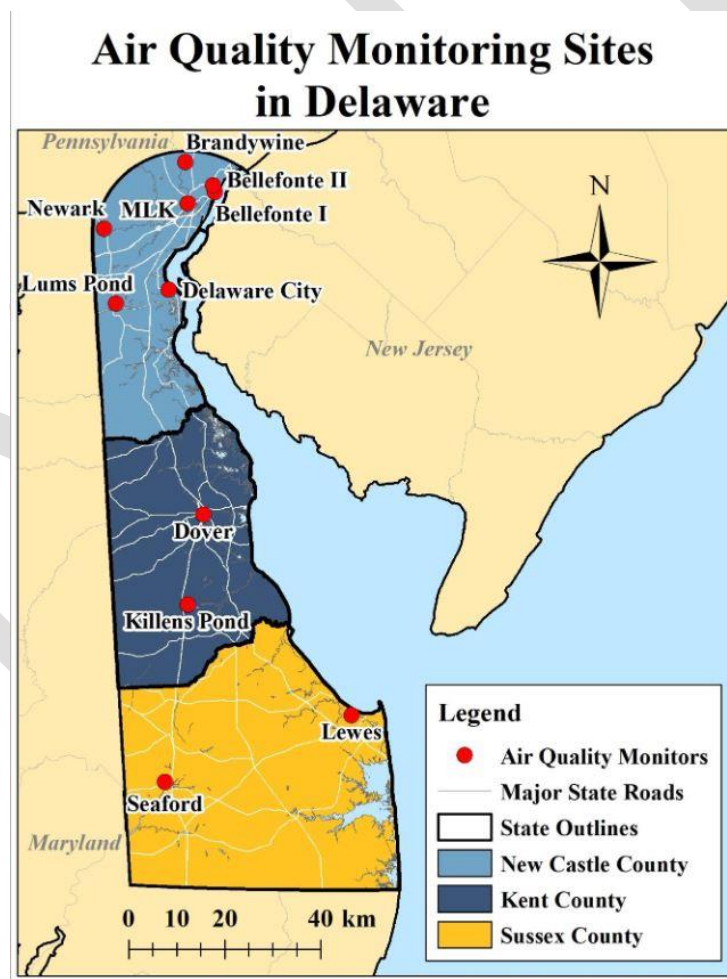


Figure 2-1. Delaware Ozone Monitoring Network for 8-Hour Ozone NAAQS

2.2 Delaware 8-Hour Ozone Design Values

Under the 8-hour ozone standard (0.070 ppm), the design value of a specific county is defined as the highest three-year average of the 4th highest daily 8-hour maximum. The average is calculated as a ppm value truncated at three decimal places. Where there is more than one monitor in a county, the highest calculated value becomes the design value for that county. Figure 2-2 summarizes the 8-hour ozone design values of New Castle County in Delaware from 1997 to 2021. Figure 2.3 summarizes the 8-hour ozone design values for each individual monitor in New Castle County.

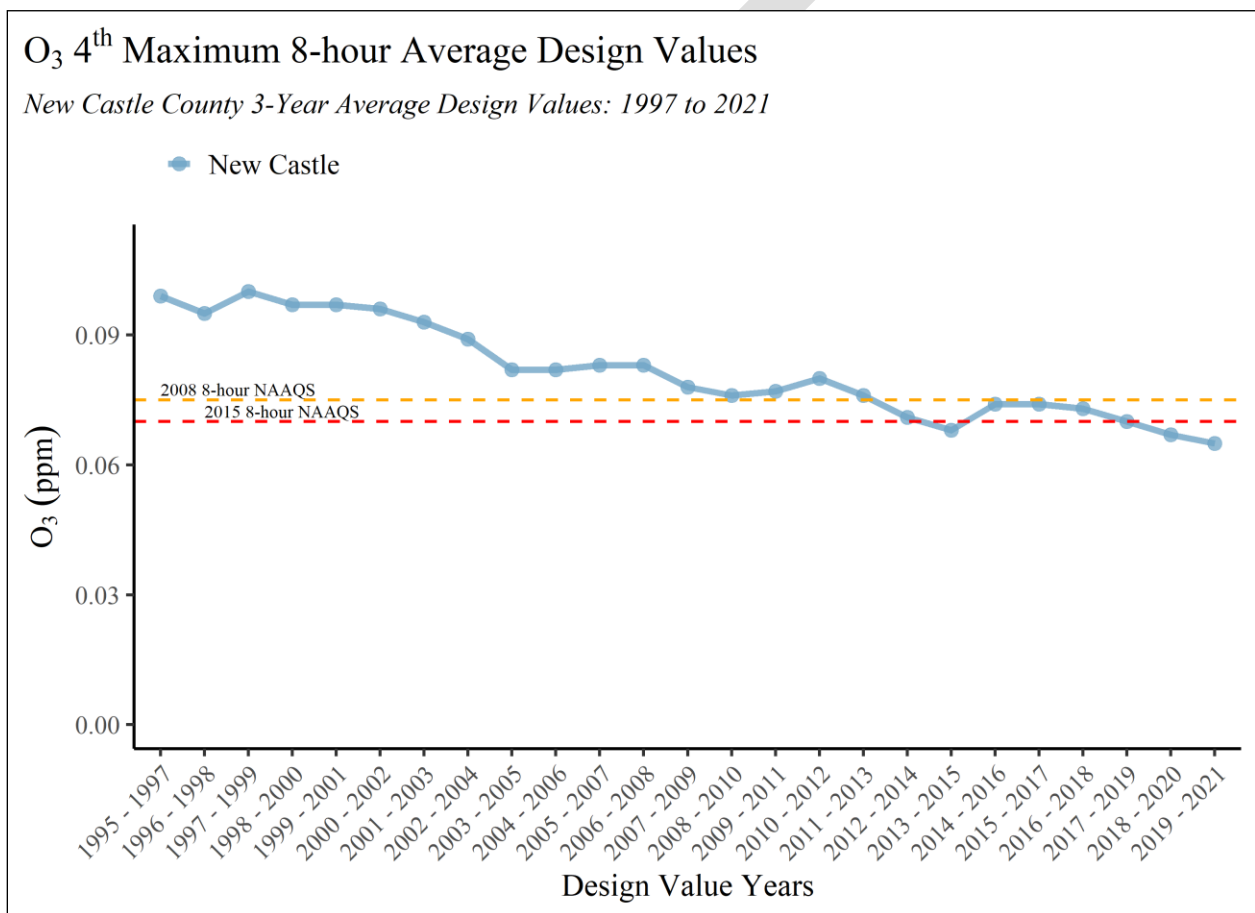


Figure 2-2. Delaware 8-Hour Ozone Design Values New Castle County

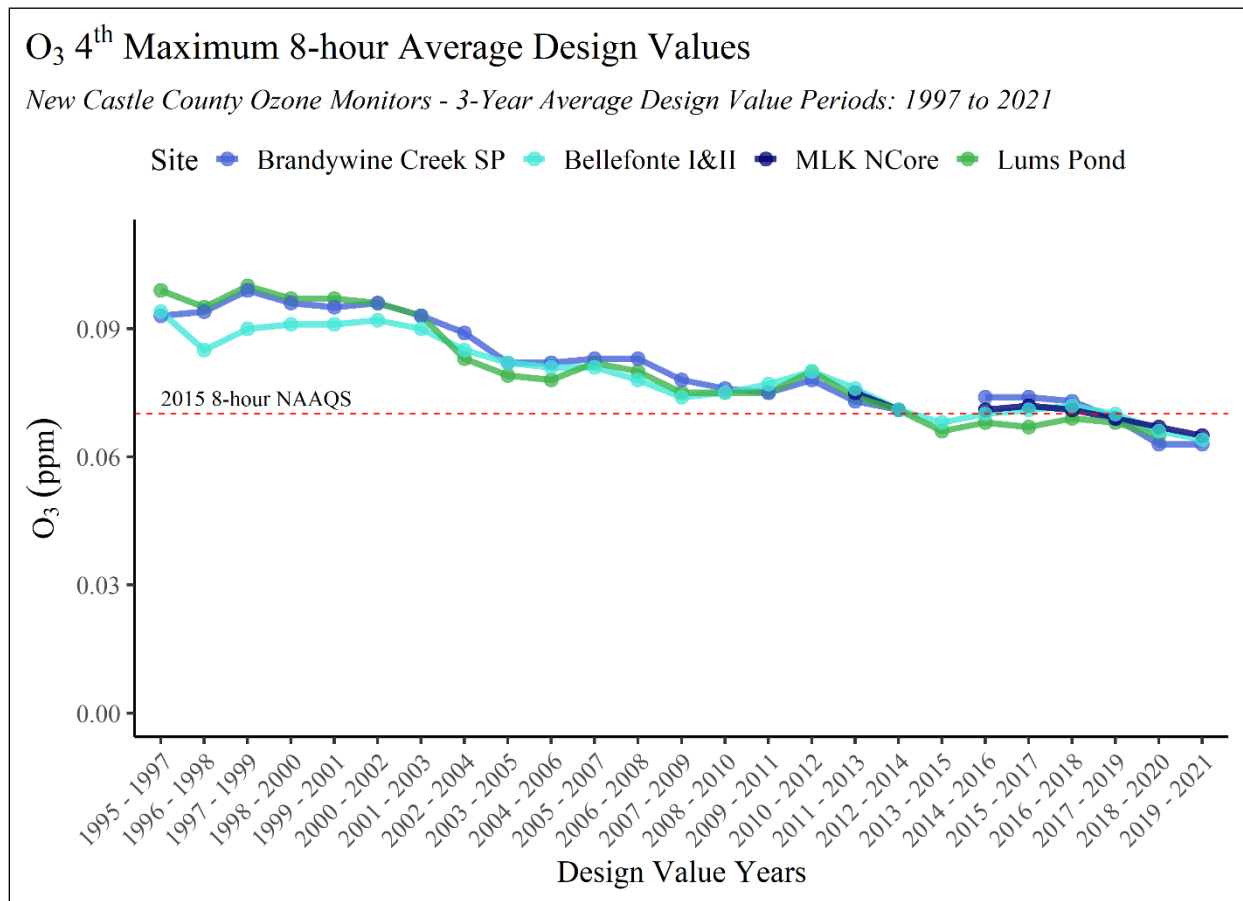


Figure 2-3. Delaware 8-Hour Ozone Design Values New Castle County Monitors

2.3 Ozone Exceedances at Delaware Monitors

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

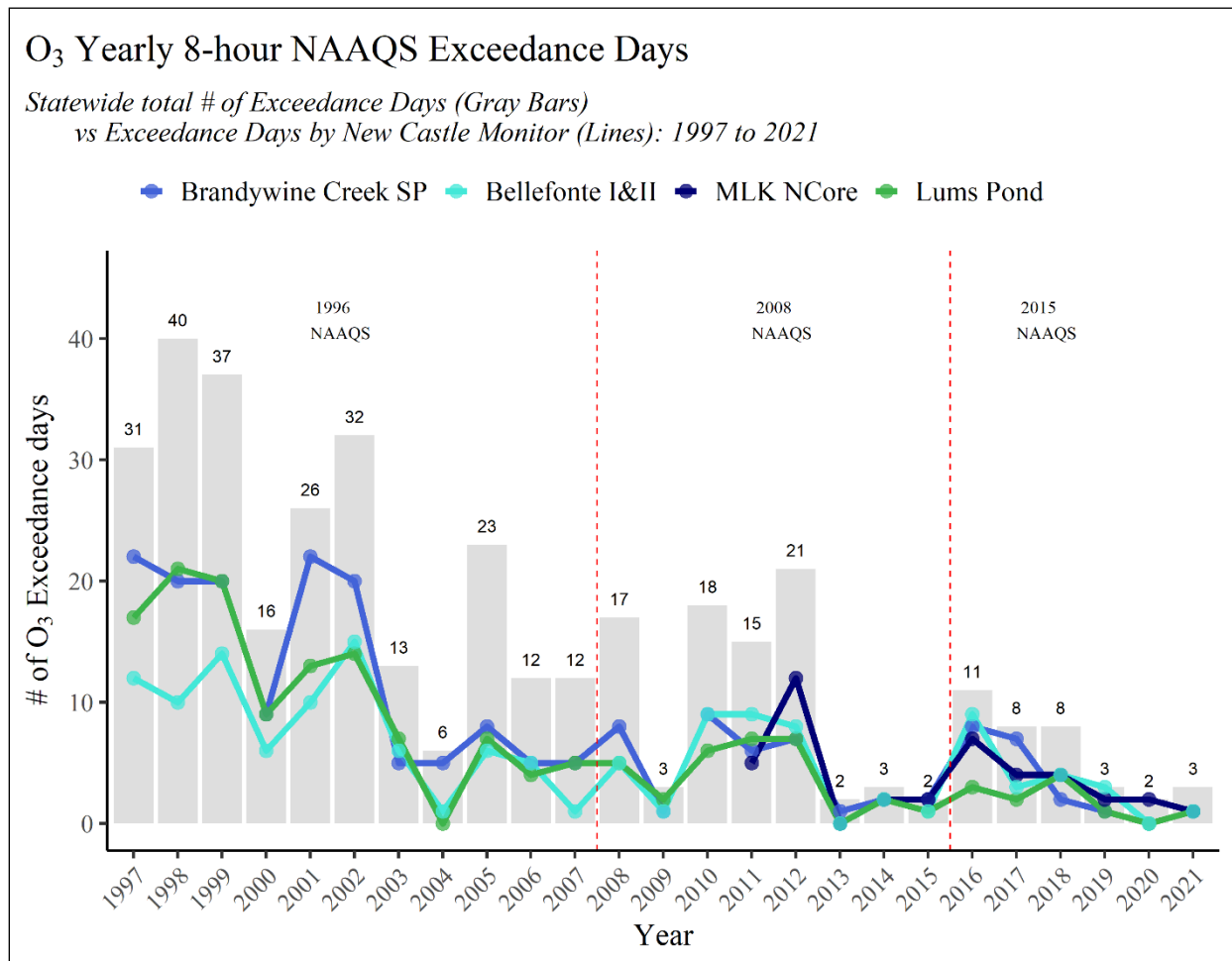


Figure 2-4. Number of 8-hour Ozone Exceedance Days at New Castle County Monitors

2.4 Meteorological Analysis

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

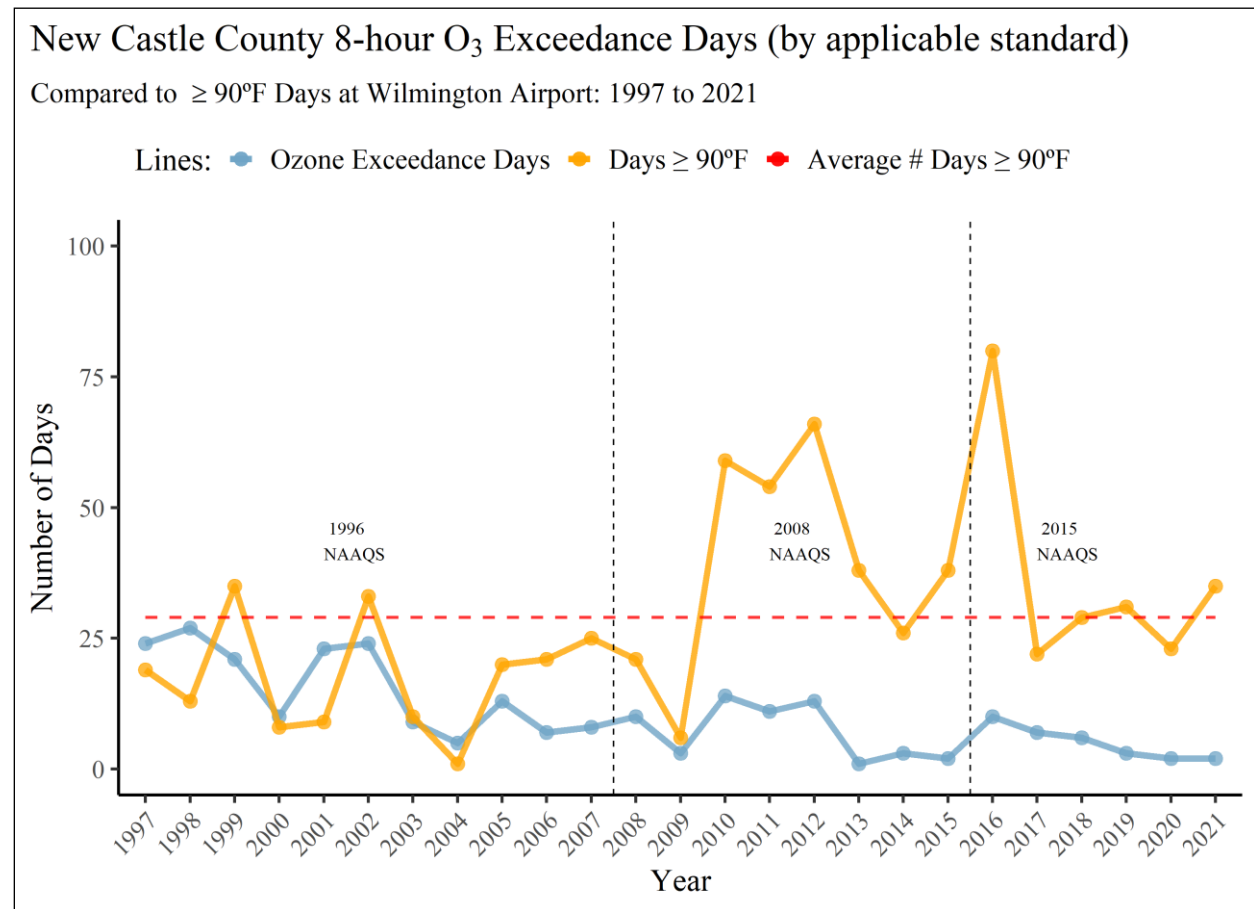


Figure 2-5 Delaware 8-Hour Ozone NAAQS Exceedance Days Compared to ≥ 90° Days at Wilmington Airport

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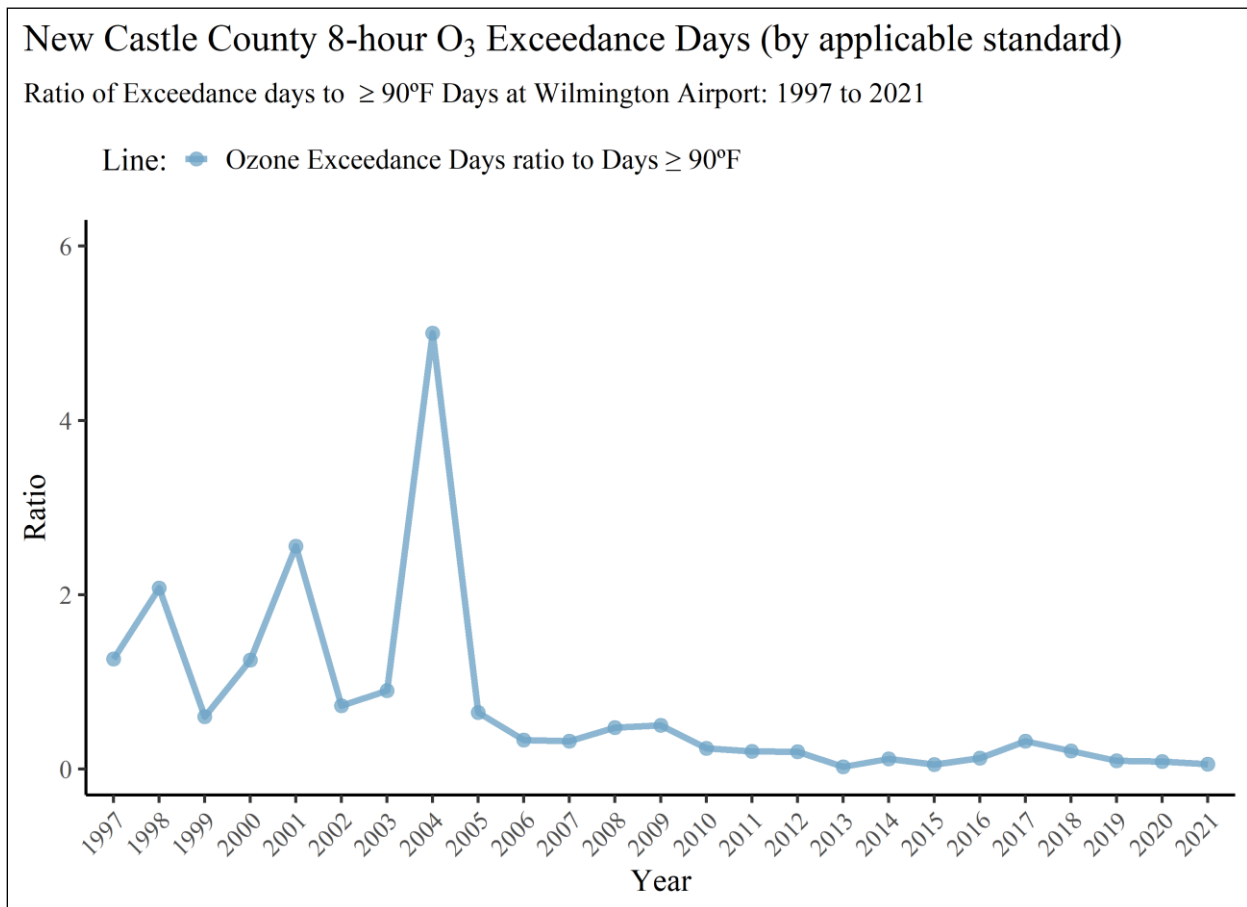


Figure 2-6 Delaware Ratio of 8-Hour Ozone NAAQS Exceedances Days to Number of $\geq 90^{\circ}$ Days at Wilmington Airport

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

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

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

3.0 Gasoline Vapor Recovery

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

3.1 Background and Federal Requirements

Because gasoline vapors contain mainly VOCs that contribute to the formation of ground-level ozone in the ambient air, Section 182(b)(3) of the CAA requires states with moderate and higher ozone NAAs, including Delaware,¹⁰ to revise their SIPs to require "owners or operators of gasoline dispensing systems to install and operate.....a system for gasoline vapor recovery of emissions from the fueling of motor vehicles."¹¹

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

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

Since 1998, automobile manufacturers in the United States have been required by Section 202(a)(6) of the CAA to install on-board refueling vapor recovery (ORVR) systems on new vehicles. Both Stage II and ORVR systems are effective for controlling gasoline vapor emissions during vehicle refueling. However, the vacuum-assist Stage II systems¹² and the ORVR systems are incompatible. When such Stage II-equipped GDFs are refueling ORVR-equipped vehicles, the ORVR system will force the Stage II's vacuum pump to pull fresh air into the UST or AST, causing vapor pressure growth in the storage tanks. The vapor pressure growth leads to additional vapor emissions from the USTs or ASTs, especially when those tanks are not vapor-tight.

¹⁰ In early 1990s, two counties in Delaware, New Castle and Kent, were designated as "severe non-attainment areas" under the 1-hour ozone national ambient air quality standard.

¹¹ CAA 182(b)(3)(A)

¹² There are two types of Stage II vapor recovery systems, the vacuum-assist system and the balance system. The Stage II systems installed at Delaware GDFs are all vacuum-assist systems.

In May 2012, the EPA determined that the ORVR systems were in widespread use nationwide on gasoline-powered vehicles and issued a final rule to waive Section 182(b)(3) Stage II requirements.¹³ The final rule aimed to reduce the adverse effect of the functional overlap and incompatibility between the vacuum-assist Stage II systems at GDFs and the ORVR system on vehicles. Under the final rule, the states in the OTR, including Delaware, are allowed to remove their GDF's Stage II vapor recovery requirements, provided the overall emissions from the GDFs without Stage II systems do not increase. Section 184(b)(2) of the CAA requires the Administrator of the EPA to identify "control measures capable of achieving emission reductions comparable to those achievable through vehicle refueling controls" and for states that are in OTR to adopt "such [comparable] measures or such vehicle refueling controls."

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

3.2 Regulatory Amendments

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

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

The amendments were submitted to EPA on November 30, 2020 and were approved into SIP on July 11, 2022.¹⁴

¹³ Air Quality: Widespread Use for Onboard Refueling Vapor Recovery and Stage II Waiver. EPA Final Rule. 77 FR 28772. May 16, 2012. <https://www.govinfo.gov/content/pkg/FR-2012-05-16/pdf/2012-11846.pdf>.

¹⁴ Approval and Promulgation of Air Quality Implementation Plans; Delaware; Removal of Stage II Gasoline Vapor Recovery Program Requirements and Revision of Stage I Gasoline Vapor Recovery Program Requirements. EPA Final Rule. 87 FR 35423. June 10, 2022. <https://www.govinfo.gov/content/pkg/FR-2022-06-10/pdf/2022-12236.pdf>

4.0 Inspection and Maintenance Program

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

4.1 Introduction and Background

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

The CAA as amended in 1990 requires that most polluted areas adopt either "Basic" or "Enhanced" I/M programs, depending on the severity of the problem and the population of the area. The moderate ozone NAAs, plus marginal ozone areas with existing or previously required I/M programs, fall under the "Basic" I/M requirements. The 1990 Amendments to the CAA signed into law on November 15, 1990 required EPA to develop Federally enforceable guidance¹⁵ for two levels of I/M program: "Basic" I/M for areas designated as moderate nonattainment, and "Enhanced" I/M for serious and worse NAAs, as well as for areas within an OTR, regardless of attainment status.

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

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

¹⁵ USEPA - Vehicle Emissions Inspection and Maintenance (I/M): Policy and Technical Guidance. 2022. Retrieved from <https://www.epa.gov/state-and-local-transportation/vehicle-emissions-inspection-and-maintenance-im-policy-and-technical>.

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

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

Under Delaware regulations 7 **DE Admin. Code** 1126 and 7 **DE Admin. Code** 1131, vehicle owners are required to bring in their vehicles for emissions inspection every two years except newer vehicles with a seven model year exemption. Vehicle I/M programs help improve air quality by identifying high emitting vehicles and require them to be repaired. Owners of vehicles with high emissions are notified to make repairs so that emissions are within legal limits so that the vehicles can pass emission testing.

Delaware has chosen to meet the performance standards by implementing an Alternate Low Enhanced I/M program in Kent and New Castle Counties and a Basic Program in Sussex County. Table 4-1 compares the federal I/M program performance standards for a Basic and Low Enhanced program.

Table 4-1. Inspection & Maintenance Program Performance Standards

I/M Program Parameter	Basic I/M per 40 CFR 51.352 (a)	Alternate Low Enhanced I/M per 40 CFR 51.351 (g) Alternate Low Enhanced I/M Performance Standard
Network Type	Centralized testing.	Centralized testing.
Start Date	For areas with existing I/M programs, 1983. For areas newly subject, 1994.	For areas with existing I/M programs, 1983. For areas newly subject, 1995.
Test Frequency	Annual testing.	Annual testing.
Model Year Coverage	Testing of 1968 and later model year vehicles.	Testing of 1968 and later model year vehicles.
Vehicle Type Coverage	Light duty vehicles.	Light duty vehicles, and light duty trucks, rated up to 8,500 pounds GVWR.
Emission Test Type	Idle test.	Idle testing of all covered vehicles (as described in appendix B of subpart S).
Emission Standards	No weaker than specified in 40 CFR part 85, subpart W.	Those specified in 40 CFR part 85, subpart W.
Emission Control Device Inspection	None.	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.
Evaporative System Function Checks	—	None.
Stringency	A 20% emission test failure rate among pre-1981 model year vehicles.	A 20% emission test failure rate among pre-1981 model year vehicles.
Waiver Rate	A 0% waiver rate.	A 3% waiver rate, as a percentage of failed vehicles.
Compliance Rate	A 100% compliance rate.	A 96% compliance rate.
Evaluation Date	Basic I/M programs shall be shown to obtain the same or lower emission levels as the model inputs by 1997 for ozone nonattainment areas and 1996 for CO nonattainment areas; and, for serious or worse ozone nonattainment areas, on each applicable milestone and attainment deadline, thereafter.	Enhanced I/M program areas subject to the provisions of this paragraph (g) shall be shown to obtain the same or lower emission levels as the model program described in this paragraph by January 1, 2002 to within ± 0.02 gpm ¹ . Subject programs shall demonstrate through modeling the ability to maintain this level of emission reduction (or better) through their attainment deadline for the applicable NAAQS standard(s).

1. The +/-0.02 threshold is interpreted as lowering the performance standard by 0.02 gpm and not exceeding that limit.

4.2 Performance Standard Certification

EPA's final rule¹⁶ published October 7, 2022, reclassified certain ozone NAAs from marginal to moderate for the 2015 ozone NAAQS, which included New Castle County. The rule obligated NAAs reclassified as moderate for the 2015 ozone NAAQS to certify their "Basic" I/M programs. This rulemaking explained that states with existing I/M programs would need to conduct and submit a Performance Standard Modeling (PSM) analysis as well as make any necessary program revisions as part of their moderate area SIP submissions to ensure that I/M programs are operating at or above the "Basic" I/M performance standard level for the 2015 ozone NAAQS.

Since New Castle County already implements a "Low Enhanced" I/M program that is more stringent than the "Basic" I/M program, Delaware was only required to perform the analysis and certify their program. The modeling and certification requirement is fulfilled in a separate report following EPA's October 2022 Guidance, "Performance Standard Modeling for New and Existing Vehicle I/M Programs using the Motor Onroad Vehicle Emissions Simulator (MOVES) Mobile Source Emissions Model".¹⁷ The PSM analysis shows New Castle County's I/M program meets the "Basic" performance standard without modification or revision required of the regulation and that Delaware's current I/M SIP (Motor Vehicle Emissions Inspection Program; Plan for Implementation) for 7 **DE Admin. Code** 1126 and 7 **DE Admin. Code** 1131, meets the I/M regulations at 40 CFR 51.372 required elements outlined in (a)(1)-(8).

Delaware is addressing the PSM Certification requirement in a separate action. The public hearing for the PSM Certification is expected to take place on conjunction with this SIP revision.

¹⁶ Determinations of Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as marginal for the 2015 Ozone National Ambient Air Quality Standard. EPA Final Rule. 87 FR 60897. October 7, 2022. <https://www.govinfo.gov/content/pkg/FR-2022-10-07/pdf/2022-20460.pdf>

¹⁷ Performance Standard Modeling for New and Existing Vehicle Inspection and Maintenance (I/M) Programs Using the MOVES Mobile Source Emissions Model EPA. October 2022. Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P101555C.pdf>

5.0 NNSR Certification

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

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

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

6.0 Offsets and Emission Reduction Credits

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

6.1 Non-attainment New Source Review Offsets

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

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

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

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

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

6.2 Emission Reduction Credits

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

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

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

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

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

6.2.1 Certification of Emission Reduction Credits

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

“Real (reductions) means reductions in actual emissions released into the atmosphere.”

“Surplus (reductions) means actual emission reductions below the baseline (see 6.0 of this regulation) not required by regulations or proposed regulations, and not used by the source to meet any state or federal regulatory requirement.”¹⁸

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

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

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

6.2.2 Status of Credits

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

¹⁸ In order to establish the amount of an emission reduction that is surplus and thus eligible for credit, an ozone season and a non-ozone season emission baseline must be established for each emission unit or units associated with a particular emission reduction. The formula for calculation of the ozone season and non-ozone season emission baselines can be found in 7 **DE Admin. Code** 1134, Section 6.3.

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

Held By	VOC (tons)		NO _x (tons)	
	Ozone Season	Non-Ozone Season	Ozone Season	Non-Ozone Season
<i>1734 LLC</i>	117	78	9	20
<i>Calpine</i>	0	0	27	19
<i>Delaware City Industries (DCI)</i>	4	2	1	1
<i>Diamond State Port Corporation</i>	34	24	9	7
<i>DuPont</i>	0	0	0	0
<i>Lafarge</i>	3	2	0	0
<i>NRG Energy Center</i>	0	0	121	147
<i>Veolia</i>	4	2	4	5
<i>VPI</i>	6	4	1	1
<i>Division of Small Business</i>	86	51	31	22
Total ERCs Currently in New Castle and Kent Counties	254	163	203	222

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

7.0 Delaware 2017 Base Year Emissions Inventory

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

7.1 Introduction

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

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

7.2 Background and Requirements

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

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

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

- **Inventory year** – 2017
- **Pollutants**¹⁹ – 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
- **Seasonal Allocation** – Annual and summer season weekday (SSWD) daily emissions.
 - The summer season is defined as the months June, July, and August. Weekday is defined as the days Monday, Tuesday, Wednesday, Thursday, and Friday.

EPA requires states to update their base year inventory with the latest emission estimates as directed. This SIP revision updates the Onroad emissions to include emission estimates using the latest available EPA Motor Onroad Vehicle Emissions Simulator model, MOVES3. The EPA mandated use of MOVES3 for SIPs and Transportation Conformity in their January 7, 2021 Notice of Availability.²⁰

In addition, the revision updates the Nonpoint sector for a more comprehensive and accurate baseline inventory as recommended in EPA’s May 2017 Inventory Guidance, “Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter NAAQS and Regional Haze Regulations”²¹ (hereafter referred to as “EPA’s 2017 Inventory Guidance”). The updated inventory will be referenced in this document as the “Adjusted 2017 base year inventory”.

7.3 Delaware Adjusted 2017 Base Year Emission Inventory Summary

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

¹⁹ 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.

²⁰ Official Release of the MOVES3 Motor Vehicle Emissions Model for SIPs and Transportation Conformity. EPA Notice of Availability. 86 FR 1106. January 7, 2021. <https://www.govinfo.gov/content/pkg/FR-2021-01-07/pdf/2021-00023.pdf>

²¹ Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA. May 2017. Retrieved July 2023 from https://www.epa.gov/sites/default/files/2017-07/documents/ei_guidance_may_2017_final_rev.pdf

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

Source Sectors	2017 Annual Emissions (tpy)			2017 SSWD Emissions (tpd)		
	CO	NO _x	VOC	CO	NO _x	VOC
Point	1,766	2,504	747	10.42	14.53	3.12
Nonpoint	3,678	1,445	3,184	7.46	2.51	9.59
Nonroad	23,844	3,152	2,262	92.89	9.27	7.69
Onroad	26,302	5,105	1,693	83.23	16.06	5.37
All Sectors	55,590	12,206	7,886	194.00	42.38	25.76

7.3.1 Point Sources

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

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

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

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

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

7.3.2 Nonpoint Sources

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

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

Table 7-2 2017 Demographic Data for New Castle County

Demographic Parameter	New Castle County
Population ²²	564,193
Households	207,325
Land Area (square miles)	439
Annual Vehicle Miles Traveled (VMT) (million miles)	6,095

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

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

Table 7-3 lists the Nonpoint source categories for which CO, NO_x, 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).

²² Delaware Population Consortium. (2018). Annual Projections from the Delaware Population Consortium. Retrieved on Sep 17, 2018 from <https://stateplanning.delaware.gov/demography/dpc.shtml>

Table 7-3 2017 Base Year Inventory for Nonpoint Categories

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

*AIM: Architectural and Industrial Maintenance

7.3.2.1 Nonpoint Sources Emission Revisions

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

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

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

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

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

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

Source Categories	Original 2017 Base Year Inventory			Adjusted 2017 Base Year Inventory		
	Annual Emissions (tpy)			Annual Emissions (tpy)		
	CO	NO _x	VOC	CO	NO _x	VOC
Agricultural Pesticides	-	-	117	-	-	30
AIM ⁴ Coatings	-	-	403	-	-	390
Animal Cremation ¹	-	-	-	<1	<1	<1
Animal Husbandry ¹	-	-	-	-	-	35
Auto Refinishing	-	-	29	-	-	22
Human Cremation ¹	-	-	-	<1	<1	<1
Lighter Fluid (C&CP ²) ¹	-	-	-	-	-	12
POTWs ^{1,3}	-	-	-	-	-	12
Residential Grilling ¹	-	-	-	150	3	8
Retail Gasoline Stations	-	-	402	-	-	240
Total	-	-	951	150	3	749

1) New Category

2) C&CP: Consumer and Commercial Products

3) POTWs: Publicly Owned Treatment Works

4) AIM: Architectural and Industrial Maintenance

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

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

Source Categories	Original 2017 Base Year Inventory			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	-	-	-	-	-	0.10
Commercial Fuel	0.43	0.73	0.04	0.43	0.52	0.03
Human Cremation ¹	-	-	-	<0.01	<0.01	<0.01
Lighter Fluid (C&CP ²) ¹	-	-	-	-	-	0.05
Portable Fuel Containers	-	-	0.33	-	-	0.42
POTWs ^{1,3}	-	-	-	-	-	0.03
Residential Grilling ¹	-	-	-	0.66	0.01	0.04
Residential Fuel	0.12	0.28	0.02	0.10	0.22	0.01
Retail Gasoline Stations	-	-	1.91	-	-	0.78
Total	0.55	1.01	2.62	1.19	0.76	1.57

1) New Category

2) C&CP: Consumer and Commercial Products

3) POTWs: Publicly Owned Treatment Works

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

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

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

*BYI: Base Year Inventory

7.3.3 Onroad Sources

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

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

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

7.3.3.1 Onroad Sources Emission Revisions

This SIP revision updates the Onroad emissions to include emission estimates using the latest available EPA MOVES model, MOVES3.1.0. The EPA mandated use of MOVES3 for SIPs and Transportation Conformity in their January 7, 2021 Notice of Availability.²³ MOVES3.1.0 was the most up to date version available during this analysis and is the version the Department used to calculate future emissions for RFP. As indicated in Section 3.4.2 of *EPA's 2017 Inventory Guidance*:

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

²³ Official Release of the MOVES3 Motor Vehicle Emissions Model for SIPs and Transportation Conformity. EPA Notice of Availability. 86 FR 1106. January 7, 2021. <https://www.govinfo.gov/content/pkg/FR-2021-01-07/pdf/2021-00023.pdf>

The MOVES 2014b input database was converted to MOVES3 formatting using the MOVES2014 to MOVES3 conversion tool and guidance.²⁴ The county-specific input data types created for the 2017 inventory include VMT (by vehicle and roadway type), vehicle registration data (vehicle populations and age distributions), average speeds in the form of speed bin fractions (weekday versus weekend and by roadway type), and I/M program specifications. Table 7-7 lists the updated inputs and assumptions for MOVES3 used to calculate the mobile emissions for the Adjusted 2017 base year inventory.

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

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

²⁴ MOVES3 Database Conversion Tool Help. EPA. Revised November 6, 2020. Retrieved July 2023 from Tools menu in MOVES3.1.0 Interface.

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

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

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

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

*BYI: Base Year Inventory

7.3.4 Nonroad Sources

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

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

- Aircraft – Commercial, military, and private aircraft.
- Locomotives (or Rail) – Commercial line haul and yard locomotives.
- Commercial Marine Vessels (CMVs) – Various types of vessels that navigate the Delaware Bay and River and the Chesapeake and Delaware Canal are included under this source category. Recreational boats are included in the next category.

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

7.3.4.1 Marine, Aircraft and Rail (MAR) Sources

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

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

7.3.4.2 Other Off-road Vehicles and Equipment Sources

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

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

7.3.4.2.1 Other Off-road Vehicles and Equipment Sources Emission Revisions

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

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

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

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

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

*BYI: Base Year Inventory

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8.0 Reasonable Further Progress

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

8.1 Introduction

RFP is required by the CAA under Part D, Title I to ensure that the air quality in NAAs makes steady and incremental progress toward attaining air quality standards.²⁵ SIP revisions for moderate NAAs are required to include an RFP demonstration. Listed in 40 CFR 51.1310(a)(2), moderate NAA requirements for RFP state that the area must provide 15% emission reduction from the baseline year within 6 years. It also states that the reduction relies on either NO_x or VOC (or combination) depending on criteria in CAA 182(c)(2)(C).

The EPA provides additional RFP guidance in their 2005 Phase 2 Implementation Rule.²⁶ This ruling indicates Delaware must achieve 15% VOC and/or NO_x emission reduction in New Castle County from their combined 2017 baseline level, before the end of 2023. RFP can be shown with either VOC or NO_x or a combination of the two pollutants since New Castle County had a 15% VOC Rate-of-Progress (ROP) plan approved by EPA under the 1-hour ozone standard.

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

8.2 Reasonable Further Progress 2023 Projected Inventory

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

²⁵ 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

²⁶ Final Rule To Implement the 8-Hour Ozone National Ambient Air Quality Standard—Phase 2; Final Rule To Implement Certain Aspects of the 1990 Amendments Relating to New Source Review and Prevention of Significant Deterioration as They Apply in Carbon Monoxide, Particulate Matter and Ozone NAAQS; Final Rule for Reformulated Gasoline. EPA Final Rule. 70 FR 71612. November 29, 2005. <https://www.govinfo.gov/content/pkg/FR-2005-11-29/pdf/05-22698.pdf>.

8.2.1 Background

Department staff developed the 2023 Projected Attainment Inventory by applying appropriate growth factors to the Adjusted 2017 base year inventory. EPA's May 2017 Inventory Guidance "*Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter NAAQS and Regional Haze Regulations*" (hereafter referred to as "*EPA's 2017 Inventory Guidance*") was used in the development of the 2023 Projected Attainment Inventory. As indicated in the guidance, the goal of the projected inventory is to make a "reasonable and technically credible estimate of future-year emissions that accounts for key variables".²⁷ These variables include changes to activities, emission controls, fuel types, and/or regulations.

The EPA periodically develops modeling platforms with a set of future year inventories and detailed documentation of the approaches used to develop the inventories. Section 5 of *EPA's 2017 Inventory Guidance* suggests air agencies use EPA's modeling platforms "to develop and improve their own emissions projections". As a recommended resource in the guidance, Delaware relied on EPA's most recent modeling platform, 2016v3, which included future year 2023, for selecting projection methods. This ensured that Delaware's 2023 Projected Attainment Inventory was grown using the most up-to-date methods. The Technical Support Document (TSD) for EPA's 2016v3 platform²⁸ is referred to as "*EPA's 2016v3 TSD*" in this document. Deviations from EPA's 2016v3 modeling platform methodology will be discussed in detail in the sections below.

8.2.2 Growth Projection Methodology

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

8.2.2.1 Point Sources Growth Projection Methodology

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

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

²⁷ Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA. May 2017. Retrieved July 2023 from [Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards \(NAAQS\) and Regional Haze Regulations \(epa.gov\)](#)

²⁸ Technical Support Document (TSD): Preparation of Emissions Inventories for the 2016v3 North American Emissions Modeling Platform. EPA. January 2023. Retrieved July 2023 from https://www.epa.gov/system/files/documents/2023-03/2016v3_EmisMod_TSD_January2023_1.pdf

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

2023 Point Source Projections	Annual (tpy)			SSWD (tpd)		
	CO	NO _x	VOC	CO	NO _x	VOC
Emission Reduction Credits (ERCs) ^{1,2,3}	-	425	417	-	1.16	1.14
Projected Point w/o ERCs	1,619	2,218	449	9.22	13.63	2.42
Total Project Point w/ ERCs	1,619	2,643	866	9.22	14.80	3.56

1) ERCs: Emission Reduction Credits as of 2021 Audit Report; *Delaware Regulation 1134 Emission Banking and Trading Program, Final August 2022 Emission Reduction Credit Audit*

2) Verified with DE Compliance Manager that no other facilities are pursuing credits as of May 2023

3) TPD for ERCs are calculated from annual emissions since seasonal factors are not available; calculation conservative because it is known that the majority of credits will not be applied in 2023

8.2.2.1.1 Non-EGU Point Sources Growth Projection Methodology

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

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

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

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

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

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

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

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

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

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

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

8.2.2.1.2 EGU Point Sources Growth Projection Methodology

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

EGUs are regulated under 40 CFR Part 75 to continuously measure emissions and report their data to the EPA. These units have electric generating capacities greater than 25 Megawatts (MW) and burn fossil fuels.²⁹ It is noted that these units are typically part of facilities that produce other emissions. These additional emissions are reported in the non-EGU section of this report (Section 8.2.2.1.1).

Emission patterns from the electric generating fleet and resulting power sector vary substantially over time based on changing economic conditions, fuel markets, and regulatory requirements.³⁰ As a result, future emissions must be derived from modeling that accounts for these variables.

ERTAC developed their EGU Emission Projection Tool to grow EGU emissions using EPA Clean Air Markets Division (CAMD) data, fuel-specific growth rates, and state provided information such as controls and retirements.³¹ MARAMA developed EGU emissions for future year 2023 using the ERTAC EGU Growth tool.

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

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

²⁹ CAMD's Power Sector Emissions Data Guide. EPA. July 2022. Retrieved from

<https://www.epa.gov/system/files/documents/2022-07/CAMD%27s%20Power%20Sector%20Emissions%20Data%20Guide%20-%202007182022.pdf>

³⁰ Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA. May 2017. Retrieved July 2023 from [Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards \(NAAQS\) and Regional Haze Regulations \(epa.gov\)](#)

³¹ MARAMA (n.d.). ERTAC EGU. MARAMA.org. <https://marama.org/technical-center/ertac-egu-projection-tool/#:~:text=ERTAC%20has%20developed%20the%20Energy%20Generating%20Unit%20%28EGU%29,assessment%20on%20both%20annual%20and%20episodic%20peak%20bases>

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

Facility Name	Annual (tpy)			SSWD (tpd)		
	CO	NO _x	VOC	CO	NO _x	VOC
Christiana Energy Center	<1	<1	<1	<0.01	<0.01	<0.01
Delaware City Energy Center	<1	<1	<1	<0.01	<0.01	<0.01
Delaware City Refinery*	77	88	4	0.28	0.32	0.01
Edge Moor Energy Center	27	62	5	0.55	1.22	0.10
Hay Road Energy Center	79	459	15	0.56	3.22	0.11
West Energy Center	<1	<1	<1	<0.01	<0.01	<0.01
Total	184	610	24	1.40	4.78	0.23

*Delaware City Refinery Power Plant

8.2.2.1.3 Emission Reduction Credits

The EPA also requires ERCs in the projected inventory.³² An ERC is a credit earned by a company when it reduces its air emissions (Section 6.2). They are generated through facility shutdowns or curtailments. Since the credits can be sold to offset new emission sources, they must be considered as “in the air” for the projected inventory when demonstrating attainment.

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

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

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

³² Phase 2 of the Final Rule To Implement the 8-Hour Ozone National Ambient Air Quality Standard—Notice of Reconsideration. EPA Proposed Rule. 71 FR 75902. December 19, 2006. <https://www.govinfo.gov/content/pkg/FR-2006-12-19/pdf/FR-2006-12-19.pdf>

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

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

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

8.2.2.2 Nonpoint Sources Growth Projection Methodology

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 8-8 Control Efficiencies for Nonpoint Sources

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

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

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

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

8.2.2.3 Onroad Sources Growth Projection Methodology

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

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

Table 8-10 2023 Onroad Source Emissions

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

*Includes 10% Safety Margin. See Section 9.2.2

8.2.2.4 Nonroad Sources Growth Projection Methodology

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

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

Table 8-11 2023 Nonroad Source Emissions for New Castle

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

8.2.2.4.1 Marine, Air, Rail Sources Growth Projection Methodology

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

Commercial Marine Vessels (CMV) are split into two groups; category 1 and 2 vessels, and category 3 vessels. Category 1 and 2 vessels are typically smaller vessels with engines less than 30 liters per cylinder. The EPA projected category 1 and 2 vessel emissions using national factors derived from *the Regulatory Impact Analysis Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters per Cylinders*.³³ Category 3 vessels are larger vessels with engines greater than 30 liter per cylinder. EPA used an EPA report on projected bunker fuel and Regulatory Impact Assessment data to calculate the appropriate growth factors. More detail on the CMV growth methodologies can be found in Section 4.2.3.2 of *EPA’s 2016v3 TSD*.

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

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

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

³³ Regulatory Impact Analysis: Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters Per Cylinder. EPA. March 2008. Retrieved July 2023 from <https://nepis.epa.gov/Exe/ZyPDF.cgi/P10023S4.PDF?Dockey=P10023S4.PDF>

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

Category	2023 Annual Emissions (tpy)			2023 SSWD Emissions (tpd)		
	CO	NO _x	VOC	CO	NO _x	VOC
Aircrafts	502	71	43	1.38	0.19	0.12
CMV	224	1,279	88	0.60	3.50	0.24
Rail	74	436	28	0.21	1.19	0.08
Total	800	1,786	159	2.19	4.88	0.45

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

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

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

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

Table 8-13 2023 Nonroad MOVES3 Results

Category	2023 Annual Emissions (tpy)			2023 SSWD Emissions (tpd)		
	CO	NO _x	VOC	CO	NO _x	VOC
Nonroad - MOVES3	25,024	936	1,720	100.02	3.06	6.23

8.3 Reasonable Further Progress Demonstration

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

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

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

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

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

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

8.3.1 Reasonable Further Progress Calculations

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

Equation 8-1

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

Equation 8-2

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

Equation 8-3

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

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

According to the 1990 Clean Air Act Amendment (CAAA) – 42 U.S.C. §7545 and 7546, reductions necessary to meet the RFP requirement must exclude the effects of the noncredible Federal Motor Vehicle Control Program (FMVCP) and Reid Vapor Pressure (RVP) programs. EPA proposed in their SIP Requirements for the 2008 ozone NAAQS that states no longer needed to calculate and deduct emissions related to these measures.³⁴ As a result, these reductions were not included in the 2023 Target Level calculations. The general 2023 Target Level Equation is shown in Equation 8-4:

Equation 8-4

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

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

Equation 8-5

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

Equation 8-6

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

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

³⁴ Final Rule To Implement the 8-Hour Ozone National Ambient Air Quality Standard—Phase 2; Final Rule To Implement Certain Aspects of the 1990 Amendments Relating to New Source Review and Prevention of Significant Deterioration as They Apply in Carbon Monoxide, Particulate Matter and Ozone NAAQS; Final Rule for Reformulated Gasoline. EPA Final Rule. 70 FR 71612. November 29, 2005. <https://www.govinfo.gov/content/pkg/FR-2005-11-29/pdf/05-22698.pdf>

Table 8-14 Reasonable Further Progress Calculations for NOx

NOx Target Level for 2023 Milestone New Castle Non-attainment Area Emissions in Tons per Day			
		Formula	tpd
A	Adjusted 2017 Base Year Inventory		42.38
B	Biogenic Emissions (Not included in BYI)		0.00
C	Adjusted 2017 Base Year Inventory	A - B	42.38
D	FMVCP/RVP Reductions Between 2017 and 2023 ¹		0.00
E	Adjusted 2017 Base Year Inventory Relative to 2023	C - D	42.38
F	Ratio		11.0%
G	Emissions Reductions Required Between 2017 and 2023	E * F	4.66
H	2023 Target Level for NOx	C - D - G	37.72
Emission Level from 2023 Projected Attainment Inventory²			34.26
J	Surplus Emissions for NOx (tpd)		3.45

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

Table 8-15 Reasonable Further Progress Calculations for VOC

VOC Target Level for 2023 Milestone New Castle Non-attainment Area Emissions in Tons per Day			
		Formula	tpd
A	Adjusted 2017 Base Year Inventory		25.76
B	Biogenic Emissions (Not included in BYI)		0.00
C	Adjusted 2017 Base Year Inventory	A - B	25.76
D	FMVCP/RVP Reductions Between 2017 and 2023 ¹		0.00
E	Adjusted 2017 Base Year Inventory Relative to 2023	C - D	25.76
F	Ratio		4.0%
G	Emissions Reductions Required Between 2017 and 2023	E * F	1.030
H	2023 Target Level for VOC	C - D - G	24.73
Emission Level from 2023 Projected Attainment Inventory²			24.22
J	Surplus Emissions for VOC (tpd)		0.51

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

8.3.2 Reasonable Further Progress Results

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

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

Description	NO_x Emissions (tpd)	VOC Emissions (tpd)
2023 Target Levels	37.72	24.73
2023 Projected Inventory	34.26	24.22

DRAFT

9.0 Mobile Budgets for Transportation Conformity

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

9.1 Introduction to Transportation Conformity

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

New Castle County's Metropolitan Planning Organization (MPO), the Wilmington Area Planning Council (WILMAPCO), is responsible for planning, coordinating, and programming transportation investments with federal funds. They develop a TIP and a Regional Long-range Transportation Plan (RTP) in cooperation with state, county, and local governments, and transportation providers. They must also show that the RTP and TIP conform to the transportation emission budgets set forth in this section of the SIP. If emissions generated from the projects programmed in the TIP and RTP are equal to or less than the emission budgets in the SIP, then conformity has been demonstrated.³⁵

9.2 Motor Vehicle Emissions Budget

According to EPA's Phase 2 Implementation Rule,³⁶ Delaware is required to establish mobile budgets for the attainment year, 2023. The emissions budget, otherwise known as the Motor Vehicle Emissions Budget (MVEB), is set by the Department in this section as required by New Castle County's moderate reclassification of the 2015 Ozone NAAQS.

³⁵ 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 (PM_{2.5}) Maintenance Area. WILMAPCO. May, 2022. Retrieved on http://www.wilmapco.org/Aq/NCC_Conformity_FY23_TIP.pdf

³⁶ Ibid 26.

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

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

9.2.1 Motor Vehicle Emissions Budget Modeling

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

Each parameter described above was grown to year 2023 to estimate future mobile emissions. Delaware grew 2019 VMT data to 2023 using FHWA’s national Onroad growth factor. The 2022 age distribution was grown using EPA’s projection tool: *moves3-age-distribution-projection-tool-20210405.xls*.³⁷ Source type population was grown via a linear regression from 2017 to 2022. All other inputs and assumptions used to estimate the MVEB are shown in Table 9-1. Detailed results of the MOVES run are shown in *2023 Onroad MOVES Output Results* (Appendix H).

³⁷ EPA (2021, April 4) Age Distribution Projection Tool for MOVES3. <https://www.epa.gov/moves/tools-develop-or-convert-moves-inputs>

Table 9-1 2023 Newcastle County MVEB Inputs and Assumptions

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

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

9.2.2 Motor Vehicle Emissions Budget for 2023

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

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

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

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

*Safety margin included

9.3 Trends in Motor Vehicle Emissions Budget

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

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

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

- Updated Onroad exhaust emission rates, including Heavy Duty (HD) Greenhouse Gas (GHG) Phase 2 and Safer Affordable Fuel Efficiency (SAFE) rules
- Updated Onroad activity, vehicle populations and fuels
- Added gliders and off-network idle
- Revised inputs for hoteling and starts³⁸

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

Table 9-3 2023 MVEB vs 2009 MVEB

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

*Safety margin included

³⁸ EPA (2021, March) Overview of EPA’s Motor Vehicle Emission Simulator (MOVES3). Retrieved on July 2023 from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P1011KV2.pdf>

10.0 Control Measures and Emission Reductions for Attainment

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

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

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

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

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

10.1 CONTROL MEASURES INCLUDED IN THE 2017 BASE YEAR INVENTORY

10.1.1 Electric Generating Units

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

Regulation	Title	Pollutant(s)	Effective Date	EPA SIP Approval
1144	Control of Stationary Generator Emissions	VOC/NO _x	1/11/06	August 11, 2010 [75 FR 48566] ³⁹
1146	EGU Multi-Pollutant Regulation	NO _x	12/11/06	August 11, 2010 [75 FR 48566] ⁴⁰
1148	Control of Stationary Combustion Turbine Electric Generating Unit Emissions	NO _x	7/11/07	August 11, 2010 [75 FR 48566] ⁴¹

10.1.2 Non-EGUs

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

Regulation	Title	Pollutant(s)	Effective Date	EPA SIP Approval
1124 - 46.0	Crude Oil Lightering Operations	VOC	5/11/07	August 11, 2010 [75 FR 48566] ⁴²⁾
1142 – 2.0	Control of NO _x Emissions from Industrial Boilers and Process Heaters at Petroleum Refineries*	NO _x	12/1/01, 7/11/07, 4/11/11	May 15, 2012 [77 FR 28489] ⁴³

*Delaware City Refinery, enforceable emission cap for NO_x

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 Ibid 39.

⁴¹ Ibid 39.

⁴² Ibid 39.

⁴³ Approval and Promulgation of Air Quality Implementation Plans; Delaware; Amendments to the Control of Nitrogen Oxides Emissions From Industrial Boilers and Process Heaters at Petroleum Refineries. EPA Final Rule. 77 FR 28489. May 15, 2012. <https://www.govinfo.gov/content/pkg/FR-2012-05-15/pdf/2012-11656.pdf>

10.1.3 Area Sources

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

Regulation	Title	Pollutant(s)	Effective Date	EPA SIP Approval
1113	Open Burning	VOC/NOx	4/11/07	August 11, 2010 [75 FR 48566] ⁴⁴
1124 - 11.0	Mobile Equipment Repair and Refinishing	VOC	10/11/10	August 11, 2010 [75 FR 48566] ⁴⁵
1141 - 1.0	Architectural and Industrial Maintenance Coatings	VOC	11/11/06	August 11, 2010 [75 FR 48566] ⁴⁶
1141 - 1.0	Architectural & Industrial Maintenance Coating	VOC	3/1/2017	Not included in Delaware's SIP
1141 - 2.0	Consumer Products	VOC	4/11/09	October 20, 2010 [75 FR 64673] ⁴⁷
1141 - 2.0	Consumer Products	VOC	1/1/2017	Not included in Delaware's SIP
1141 - 3.0	Portable Fuel Containers	VOC	4/11/10	December 14, 2010 [75 FR 77758] ⁴⁸
1141 - 4.0	Adhesives and Sealants	VOC	4/11/09	December 22, 2011 [76 FR 79537] ⁴⁹

10.1.4 Nonroad Sources

Federal Regulations

- Aircraft: Exhaust Emission Standards (40 CFR Part 87)
- Nonroad Compression-Ignition Engines: Exhaust Emission Standards (40 CFR 1039, 40 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 (CI) Engines: Exhaust Emission Standards (40 CFR 1042)
- Marine Spark-Ignition Engines and Vehicles: Exhaust Emission Standards (40 CFR Part 91 and 1045)
- Nonroad Recreational Engines and Vehicles: Exhaust Emission Standards (40 CFR 1051)

⁴⁴ Ibid 39.

⁴⁵ Ibid 39.

⁴⁶ Ibid 39.

⁴⁷ 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>

⁴⁸ 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>

⁴⁹ 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>

- Nonroad Spark-Ignition Engines 19 Kilowatts and Below: Exhaust Emission Standards (40 CRF Part 90 & 1054)
- Nonroad Spark-Ignition Engines 19 Kilowatts and Below, Recreational Engines and Vehicles, and Marine Spark-Ignition Engines: Evaporative Emission Standards (40 CRF Part 1045, 1051,1054, and 1060)⁵⁰

10.1.5 Onroad Sources

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

Regulation	Title	Pollutant(s)	Effective Date	EPA SIP Approval
1131	Low Enhanced Inspection and Maintenance Program	NOx	10/11/01	November 26, 2003 [68 FR 66343] ⁵¹
1132	Transportation Conformity Regulation	NOx	11/11/07	August 11, 2010 [75 FR 48566] ⁵²
1140	Delaware Low Emission Vehicle Program	NOx	10/11/99	October 14, 2015 [80 FR 61752] ⁵³
1145	Excessive Idling of Heavy Duty Vehicle	NOx	4/11/05	August 11, 2010 [75 FR 48566] ⁵⁴

Federal Regulations

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

⁵⁰ 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>

⁵¹ 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>

⁵² Ibid 39.

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 Ibid 39.

10.2 CONTROL MEASURES POST 2017 BASE YEAR INVENTORY

10.2.1 Area Sources

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

Regulation	Title	Pollutant	Effective Date	EPA SIP Approval
1124 - 26.0 and 36.0	Gasoline Dispensing Facility Stage I Vapor Recovery, and Vapor Emission Control at Gasoline Dispensing Facilities*	VOC	7/11/20	July 11, 2022 [87 FR 35423] ⁵⁵
1124 - 33.0	Solvent Cleaning and Drying	VOC	8/11/21	November 3, 2022 [87 FR 60102] ⁵⁶
1124 - 36.0	Vapor Emission Control at Gasoline Dispensing Facilities	VOC	4/11/21	July 11, 2022 [87 FR 35423] ⁵⁷

*Stage II Vapor Recovery Decommissioning

10.2.2 Onroad Sources

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

Regulation	Title	Pollutant(s)	Effective Date	EPA SIP Approval
1140	Delaware Low Emission Vehicle Program	NOx	3/11/18 and 5/1/19	October 14, 2015 [80 FR 61752] ⁵⁸
1126	Low Enhanced Inspection and Maintenance Program – Sussex County	NOx	1/11/23	Pending approval into the Delaware SIP
1131	Low Enhanced Inspection and Maintenance Program – Kent and New Castle Counties	NOx	1/11/23	Pending approval into the Delaware SIP

⁵⁵ 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>

⁵⁶ 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>

⁵⁷ Ibid 55.

⁵⁸ Ibid 53.

10.3 DETAILS OF CONTROL MEASURES FOR REASONABLE FURTHER PROGRESS

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

10.3.1 Area Sources

Solvent Cleaning 7 DE Admin. Code 1124, Section 33.0

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

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

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

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

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

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

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

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

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

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

10.3.2 Onroad Mobile Sources

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

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

Amendments to 7 **DE Admin. Code** 1131 “Low Enhanced Inspection and Maintenance Program – Kent and New Castle Counties,” provide a model year exemption that expands the vehicle inspection program from five to seven years to align with Delaware Code; increase 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. At the same time, the Department amended 7 **DE Admin. Code** 1126 “Motor Vehicle Emissions Inspection Program” to unify the Sussex I/M program with the Kent/Sussex program.

The Department decided that the emission reductions attributed to adding onboard diagnostic testing programs in Sussex County, could be used to offset, in part, the emissions increases attributed to the vehicle emissions exemption extension for Kent and New Castle Counties. Delaware drivers travel through the three counties, which supports the use of Sussex County reductions towards offsetting Kent and New Castle County’s vehicle emissions. Along with the revisions to the I/M program, the Delaware Department of Motor Vehicles requested the Two Speed Idle test be eliminated for older vehicles in Kent and New Castle Counties.

The inspection and maintenance program ensures cars and trucks are emitting emissions within legal limits and vehicles with high emissions are identified and repaired.

Delaware Low Emission Vehicle 7 DE Admin. Code 1140

The Department has chosen to adopt California’s Low Emission Vehicle (LEV) and GHG standards as part of the Delaware Code (7 **DE Admin. Code** 1140). These standards (7 **DE Admin. Code** 1140) became effective in Delaware for model year 2014 vehicles, significantly reducing a number of emissions including VOCs and NOx. The LEV III regulations include increasingly stringent emission standards for both criteria pollutants and greenhouse gases for new passenger vehicles through the 2025 model year. By adopting California’s motor vehicle emission vehicle standards, Delaware joined a growing number of states, currently at 14 (including the District of Columbia), committed to reducing pollution from motor vehicles.⁵⁹

⁵⁹ Division of Air Quality (n.d) Clean Vehicles and Fuels. Retrieved on August 14, 2023 from <https://dnrec.alpha.delaware.gov/air/mobile-sources/clean-vehicles-fuels/>

Reformulated Gasoline (40 CFR Part 80, Subpart D)

Reformulated Gasoline (RFG) was mandated by Section 211(k) of the federal CAA for metropolitan areas with the worst smog beginning in 1995. This includes New Castle and Kent County Delaware; and Sussex County which was opted in by the Governor in 1993. RFG is blended to burn more cleanly than conventional gasoline, reducing emissions of ozone-forming and toxic pollutants. The first phase of the RFG program began in 1995 and the second (current) phase began in 2000.⁶⁰

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

The program considers the vehicle and its fuel as an integrated system, setting new vehicle emissions standards and a new gasoline sulfur standard beginning in 2017. The vehicle emissions standards will reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. The gasoline sulfur standard will enable more stringent vehicle emissions standards and will make emissions control systems more effective.⁶¹

10.3.3 Nonroad Sources

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

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

⁶⁰ Division of Air Quality (n.d) Mobile Sources. Retrieved on August 4, 2023 from <https://dnrec.alpha.delaware.gov/air/mobile-sources/>

⁶¹ Final Rule for Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards Retrieved on August 2023 from <https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-control-air-pollution-motor-vehicles-tier-3>

- 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)⁶²

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

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

⁶² EPA (2022). EPA Emission Standards for Nonroad Engines and Vehicles. Retrieved on August 2023 from <https://www.epa.gov/emission-standards-reference-guide/epa-emission-standards-nonroad-engines-and-vehicles>

11.0 Reasonably Available Control Technology (RACT)

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

11.1 Background and Requirements

The EPA has defined the RACT as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.⁶³ 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 NO_x emission sources and on all sources and source categories covered by a Control Technique Guideline (CTG) and Alternate Control Techniques (ACTs) issued by EPA.

Under section 183 of the CAA, EPA was required to issue by certain timeframes several guidance documents for RACT controls that would help states meet the requirements of section 182(b)(2). This requirement upon EPA includes developing (1) CTGs for controls of VOC emissions from stationary sources, and (2) ACTs for controls of VOC and 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 NO_x sources in their moderate or worse NAAs. Adoption of new RACT regulation(s) shall occur when states have new stationary sources not covered by existing RACT regulations, or when new data or technical information indicates that a previously adopted RACT measure does not represent a newly-available RACT control level.

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

⁶³ State Implementation Plans; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas-Supplement (on Control Techniques Guidelines. EPA General Preamble for proposed rulemaking-Supplement. 44 FR 53762. September 17, 1979. https://archives.federalregister.gov/issue_slice/1979/9/17/53760-53764.pdf#page=3

12. Reasonably Available Control Measure (RACM)

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

12.1 Background and requirements

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

RACM is defined by the EPA⁶⁴ as any potential control measure that meets the following criteria:

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

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

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

12.2 RACM Determination

Advancement of Attainment Date By One Year Requirement

The EPA did not issue its final rule for the Determinations of Attainment by the Attainment Date and Reclassification of Areas Classified as marginal for the 2015 Ozone NAAQS until October 7, 2022.⁶⁵ Consequently, by the time the rule was issued, the deadline of September 30, 2022 required by RACM to advance the attainment date by one year had already passed. In addition, it can take Delaware a year or more to finish the process of adopting a new regulation, especially when more stringent controls are involved. Therefore, Delaware would not have been able to adopt any new regulations before the “advancement of attainment date” deadline of September 30, 2022.

⁶⁴ State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990. EPA General preamble for future proposed rulemakings. 57 FR 13498. Page 13560-13561. April 16, 1992. https://archives.federalregister.gov/issue_slice/1992/4/16/13412-13570.pdf#page=87

⁶⁵ Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as marginal for the 2015 Ozone National Ambient Air Quality Standards. EPA Final Rule. 87 FR 60897. October 7, 2022. <https://www.govinfo.gov/content/pkg/FR-2022-10-07/pdf/2022-20460.pdf>

Ozone Transport Commission Model Rules

The OTC is a multi-state organization created under the CAA⁶⁶. It is responsible for advising EPA on transport issues and for developing and implementing regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions.

The OTC has developed a number of Model Rules⁶⁷ that can be used by states as a template to adopt VOC emission reduction regulations. Some Model Rules have different Phases, or successively more stringent emissions controls. Delaware has already adopted the majority of applicable OTC model rules for Stationary and Area Sources:⁶⁸

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

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

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

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

⁶⁶ CAA Section 176A

⁶⁷ Status of Adoption of OTC Model Rules/Regulatory & Technical Guidelines. Updated May 10, 2023
<https://otcair.org/document.asp?view=modelrules>

⁶⁸ Ibid.

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

DRAFT

13.0 Attainment Demonstration Modeling

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

13.1 Background and Objectives

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

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

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

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

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

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

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

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

13.2 OTC Modeling Methodology

Ozone Conceptual Model

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

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

Some ozone is natural, or transported internationally, leading to ozone that is not considered attributed to U.S. human activity. This U.S. background ozone in the eastern United States is estimated to be in the range of 30 to 35 ppb, though it can be as high as 50 ppb in the Intermountain West.⁶⁹

To address the complexity of ozone formation and transport that occurs in the OTR, the 2016-based modeling year was selected as representative of the conceptual model as described in “The Nature of the Ozone Air Quality Problem in the Ozone Transport Region: A Conceptual Description”.⁷⁰

Models

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

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

Base Year Selection

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

Ultimately, the Base Year Selection Workgroup recommended that both 2015 and 2016 be used as base years, but that 2016 should be the focus if time and resource constraints allow for only one. This was decided for simplicity and to keep all portions of the country working with the same period of data. Therefore, 2016 was ultimately selected as the base year due to these restraints. More details can be found in the document “Base Year Selection Workgroup Final Report”⁷¹ produced by the Inventory Collaborative Base Year Selection Workgroup, December 12, 2017.

⁶⁹ US EPA 2014, Policy Assessment for the Review of the O₃ National Ambient Air Quality Standards, Research Triangle Park, NC, https://www.epa.gov/sites/default/files/2020-05/documents/o3-final_pa-05-29-20compressed.pdf

⁷⁰ The Nature of the Ozone Air Quality Problem in the Ozone Transport Region: A Conceptual Description, Downs et al., August 2010, https://www.nescaum.org/documents/2010_o3_conceptual_model_final_revised_20100810.pdf

⁷¹ Base Year Selection Workgroup Final Report, www.wrapair2.org/pdf/2017-12-12_Base_Year_Selection_Report_V1.1.pdf

Future Year Selection

The New York Metropolitan moderate NAA for the 2015 ozone NAAQS, which includes Long Island and parts of Connecticut and New Jersey, has a deadline of August 2024 to attain the 2015 ozone NAAQS. Because attainment is based on the most recent complete ozone season, attainment is based on 2023 design values. It was expected that marginal NAAs in Connecticut, Delaware, Maryland, New Jersey, Pennsylvania, and perhaps the District of Columbia, would be reclassified to moderate nonattainment and therefore face the same August 2024 deadline for attaining the 2015 O₃ NAAQS. Therefore, a future analysis year of 2023 was selected to best meet the attainment planning needs of these jurisdictions.

13.3 OTC Modeling Results

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

EPA guidance recommends the use of the RRF approach to demonstrate attainment of the 8- hour O₃ NAAQS,⁷² however occasionally model grid cells code coastal monitors as in water cells which can be problematic for model to observation comparison. The OTC Modeling Committee compared several approaches to assess modeled attainment including two modified approaches that excluded grid cells identified as majority water.

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

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

⁷² US EPA, 2018. “Air Quality Modeling Technical Support Document for the Updated 2023 Projected Ozone Design Values”, accessed at https://www.epa.gov/sites/default/files/2018-06/documents/air_modelingtsd_updated_2023_modeling_o3_dvs.pdf

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

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

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

14. Contingency Measures

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

14.1 Requirements on Contingency Measures

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

EPA Draft Contingency Measure Guidance

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

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

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

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

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

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

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

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

14.2 EPA's Contingency Measures Calculation Methodology

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

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

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

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

- Step 1:** Calculate the average annual emissions reductions needed to attain. For each relevant precursor, determine the amount of emissions reductions between the base year and the projected attainment year and divide by the number of years between the base year and the attainment year. Note: for PM, this typically represents the RFP annual average reduction, but for ozone, this will likely be different from the 3 percent annual requirement for RFP.
- Step 2:** Calculate the annual percentage reduction needed to attain. Determine what percentage of the base year inventory is represented by the annual average emissions reduction needed to attain by dividing the annual average reductions by the base year inventory for the NAA.
- Step 3:** Calculate the amount of emissions reductions needed for OYW of progress. Multiply the total emissions from the attainment projected inventory for the NAA by the annual percentage reduction needed to attain. This represents the amount of emissions reductions CMs should provide to meet OYW of progress.

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

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

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

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

14.3 Delaware’s Contingency Measures Calculations

Step 1: Calculate the average annual emissions reductions needed to attain.

Step 1a: Determine the amount of emissions reductions between the base year and the projected attainment year

Step 1b: Divide by the number of years between the base year and the attainment year.

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

<i>Step</i>	Value	Units
<i>Step 1a: VOC</i>	1.54	tpd
<i>Step 1b: VOC</i>	0.26	tpd per year
<i>Step 1a: NOx</i>	8.11	tpd
<i>Step 1b: NOx</i>	1.35	tpd per year

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

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

<i>Step</i>	Value	Units
<i>Step 2: VOC</i>	1.0%	annual reduction (%)
<i>Step 2: NOx</i>	3.2%	annual reduction (%)

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

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

<i>Step</i>	Value	Units
<i>Step 3: VOC</i>	0.24	tpd
<i>Step 3: NOx</i>	1.09	tpd

14.4 Delaware's Proposed Contingency Measures

14.4.1 Volatile Organic Compounds

Delaware is proposing to implement the OTC model rule for Consumer Products Phase V.⁷³ Delaware will update 7 **DE Admin. Code** 1141, *Limiting Emissions of Volatile Organic Compounds from Consumer and Commercial Products*, Section 2.0 *Consumer Products*, to require Phase V to be automatically triggered if the Philadelphia NAA does not attain by the end of the 2023 Ozone Season. The regulatory amendments will allow at least one year for existing sources to comply, as the additional emission reductions within the amendments may require reformulation of products. The compliance period would also allow retailers additional time to transition to compliant product. New sources would be expected to comply upon the effective date of the amendments. Delaware anticipates that these amendments would result in 0.30 tpd of VOC reductions for 2023 in New Castle County.

14.4.2 Nitrogen Oxides

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

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

14.5 Contingency Measure Implementation

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

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

⁷³ Ozone Transport Commission. Retrieved on September 18, 2023. <https://otcair.org/document.asp?fview=modelrules>