The State of New Jersey
Department of Environmental Protection

State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standards

1997 84 ppb and 2008 75 ppb 8-Hour Ozone Attainment Demonstration Northern New Jersey-New York-Connecticut Nonattainment Area

and

Nonattainment New Source Review (NNSR) Program Compliance Certification New Jersey Statewide

Proposal

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ACRONYMS AND ABBREVIATIONS

ACO	Administrative Consent Order
ACT	Alternative Control Technique
AEL	Alternative Emission Limit
AERR	Air Emission Reporting Requirements
AMCC	Aftermarket Catalytic Converter
As	Arsenic
BACT	Best Available Control Technology
BART	Best Available Retrofit Technology
BEIS	Biogenic Emission Inventory System
CAA	Clean Air Act
CAMD	Clean Air Markets Division
CASTNET	Clean Air Status and Trends Network
CCTM	CMAQ Chemical-Transport Model
CDD	Clean Data Determination
CEM	Continuous Emission Monitoring
CENSARA	Central States Air Resources Agencies
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Model
CO	Carbon Monoxide
CONUS	Continental/Contiguous United States
Cr	Chromium
CSAPR	Cross-State Air Pollution Rule
CTG	Control Technique Guideline
DG/DR	Distributed Generation/Demand Response
DV	Design Value
EAC	Early Action Compact
EE	Exceptional Event
EEA	Energy Emergency Alert
EGU	Electric Generating Unit
EV	Electric Vehicle
FERC	Federal Energy Regulatory Commission
FCCU	Fluid Catalytic Cracking Unit
FCU	Fluid Cooking Unit
Fed. Reg.	Federal Register
FIP	Federal Implementation Plan
FMVCP	Federal Motor Vehicle Control Program
FRM	Federal Reference Method
FSEL	Facility-Specific Emission Limit
GEOS	Goddard Earth Observing System
HC	Hydrocarbon
HCl	Hydrogen Chloride
HEDD	High Electric Demand Day
HF	Hydrogen Fluoride
Hg	Mercury
hp	horsepower
ICI	Industrial, Commercial and Institutional
IM	Inspection and Maintenance
IMO	International Maritime Organization
kW	Kilowatt
LADCO/MWRPO	Lake Michigan Air Directors Consortium/ Midwest Regional Planning Organization
LAER	Lowest Achievable Emission Rate

ACRONYMS AND ABBREVIATIONS

lbs.	Pounds
LDAR	Leak Detection and Repair
LEV	Low Emission Vehicle
MACT	Maximum Available Control Technology
MANE-VU	Mid-Atlantic Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
MARPOL	International Convention for the Prevention of Pollution from ships
MATS	Mercury and Air Toxics Standards
MCIP	Meteorology-Chemistry Interface Processor
MMBtu	Million British Thermal Units
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NACAA	National Association of Clean Air Agencies
NEI	National Emission Inventory
NESCAUM	Northeast States for Coordinated Air Use Management
NESHAP	National Emission Standard for Hazardous Air Pollutants
Ni	Nickel
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJLEV	New Jersey Low Emission Vehicle Program
N.J.R.	New Jersey Register
NJTPA	North Jersey Transportation Planning Authority
NLEV	National Low Emission Vehicle Program
NMOG	Non-Methane Organic Gas
NNSR	Nonattainment New Source Review
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
NYSDEC	New York Department of Environmental Conservation
OBD	On-Board Diagnostics
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
PANYNJ	Port Authority of New York and New Jersey
PFC	Portable Fuel Container
PM2.5	Fine Particulate Matter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
PSEG	Public Service Electric and Gas Company
RACM	Reasonably Available Control Measure
RACT	Reasonably Available Control Technology
RFF	Relative Response Factor
RFP	Reasonable Further Progress
RICE	Reciprocating Internal Combustion Engine
ROP	Rate of Progress
RVP	Reid Vapor Pressure
RWC	Residential Wood Combustion
SESARM	Southeastern States Air Resource Managers

ACRONYMS AND ABBREVIATIONS

SCR	Selective Catalytic Reduction
SJPC	South Jersey Port Corporation
SMOKE	Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer
SNCR	Selective Non-Catalytic Reduction
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SOTA	State of the Art
TCM	Transportation Control Measure
TMA	Transportation Management Association
tpd	tons per day
tpy	tons per year
TSD	Technical Support Document
USC	United States Code
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WOE	Weight of Evidence
WRF	Weather Research and Forecasting
ZEV	Zero Emission Vehicle

EXECUTIVE SUMMARY

The purpose of this State Implementation Plan (SIP) revision is to meet the requirements of the Clean Air Act (CAA) regarding New Jersey's plan for attaining the 2008 75 ppb 8-hour ozone National Ambient Air Quality Standard (NAAQS) in its Northern New Jersey multi-state nonattainment area by its attainment date of July 20, 2018. This SIP revision will also show that the State is meeting the 1997 84 ppb 8-hour ozone NAAQS. This SIP Revision also addresses the submittal requirements for New Jersey's Nonattainment New Source Review (NNSR) permitting program for implementing the 75 ppb 2008 ozone NAAQS and includes the required NNSR Program Compliance Certification. New Jersey has met its obligations for attainment of the 84 ppb and 75 ppb ozone NAAQS. This proposed SIP revision conforms to the United States Environmental Protection Agency's (USEPA) requirements and guidance with respect to 8-hour ozone attainment.

Despite New Jersey's success in meeting its obligation for attaining the 84 ppb and 75 ppb ozone NAAQS, ozone continues to be the most pervasive air quality challenge in New Jersey's Northern New Jersey-New York-Connecticut (NJ-NY-CT) Nonattainment Area. All ambient air quality monitors within the Northern NJ-NY-CT Nonattainment Area are measuring attainment of the 1997 84 ppb ozone NAAQS. Although all of New Jersey's monitors are measuring below the 2008 75 ppb ozone standard, seven monitors in Connecticut and one monitor in New York continue to be in noncompliance with the 75 ppb ozone standard.

This SIP revision demonstrates that New Jersey has made great strides over the years in reducing its ozone levels in New Jersey and its contribution to downwind ozone concentrations. New Jersey has implemented several significant control measures to reduce ozone precursors, nitrogen dioxide (NO_x) and volatile organic compounds (VOCs), including measures that are more stringent than other states within its nonattainment area such as those regulating power generation. This is of significant importance for ozone reduction as peak power generation occurs on hot summer days when elevated ozone concentrations typically occur. However, attainment of the standard is not contingent on local reduction measures alone.

The transport of ozone from sources upwind of the nonattainment area continues to contribute significantly to the poor ozone air quality in Connecticut and New York. Currently there is no remedy to fully address these significant contributions. Additionally, the largest source sector contributing to NO_x emissions within the nonattainment area and the region continue to be mobile sources. States are limited in their authority to address these emissions and have relied on Federal measures to achieve significant emission reductions from this sector. In order to attain the 75 ppb ozone NAAQS in the Northern NJ-NY-CT Nonattainment Area, the following must be addressed: implementation of more stringent control measures similar to New Jersey by other states that contribute to poor air quality in the region, especially for nitrogen oxides (NO_x) directly upwind of the controlling CT monitors, a full remedy by USEPA to address ozone transport and additional Federal emission reductions from mobile sources.

<u>New Jersey Has Done It's Share to Address Ozone Nonattainment</u>

New Jersey's NO_x and volatile organic compound (VOC) (ozone precursor) emissions have decreased significantly. New Jersey's annual NO_x and VOC emissions have each decreased approximately 77 percent from 1990 to 2017. Annual NO_x and VOC emissions have decreased approximately 31 percent and 17 percent, respectively, from 2011 to 2017. A significant decreasing trend has also been shown in 8-hour ozone air quality monitoring design values in New Jersey of approximately 39 percent from 1988 to 2016 and 15 percent from 2011 to 2016.

New Jersey has met Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT) requirements and has gone beyond RACM and RACT by adopting control measures more stringent than Federal rules, Control Technique Guidelines (CTGs) and neighboring state rules, especially those of most importance that address NO_x on high ozone days, thereby setting the standard for what modern RACT should be. Following are highlights of some of New Jersey's control measures:

- Power Plants: New Jersey has enforceable performance standards for NO_x and VOC emissions from power plants (or Electric Generating Units (EGUs)) that are among the most stringent and effective air pollution control regulations in the country. New Jersey has taken the lead by adopting measures to address emissions from EGUs that operate on High Electric Demand Days (HEDDs) when ozone concentrations tend to be elevated. These sources are critically important contributors to episodes of elevated ozone in the Northern NJ-NY-CT Nonattainment Area.

- Distributed Generation/Demand Response (DG/DR): New Jersey's rules for stationary reciprocating internal combustion engines (RICE) do not allow the use of uncontrolled engines for the purpose of distributed electric generation or demand response in non-emergency situations. However, in some states these engines are uncontrolled and used to assist the electric grid during high electric demand periods. Like HEDD EGUs, many of these engines are operating on hot summer days which usually coincide with the high ozone days. Emissions from these units in the New York City Metropolitan/Long Island area on peak ozone days may be significantly contributing to ozone formation.

- Municipal Waste Combustors: New Jersey has implemented measures to control NO_x emissions from Municipal Waste Combustors. New Jersey has taken significant actions to address these important sources while the USEPA, State of New York, and other nearby states, including upwind states that significantly contribute to ozone nonattainment, have not.

- Mobile Source Controls: New Jersey has addressed emissions from mobile sources to the extent that state action is not pre-empted by the Clean Air Act. New Jersey has adopted a Low Emission Vehicle Program (NJLEV) addressing motor vehicle emissions based on the standards used by the State of California to ensure that the lowest emitting vehicles available in the nation are sold in New Jersey including zero emission vehicle standards. Other states have not made the same commitment. New Jersey also has some of the most stringent rules in the country for vehicle idling and heavy-duty vehicle inspection and maintenance using on-board diagnostics (OBD) technology.

Further Actions Are Needed by the USEPA and Other States to Achieve Attainment of the 75ppb 8-Hour Ozone Standard in the Northern NJ-NY-CT Nonattainment Area

Attainment of the 2008 75 ppb ozone NAAQS in the Northern NJ-NY-CT Nonattainment Area will not happen unless additional actions are taken by the USEPA and other states to address the interstate ozone transport issue. In 2016, the USEPA finalized the CSAPR Update rule to reduce the impact of upwind states' pollution on ozone nonattainment in downwind states. However, the USEPA acknowledges that it falls short of providing the full remedy required by the "good neighbor" provision of CAA Section 110(a)(2)(D)(i)(I). Additionally, the USEPA has not required the upwind states to supplement the 2016 CSAPR update requirements with additional control measures to satisfy CAA transport requirements. Considering that the CAA requires states to address their significant contribution to ozone nonattainment within three years of the promulgation of the standard, ahead of the 75 ppb attainment demonstration SIP submittal deadline for New Jersey's northern nonattainment area, the USEPA's partial solution to transport was too late and insufficient to address the transport contribution to nonattainment by the attainment deadline of July 2018 (2017 ozone season). The Northern NJ-NY-CT

Nonattainment Area can attain the 2008 75 ppb NAAQS if a full transport remedy for the 75 ppb ozone standard is implemented by USEPA.

The following are specific recommendations to achieve compliance in the Northern NJ-NY-CT nonattainment:

- CSAPR: USEPA should adopt a full remedy, addressing those largest contributing States identified by USEPA's analysis of contributing States outside the non-attainment area (e.g. Pennsylvania, Maryland, Ohio, Virginia, West Virginia and Indiana), to transport that includes, but is not limited to:

    - Daily NO_x performance standards for EGUs, including distributed generation units, similar to those implemented in New Jersey, in states that significantly impact the Northern NJ-NY-CT Nonattainment Area for ozone.

    - A requirement that all installed NO_x controls on EGUs be fully operated, as required in New Jersey.

- Address Power Generation Emissions in New York: The New York metropolitan area is directly upwind of the controlling Connecticut monitors. New York should adopt and implement controls measures that meet RACT standards equivalent or better than those in New Jersey for High Electric Demand Day power generation, oil, gas and coal-fired EGUs and DG/DR power generation. It is important for upwind states to also implement measures to reduce emissions from electric generation on high electric demand days, including electric generating units in CAMD, smaller electric generating units and behind the meter demand response units. Bringing these units into compliance with modern RACT standards will assist New York in meeting its good neighbor requirements and assist in achieving attainment of the 75 ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area.

  New York recently adopted a regulation, 6 NYCRR Part 222, that establishes performance standards for distributed generation sources. On March 1, 2017, the implementation and enforcement of this rule was challenged and subsequently stayed. The implementation of this rule in New York and similar rules in upwind states will contribute to the attainment of the 75ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area.

- New Jersey RACT Rules in Other States: Nonattainment area and upwind states should adopt and implement controls measures that meet RACT standards similar to those in New Jersey for sources such as HEDD power generation, DG/DR power generation and municipal waste combustors. In addition to electric generation rules discussed above, New York should take action to adopt rules for municipal waste combustors, similar to those implemented in Connecticut and New Jersey.

- Mobile Source Rules: Nonattainment area and upwind states should adopt mobile source measures similar to those in New Jersey such as the California Low Emission Vehicle Program. The USEPA must also do its part to address the largest source sector contributing to NO_x emissions within the nonattainment area, as well as, the region. For example, the USEPA should evaluate if new engine standards to reduce NO_x emissions from heavy-duty on-road diesel vehicles are feasible and prioritize an update to the Federal Aftermarket Catalytic Converter (AMCC) Policy dated August 5, 1986 to reflect the most recent technological advances.

New Jersey is complying with the USEPA's requirements regarding interstate transport as it relates to the 8-hour ozone NAAQS and has done its part to ensure that it is not interfering with the ability of its neighboring states to attain and maintain the ozone NAAQS. Many of New Jersey's existing air pollution control requirements are more stringent than those in neighboring upwind states. All monitors in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area are below the 75 ppb standard and have been since 2014. Therefore, New Jersey has met its obligations for attainment of the 75 ppb ozone NAAQS.

Nonattainment New Source Review (NNSR)

As requested by USPEA, New Jersey is certifying that its NNSR program satisfies the requirements of the CAA for implementing the 2008 75 ppb 8-hour ozone NAAQS. On February 13, 2017, USEPA determined that New Jersey's Infrastructure SIP did not include the NNSR element addressing the Northern NJ-NY-CT and Southern NJ-PA-DE-MD Nonattainment Areas for the 2008 75 ppb 8-hour ozone NAAQS. This SIP revision includes the required NNSR Program Compliance Certification for both nonattainment areas.

Other SIP Components

New Jersey has met its Reasonable Further Progress (RFP) demonstration requirements. New Jersey's Northern nonattainment area has achieved a total reduction in VOC and NO_x tons per summer day emissions of 45 percent between 2011 and 2017. This is triple the RFP Clean Air Act (CAA) requirement of a 15 percent reduction over the six-year period.

This SIP revision was prepared in accordance with USEPA requirements and guidance regarding photochemical modeling for attainment demonstrations, transportation conformity and contingency measures. It includes a summary of New Jersey's latest air quality monitoring, attainment demonstration base and projected future year emission inventories and previous RACT, Inventory and Infrastructure SIP submittals for the 75 ppb 8-hour ozone NAAQS. It also includes a status update for New Jersey's latest RACT rule proposal.

Conclusion

New Jersey has met its obligations for attainment of the 84 ppb and 75 ppb ozone NAAQS. All appropriate control measures have been adopted and implemented. It is now USEPA's responsibility to ensure that neighboring and upwind states outside of the non-attainment area do their part to address the challenges at the New York and Connecticut monitors.

Chapter 1 INTRODUCTION and BACKGROUND

1.1 Introduction

The purpose of this State Implementation Plan (SIP) revision is to meet the requirements of Clean Air Act (CAA) Section 110(a)(1) (or 42 U.S.C. §7410(a)(1)) to submit New Jersey's plan for attaining the 2008 75 ppb 8-hour ozone National Ambient Air Quality Standard (NAAQS) in its Northern New Jersey multi-state nonattainment area by its attainment date of July 20, 2018. This SIP will also show that the State is meeting the 1997 84 ppb 8-hour ozone NAAQS. This SIP Revision also addresses the submittal requirements for New Jersey's Nonattainment New Source Review (NNSR) permitting program for implementing the 75 ppb 2008 ozone NAAQS and includes the required NNSR Program Compliance Certification.

In accordance with 40 CFR §51.112 attainment demonstrations must show that the control measures contained within the SIP are adequate to provide for the timely attainment and maintenance of the NAAQS. Each demonstration must include*:*

- A summary of the computations, assumptions, and judgments used to determine the degree of reduction of emissions (or reductions in the growth of emissions) that will result from the implementation of the control strategy;
- A presentation of emission levels expected to result from implementation of each measure of the control strategy;
- A presentation of the air quality levels expected to result from implementation of the overall control strategy showing expected maximum pollutant concentration;
- A description of the dispersion models used to project air quality and to evaluate control strategies; and
- For interstate regions, the analysis from each constituent State must, where practicable, be based upon the same regional emission inventory and air quality baseline.

The March 6, 2015[1], USEPA Ozone Implementation Rule or SIP requirements rule for the 75 ppb 8-hour ozone standard states that an attainment demonstration consists of the following:

- Technical analyses, such as base year and future year modeling of emissions which identifies sources and quantifies emissions from those sources that are contributing to nonattainment;
- Analyses of future year emissions reductions and air quality improvement resulting from existing (i.e., already adopted or ''on the books'') national, regional and local programs, and potential new local measures needed for attainment, including Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT) for the area;
- A list of adopted measures (including RACT) with schedules for implementation and other means and techniques necessary and appropriate for demonstrating attainment as expeditiously as practicable but no later than the outside attainment date for the area's classification;
- A RACM analysis to determine whether any additional RACM measures could advance attainment by 1 year.

The CAA provides the United States Environmental Protection Agency (USEPA) with the authority to set primary and secondary standards for criteria air pollutants. The primary standard protects human health, and the secondary welfare standard is designed to protect

[1] 80 Fed. Reg. 12264 (March 6, 2015)

against any potential environmental and/or property damage. These standards are known as the NAAQS. The criteria pollutants covered by the NAAQS are ozone and its precursors, volatile organic compounds (VOCs) and nitrogen oxides (NO_x), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM10) and fine particulate matter (PM2.5) and lead. The 1990 CAA Amendments furthered the mission to reducing air contaminants nationwide by addressing interstate movement of air pollution, emissions control measures, permits, enforcement, deadlines, and public participation to achieve and maintain those air quality standards.

The CAA Section 109 (or 42 U.S.C. §7409) further requires the USEPA to review and, if appropriate, revise the NAAQS for each criteria air pollutant every five years to insure they continue to adequately protect human health and welfare.

When an area does not meet the NAAQS for one or more criteria pollutants, the area is subject to the formal rulemaking process by the USEPA, which designates the area as nonattainment for that pollutant. The CAA further classifies ozone, carbon monoxide, and particulate matter nonattainment areas based on the magnitude of an area's air quality problem. Nonattainment classifications vary in SIP requirements and attainment dates. The technical details underlying these classifications are discussed in the Code of Federal Regulations, Part 81 (40 CFR Part 81).

The CAA contains two sets of provisions – Subpart 1 and Subpart 2 – which address planning, attainment and control requirements for ozone nonattainment areas.[2] Subpart 1, referred to as "basic" nonattainment, contains general, less prescriptive, requirements for nonattainment areas for any pollutant – including ozone – governed by a NAAQS. Subpart 2 sets forth a classification scheme for ozone nonattainment areas and provides more specific requirements for ozone nonattainment areas.[3] Under subpart 2, the ozone nonattainment areas are classified based on the severity of their ozone levels, as determined based on the area's "design value," (which represents air quality in the area for the most recent 3 years).[4] The possible classifications are marginal, moderate, serious, severe, and extreme. Nonattainment areas with a "lower" classification have ozone levels that are closer to the standard than areas with a "higher" classification. Areas in the lower classification levels have fewer and/or less stringent mandatory air quality planning and control requirements than those in the higher classifications. Areas with greater levels of ozone pollution are subject to more prescriptive requirements and are given a longer period to attain the standard. The requirements are designed to bring areas into attainment by their specified attainment dates.

CAA Section 179 (or 42 U.S.C. §7509) requires sanctions when a State fails to submit a timely and approvable plan or fails to fully implement its commitments. First, the State could face serious economic development constraints. Specifically, the USEPA could order that any proposed new air pollution source in the State secure double the offset of the emissions it might produce before it can be permitted. Second, the State could be exposed to sanctions that could result in the loss of New Jersey's Federal transportation funds. These sanctions must be applied unless the deficiency is corrected within 18 months after a finding of failure or disapproval. Additionally, CAA Section 110(c) (or 42 U.S.C. §7410(c)) requires that the USEPA impose a Federal Implementation Plan (FIP) if a State fails to complete and submit a revised submission within 24 months of the failure to submit or implement a SIP.

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[2] A description of subpart 1 and subpart 2 are found in CAA Title I, part D

[3] For more information on the subpart 2 classification and requirements see "State Implementation Plans; General Preamble for the Implementation of Title I of the CAA Amendments of 1990; Proposed Rule." April 16, 1992 (57 Fed. Reg. 13498 at 13501 and 13510).

[4] The air quality design value for the 8-hour ozone NAAQS is the 3-year average of the annual 4th highest daily maximum 8-hour average ozone concentration. See 40 CFR part 50, Appendix I.

1.2 Ozone National Ambient Air Quality Standards

1.2.1 1-Hour Ozone

In 1971, the USEPA established the first NAAQS for photochemical oxidants of 0.08 parts per million (ppm), measured as a 1-hour average concentration. In 1979, the ozone NAAQS was revised to 0.12 parts per million (ppm). The 1-hour ozone standard remained 0.12 ppm until 1997 when the USEPA replaced the 1979 standard with an 8-hour ozone standard set at 0.08 ppm.[5] The entire State of New Jersey was designated by the USEPA as nonattainment for the 1-hour ozone NAAQS, and was split into four nonattainment areas. For 1-hour ozone, all of the New Jersey-associated nonattainment areas were classified under Subpart 2 of the CAA. The New Jersey counties included in each of those 1-hour nonattainment areas, as well as their classifications are shown in Table 1-1.

The USEPA revoked the 1-hour ozone standard for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (EAC) areas (which did not include any New Jersey-associated nonattainment areas) on June 15, 2005.[6] This revocation occurred prior to the attainment dates for New Jersey's two severe 1-hour ozone multi-state nonattainment areas associated with Philadelphia (2005) and New York City (2007).

1.2.2 8-Hour Ozone

1997 84 ppb 8-Hour Ozone NAAQS

In 1997, the USEPA revised the ozone NAAQS, setting it at 0.08 ppm (hereafter referred to as 84 ppb) averaged over an 8-hour time frame.[7] The USEPA set the 8-hour ozone standard based on scientific evidence demonstrating that ozone causes adverse health effects at lower ozone concentrations, over longer periods of time, than the then-existing 1-hour ozone standard.

On April 30, 2004, [8] the USEPA finalized designations for the 1997 84 ppb 8-hour ozone NAAQS in Phase 1 of its ozone implementation rule. The entire State of New Jersey was designated as nonattainment. New Jersey was designated into two multi-state nonattainment areas as follows:

(1) the New York-Northern New Jersey-Long Island nonattainment area (hereafter referred to as the Northern New Jersey-New York-Connecticut or Northern NJ-NY-CT Nonattainment Area); and
(2) the Philadelphia-Wilmington-Atlantic City nonattainment area (hereafter referred to as the Southern New Jersey-Pennsylvania-Delaware-Maryland or Southern NJ-PA-DE-MD Nonattainment Area.)

Under the USEPA's Phase 1 8-hour ozone implementation rule, an area was classified under Subpart 2 based on its 8-hour design value if it had a 1-hour design value at or above 0.121 ppm (the lowest 1-hour design value in Table 1 of subpart 2). Based on this criterion, both multi-state 84 ppb 8-hour ozone nonattainment areas associated with New Jersey were classified under Subpart 2 as moderate in the April 30, 2004 rule[9], with an attainment date of June 15, 2010. The USEPA Phase 2 8-hour ozone implementation rule, published on

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[5] USEPA. History of Ground-level Ozone Standards. United States Environmental Protection Agency, http://epa.gov/oar/ozonepollution/history.html. Last updated March 6, 2007.
[6] 40 CFR Part 81, Subpart C
[7] 62 Fed. Reg. 38856 (July 18, 1997)
[8] 69 Fed. Reg. 23858 (April 30, 2004)
[9] 69 Fed. Reg. 23858 (April 30, 2004)

November 9, 2005[10] (with corrections published on October 4, 2006 related to Reasonable Further Progress (RFP)[11], addressed the control obligations that apply to areas classified under Subpart 2. New Jersey's multi-state 8-hour ozone nonattainment areas for the 75 ppb standard is shown in Figure 1-1. For the 84 ppb 8-hour ozone standard Kent and Sussex counties in Delaware are also included in New Jersey's Southern NJ-PA-DE-MD Nonattainment Area. The New Jersey counties included in each of those 8-hour nonattainment areas, as well as their classifications, are shown in Table 1-1.

New Jersey submitted a SIP[12] on October 29, 2007 which presented New Jersey's plan to attain the 84 ppb 8-hour ozone standard. USEPA approved the SIP on February 11, 2013.[13]

Both of New Jersey's nonattainment areas attained the standard by the attainment date of June 15, 2010 (the southern area received a 1-year extension with a new attainment date of June 15, 2011). On June 18, 2012, the USEPA issued a clean data determination (CDD) for the 1997 84 ppb 8-hour ozone standard for the Northern NJ-NY-CT Nonattainment Area[14] and on March 26, 2012 for the Southern NJ-PA-DE-MD Nonattainment Area[15], suspending the States obligations to meet certain attainment-related planning requirements under the USEPA's Clean Data Policy dated December 14, 2004, such as reasonable available control measures (RACM), reasonable further progress, contingency measures and other planning requirements related to attainment, as long as the area continues to attain.

On May 4, 2016, the CDD for the Northern NJ-NY-CT Nonattainment Area, issued in June 2012, was rescinded.[16] USEPA determined that the area exceeded the 84 ppb standard based on 2010-2012 certified monitoring data and issued a SIP call. They required the Northern NJ-NY-CT Nonattainment Area to submit a SIP to address the 84 ppb standard exceedance either specific to the 84 ppb standard or in conjunction with the 75 ppb standard attainment demonstration moderate area SIP by January 1, 2017 and set a new attainment date of July 20, 2018.

This SIP satisfies the requirements of the May 4, 2016 SIP Call for the 1997 84 ppb ozone NAAQS.

2008 75 ppb 8-Hour Ozone NAAQS

The USEPA revised the 8-hour ozone NAAQS again on March 12, 2008.[17] The 8-hour ozone standard was lowered from 84 ppb to 0.075 ppm (75 ppb). The USEPA announced on September 16, 2009 that the 0.075 ppm standard was being reconsidered, and the designations were stayed (put on hold).

On January 19, 2010[18], the USEPA proposed to strengthen the 8-hour ozone NAAQS set in March 2008 to a level within the range of 0.060 – 0.070 ppm. In September of 2011, the USEPA announced that it would not adopt its proposed ozone NAAQS and that it would instead proceed with the implementation of the 2008 0.075 ppm 8-hour ozone standard.

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[10] 70 Fed. Reg. 71612 (November 29, 2005)
[11] 71 Fed. Reg. 58498 (October 4, 2006)
[12] State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard 8-Hour Ozone Attainment Demonstration, The State of New Jersey Department of Environmental Protection, October 29, 2007
[13] 78 Fed. Reg. 9596 (February 11, 2013)
[14] 77 Fed. Reg. 36163 (June 18, 2012
[15] 77 Fed. Reg. 17341 (March 26, 2012)
[16] 81 Fed. Reg. 26697 (May 4, 2016)
[17] 73 Fed. Reg. 16483 (March 27, 2008)
[18] 75 Fed. Reg. 2938 (January 19, 2010)

On May 21, 2012[19], the USEPA designated the entire State of New Jersey as nonattainment for the 75 ppb 8-hour ozone NAAQS. The nonattainment areas are the same as those designated for the 84 ppb standard. The final Classifications Rule for the 2008 NAAQS was signed and published at the same time as the designation rule.[20] In the May 21, 2012 classification rule, both of New Jersey's multi-state nonattainment areas were classified as marginal with an attainment date of July 20, 2015. New Jersey's multi-state 8-hour ozone nonattainment areas for the 75 ppb standard is shown in Figure 1-1. The New Jersey counties included in each of those 8-hour nonattainment areas, as well as their classifications, are shown in Table 1-1.

On June 17, 2015, New Jersey sent a letter to the USEPA requesting a 1-year extension of the attainment date to July 20, 2016 for the Southern NJ-PA-DE-MD Nonattainment Area. On May 4, 2016[21], the USEPA granted the Southern NJ-PA-DE-MD Nonattainment Area a 1-year attainment date extension to July 20, 2016.

On March 6, 2015[22], USEPA promulgated the Ozone Implementation Rule or SIP requirements rule for the 75 ppb 8-hour ozone NAAQS, which specifies the detailed requirements for States Implementation Plans.

On May 4, 2016[23] , USEPA reclassified the Northern NJ-NY-CT Nonattainment Area from marginal to moderate because they determined that the area did not attain the 2008 75 ppb ozone standards by the July 20, 2015 attainment date based on its 2012-2014 air quality data. They required the Northern NJ-NY-CT Nonattainment Area to submit a SIP to address the moderate nonattainment area requirements by January 1, 2017 and set a new attainment date of July 20, 2018.

On April 18, 2017[24], USEPA proposed that the Southern NJ-PA-DE-MD Nonattainment Area attained the 2008 75 ppb 8-hour ozone NAAQS by the July 20, 2016 attainment date based on complete, certified, and quality assured ambient air quality monitoring data for the 2013–2015 monitoring period.

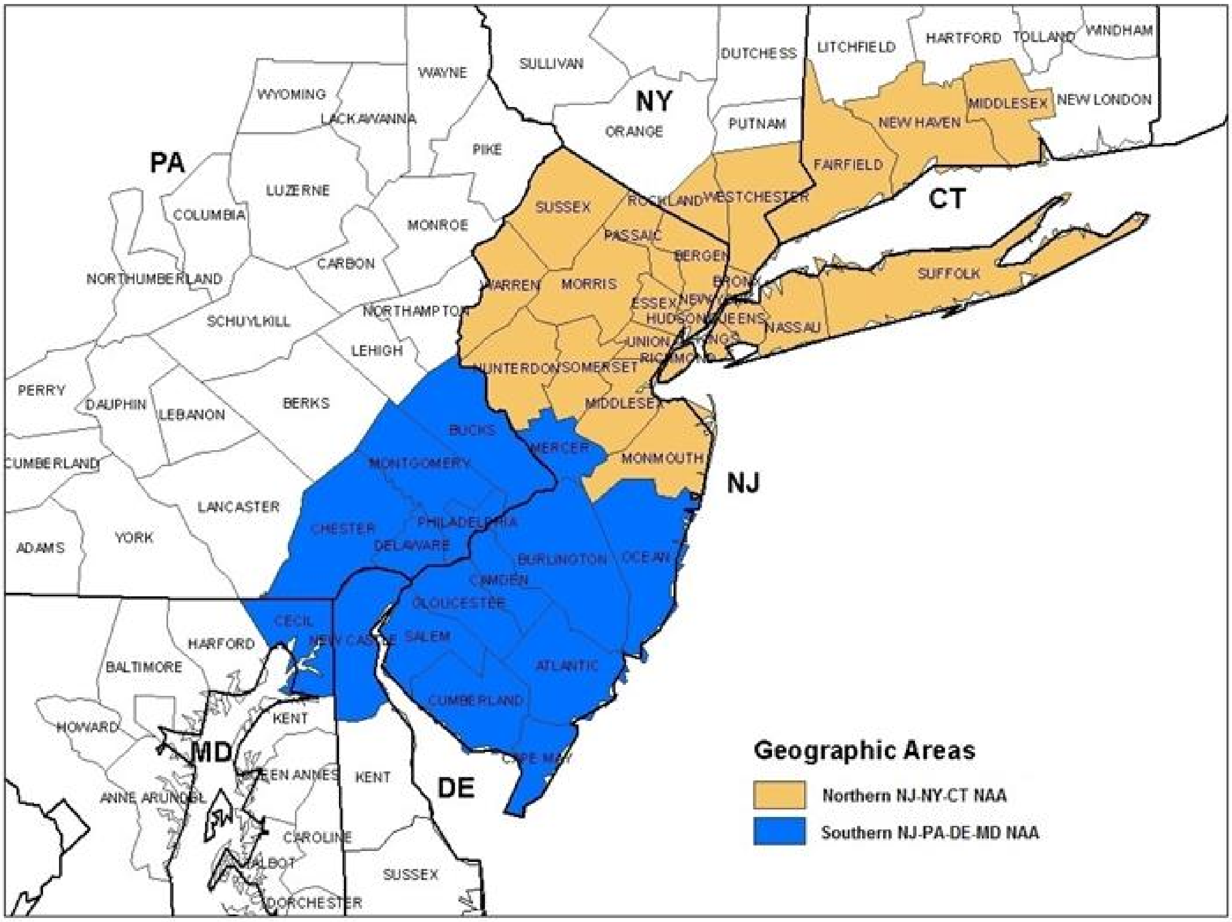
This SIP satisfies the SIP submittal requirements of the May 4, 2016 reclassification for the 2008 75 ppb 8-hour ozone NAAQS.

2015 70 ppb 8-Hour Ozone NAAQS

The USEPA revised the 8-hour ozone NAAQS again on October 1, 2015.[25] The primary 8-hour ozone standard was lowered from 75 ppb to 0.70 ppm (70 ppb). The USEPA has not yet determined the attainment/nonattainment area designations or classifications for this ozone standard. On June 6, 2017, it was announced that designations, which were due by USEPA on October 1, 2017, would be extended one year to October 1, 2018.

[19] 77 Fed. Reg. 30088 (May 21, 2012)
[20] 77 Fed. Reg. 30160 (May 21, 2012)
[21] 81 Fed. Reg. 26697 (May 4, 2016)
[22] 80 Fed. Reg. 12264 (March 6, 2015)
[23] 81 Fed. Reg. 26697 (May 4, 2016)
[24] 82 Fed. Reg. 18268 (April 18, 2017)
[25] 80 Fed. Reg. 65292 (October 26, 2015).

<u>Figure 1-1:</u> New Jersey 8-hour Ozone Nonattainment Areas
75 ppb NAAQS



* **Note:** Kent and Sussex counties in DE are included in the Southern NJ-PA-DE-MD Nonattainment Area for the 84 ppb 8-hour ozone NAAQS.

<u>Table 1-1:</u> New Jersey-Associated Ozone Nonattainment Areas – Designations and Classifications

Area Name	New Jersey 1-Hour Designations	New Jersey 1-Hour Classifications	New Jersey 84 ppb 8-hour Designations	New Jersey 84 ppb 8-Hour Classifications	New Jersey 75 ppb 8-Hour Designations	New Jersey 75 ppb 8-Hour Classifications
Northern New Jersey-New York-Connecticut, NJ-NY-CT	Bergen Essex Hudson Hunterdon Middlesex Monmouth Morris Ocean Passaic Somerset Sussex Union	Severe 17	Bergen Essex Hudson Hunterdon Middlesex Monmouth Morris Passaic Somerset Sussex Union Warren	Moderate (69 FR 23858 April 30, 2004)	Bergen Essex Hudson Hunterdon Middlesex Monmouth Morris Passaic Somerset Sussex Union Warren	Marginal (77 FR 30135 May 21, 2012) Reclassified to Moderate (81 FR 26719 May 4, 2016)
Southern New Jersey-Pennsylvania-Delaware-Maryland, NJ-PA-DE-MD	Burlington Camden Cumberland Gloucester Mercer Salem	Severe 15	Atlantic Burlington Camden Cape May Cumberland Gloucester Ocean Mercer Salem	Moderate (69 FR 23858 April 30, 2004)	Atlantic Burlington Camden Cape May Cumberland Gloucester Ocean Mercer Salem	Marginal (77 FR 30135 May 21, 2012)(3)
Allentown-Bethlehem-Easton, PA-NJ	Warren	Marginal	(1)	(1)	(1)	(1)
Atlantic City, NJ	Atlantic Cape May	Moderate	(2)	(2)	(2)	(2)

Notes:
1. Included in the Northern New Jersey-New York-Connecticut nonattainment area
2. Included in the Southern New Jersey-Pennsylvania-Delaware-Maryland nonattainment area
3. Attainment date is extended to July 20, 2016.

1.3 Health Effects and Welfare Impacts

1.3.1 Ozone

Ozone continues to be New Jersey's most pervasive air quality problem. Although the ozone found in the earth's upper atmosphere (stratosphere) forms a protective layer from the sun's ultraviolet radiation, the ozone formed near the earth's surface (troposphere) is inhaled by or comes in contact with people, animals, crops and other vegetation, and can cause a variety of health and other effects. Ozone is a highly reactive gas. In the troposphere, it is formed by complex chemical reactions involving nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight.

Ozone causes health problems because it damages lung tissue, reduces lung function, and sensitizes the lungs to other irritants. Ozone has long been known to increase the incidence of asthma attacks in susceptible individuals. Ozone exposure also makes the lungs more vulnerable to lung diseases such as pneumonia and bronchitis. Ozone not only affects people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well. Exposure to ozone for several hours at relatively low concentrations significantly reduces lung function and induces respiratory inflammation in normal, healthy people during exercise. This decrease in lung function is generally accompanied by symptoms such as chest pain, coughing, sneezing, and pulmonary congestion. Recent research in southern California strongly suggests that, in addition to exacerbating existing asthma, ozone also causes asthma in children.[26] Longer-term exposure to ozone can also lead to scarring of the lung tissue and permanent reductions in lung capacity.[27] Long-term exposure to ozone can eventually lead to premature death.[28]

Besides its impact on human health, ozone also has environmental impacts. Specifically, ozone interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, other pollutants, and harsh weather. Ozone damages the leaves of trees and other plants, ruining the appearance of cities, national parks, and recreation areas. Ozone reduces crop and forest yields and increases plant vulnerability to disease, pests, and harsh weather. This impacts annual crop production throughout the United States, resulting in significant losses, and injures native vegetation and ecosystems. Ozone also damages certain man-made materials, such as textiles, fibers, dyes, and paints, requiring more frequent upkeep and repair.

1.3.2 Ozone Precursor –Nitrogen Oxides (NO_x)

Nitrogen oxides consist of a mixture of gases comprised mostly of nitric oxide (NO) and nitrogen dioxide (NO_2). Although most NO_x is emitted as NO, it is readily converted to NO_2 in the atmosphere. NO_2 is a reddish-brown highly reactive gas that is formed in the air through the oxidation of NO. In the troposphere, near the Earth's surface, NO_2, not molecular oxygen, provides the primary source of the oxygen atoms required for ozone formation. These gases are emitted from a variety of sources such as the exhaust of motor vehicles, boats, planes and locomotives, the burning of coal, oil or natural gas, residential wood burning, forest fires, manufacturing and industrial processes.

In addition to contributing to the formation of ozone, NO_x is also harmful if directly inhaled. Short-term exposures to low levels of nitrogen dioxide may aggravate pre-existing respiratory illnesses, and can cause respiratory illnesses, particularly in children ages 5-12. Symptoms of low-level exposure to NO and NO_2 include irritation to eyes, nose, throat and lungs, coughing, shortness of breath, tiredness and nausea. Long-term exposures to NO_2 may increase susceptibility to respiratory infection and may cause permanent damage to the lung. Studies show a connection between breathing elevated short-term NO_2 concentrations and increased visits to emergency departments and hospital admissions for respiratory issues, especially asthma. Individuals who spend time on or near major roadways can experience high, short-term NO_2 exposures. Nitrogen oxides contribute to a wide range of environmental problems. These include potential changes in the composition of some plants in wetland and terrestrial

[26] MARAMA Appendix A: Health Effects of Air Pollutants, A Guide to Mid-Atlantic Regional Air Quality Report. Mid-Atlantic Regional Air Management Association (MARAMA), October 2005, p. 89.
[27] NJDEP Reasonably Available Control Technology (RACT) for the 8-Hour Ozone NAAQS (NAAQS) and other Associated State Implementation Plan (SIP) Revisions for the Fine Particulate Matter NAAQS, Regional Haze, and the CAA Requirements on Transport of Air Pollution. New Jersey Department of Environmental Protection, August 1, 2007.
[28] USEPA Air Quality Criteria for Ozone and Related Photochemical Oxidants, Volume I of III. United States Environmental Protection Agency, February 2006.

ecosystems, acidification of freshwater bodies, eutrophication of estuarine and coastal waters, increases in levels of toxins harmful to fish and other aquatic life, and visibility impairment.[29]

1.3.3 Ozone Precursor – Volatile Organic Compounds (VOCs)

VOCs are organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air, a trait known as volatility. The term volatile in VOCs indicates that the compounds evaporate easily at room temperature and organic indicates that they contain carbon. They include compounds known as hydrocarbons, which only contain carbon and hydrogen, and carbonyls, which contain a carbon atom double-bonded to an oxygen atom. Some VOCs are more harmful than others and are considered hazardous air pollutants, toxics or carcinogens (cancer causing). The USEPA and New Jersey regulatory definition of VOC, as it relates to ozone, exempts certain VOCs due to their low reactivity with sunlight to form ozone.[30]

VOCs are emitted from a wide variety of sources such as manufacturing processes, gasoline stations, autobody repair shops, motor vehicles, recreational boating, lawn and garden equipment and consumer product use including household cleaners, paints, cosmetic and hair products, cleaning solvents, adhesives and insecticides. Sources of VOCs also include natural biogenic emissions.

In sufficient quantities, VOC can cause eye, nose, and throat irritations, headaches, dizziness, visual disorders, memory impairment; some are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans.[31] In addition, several VOCs are also hazardous air pollutants (HAPs).[32] HAPs are substances that could cause serious health effects, including cancer, birth defects, nervous system problems and death due to massive accidental releases.[33]

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[29] Ibid.
[30] USEPA's ozone air quality definition of volatile organic compounds is defined at 40 CFR 51.100(s). New Jersey's ozone air quality rules reference USEPA's definition.
[31]https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/termsandacronyms/search.do?matchCriteria=Contains&checkedTerm=on&checkedAcronym=on&search=Search&term=volatile%20organic%20compound
[32] Substances listed in 1990 CAA Title I, Section 112(b).
[33] USEPA. The Plain English Guide to the Clean Air Act. United States Environmental Protection Agency, Air and Radiation (ANR-443), EPA 400-K-93-001, April 1993.

Chapter 2 AIR MONITORING

2.1 Introduction

This chapter provides a summary of ozone air quality monitoring in New Jersey and its multi-state ozone nonattainment areas. The data summarized includes current and historical 8-hour ozone design values, monitor exceedances, ozone precursor concentrations, and meteorology. Eight-hour average ozone concentrations have been calculated since 1986, prior to the 8-hour ozone standard implementation in 1997 in New Jersey and before designations were made in 2004. Data for 8-hour ozone before 1997 are used for analysis purposes only and do not represent official reporting for the 8-hour ozone NAAQS.

This SIP also includes a summary of NJDEP's "Exceptional Event Demonstration Analysis for Ozone During May 25-26, 2016", dated May 31, 2017.[34] This demonstration shows that high ozone levels measured on May 25 and 26, 2016 were influenced by the Fort McMurray wildfire in Alberta, Canada. NJDEP's exceptional event demonstration shows that this wildfire event affected the design values at New Jersey monitors, as well as, other monitors within the Northern NJ-NY-CT Nonattainment Area. The adjusted design values for New Jersey are used in this chapter and Figures 2-1 to 2- 8 and 2-12, Tables 2-1 and 2-2, and the data in Appendix 2-1 exclude the data from May 25 and May 26, 2016.

The Connecticut Department of Energy & Environmental Protection also submitted to USEPA an exceptional event demonstration for the Fort McMurray wildfire.[35] This demonstration determined that the Fort McMurray wildfire adversely affected ozone data in a regulatory significant way at four monitors in Connecticut, and requested exclusion of ozone monitoring data on May 25 and 26, 2016. The only adjusted Connecticut monitor in the Northern NJ-NY-CT Nonattainment Area included in the Connecticut demonstration and in this chapter is the Westport (Sherwood Island Connector) monitor. In a letter dated July 31, 2017, USEPA concurred with Connecticut's exceptional event demonstration.

Other states within the Southern NJ-PA-DE-MD Nonattainment Area are also considering excluding monitoring data due to exceptional events. The Maryland Department of the Environment (MDE) submitted an exceptional event demonstration to exclude ozone monitoring data from July 21 and 22, 2016.[36] The MDE demonstration shows that fires across northwestern Canada contributed to high maximum daily 8-hour average ozone concentrations in Pennsylvania and Maryland on July 21 and 22, 2017 above the 2008 ozone NAAQS. Additionally, on January 19, 2017, USEPA received an email request from the Pennsylvania Department of Environmental Protection (PADEP) requesting USEPA remove certain data from the PADEP Philadelphia monitors based on exceptional events.[37] Although USEPA has not acted on these exceptional events at this time, this chapter includes adjusted design values for Maryland and Pennsylvania monitors in the Southern NJ-PA-DE-MD Nonattainment Area based on these exceptional events.

2.2 8-Hour Ozone

To determine compliance with the NAAQS for ozone, the USEPA established criteria for the monitoring of ambient concentrations of ozone at 40 CFR 58. In accordance with 40 CFR 50, data from Federal Reference Method (FRM) air quality monitors are used to calculate design values (DV) at each FRM site to determine compliance with the ozone NAAQS. Ozone design

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34 http://www.nj.gov/dep/baqp/ee.html
35 http://www.ct.gov/deep/cwp/view.asp?a=2684&Q=591378
36 http://www.mde.state.md.us/programs/Air/AirQualityMonitoring/Documents/MDE_JUL_21_22_2016_EE_demo.pdf
37 82 Fed. Reg. 18268 (April 18, 2017)

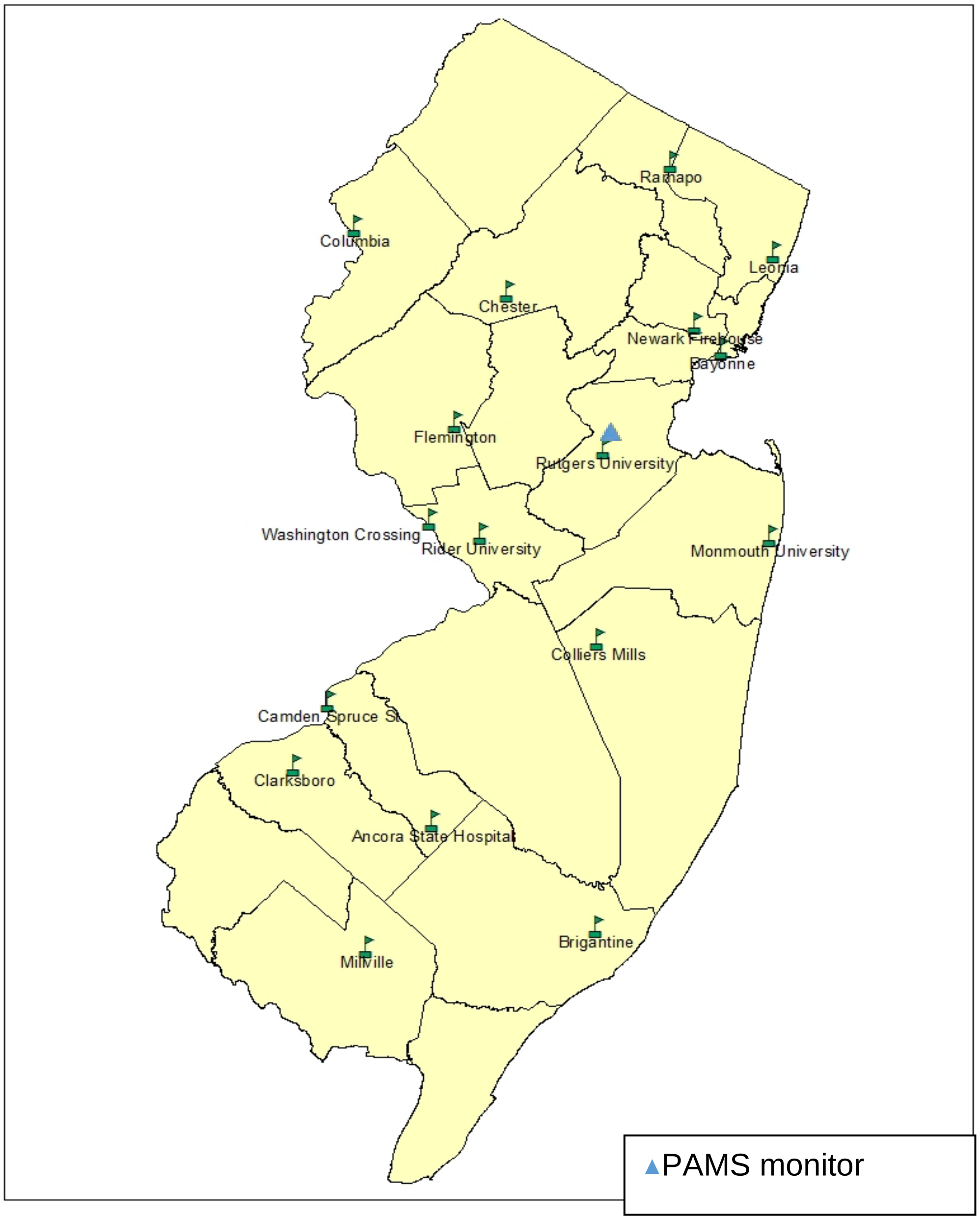
values are defined as the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration measured at any site within an area (multi-state for New Jersey). An area's design value must not exceed the standard to show compliance. The design value for a nonattainment area is the maximum monitor design value for all monitors for each 3-year period. Maximum design values are not necessarily measured at the same site from year to year.

The NJDEP currently measures ozone concentrations at 17 FRM sites in New Jersey. Eleven of the 17 sites have been collecting data continuously for at least 15 years. The Washington Crossing site is a USEPA Clean Air Status and Trends Network (CASTNET) monitor, not run by NJDEP, but the data is included in the Southern NJ-PA-DE-MD Nonattainment Area. Not all New Jersey monitoring sites shown ran continuously from 1985 to present day. Previously, the ozone monitoring season in New Jersey ran from April to October. When the 2015 ozone NAAQS were finalized on October 26, 2015, the ozone monitoring season in New Jersey was changed to run from March 1 to October 31, effective December 28, 2015.

Ozone FRM monitoring site locations in New Jersey are shown in Figure 2-1.

As discussed in Chapter 1, New Jersey is part of two multi-state ozone nonattainment areas. In the multi-state 8-hour ozone Northern NJ-NY-CT Nonattainment Area, there are currently 26 monitors for ozone. Nine of these monitors operate in the 12 county New Jersey portion of Northern NJ-NY-CT Nonattainment Area. For more details regarding New Jersey's air quality monitoring network see the NJDEP 2015 Air Quality Monitoring Report at http://www.njaqinow.net under publications.

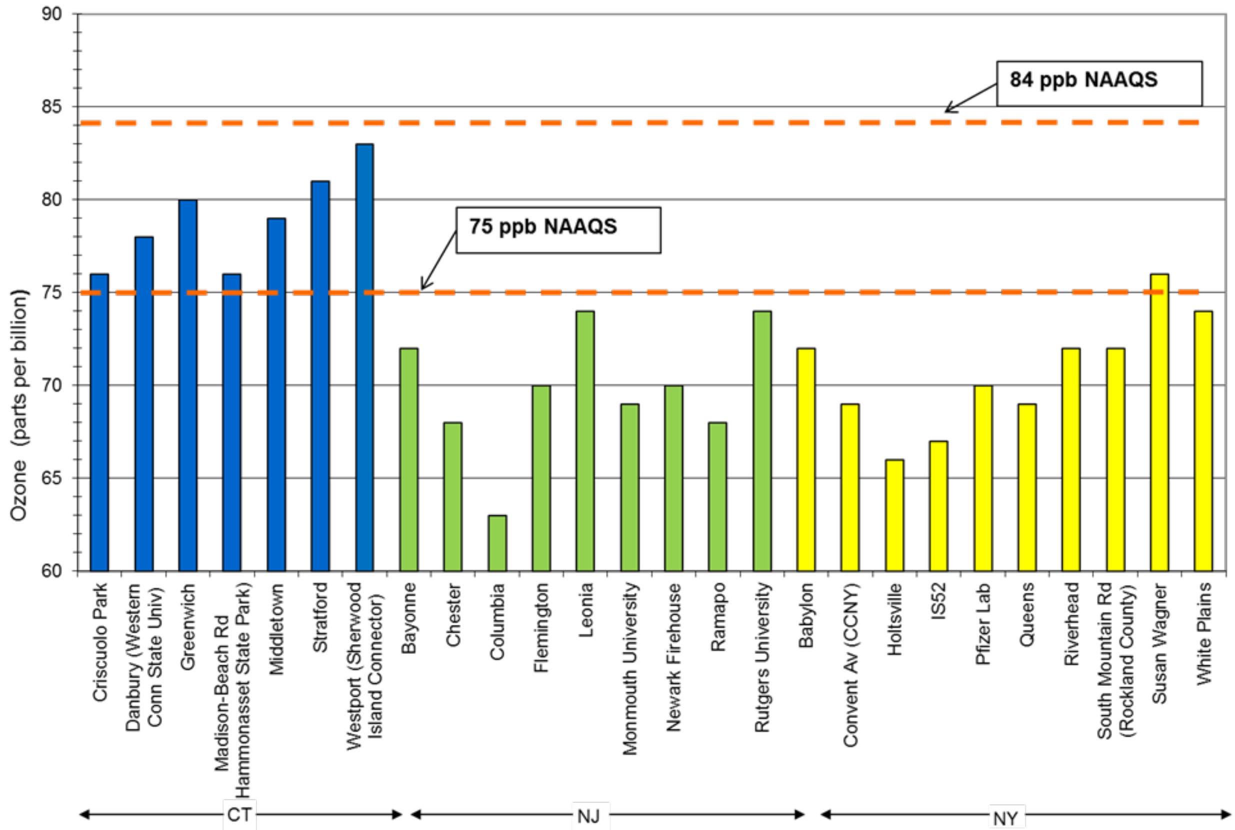
Figure 2-1: 2016 New Jersey Ozone FRM Monitoring Network



2.2.1 8-Hour Ozone 2016 Design Values

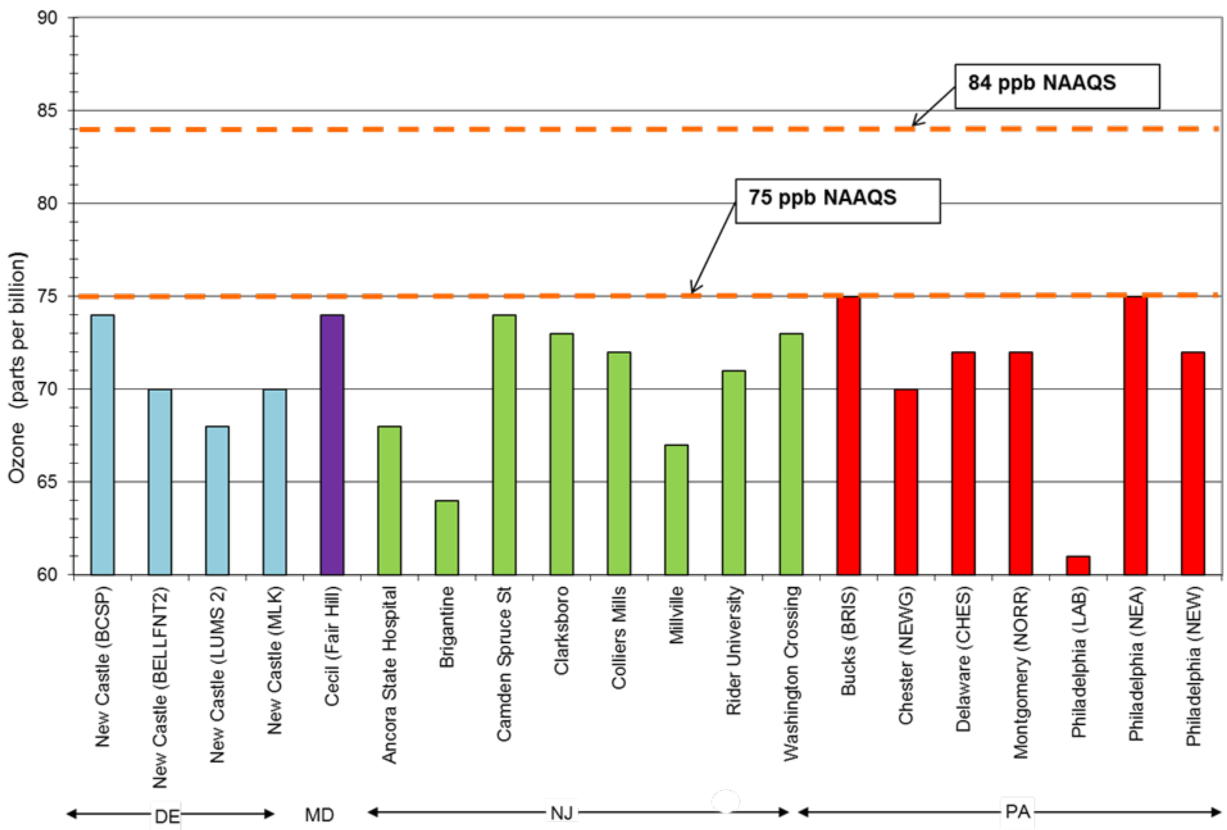
The 8-hour ozone design values for 2016 (2014/2015/2016 three-year average of 4th highest daily 8-Hour maximum) in the Northern NJ-NY-CT Nonattainment Area and Southern NJ-PA-DE-MD Nonattainment Area are shown in Figures 2-2 and 2-3, respectively. The 8-hour ozone Northern NJ-NY-CT Nonattainment Area's monitor with the highest 2016 design value is Westport (Sherwood Island Connector), Connecticut, followed by Stratford, Fairfield County, Connecticut and Greenwich, County, Fairfield Connecticut. The 8-hour ozone Southern NJ-PA-DE-MD Nonattainment Area's monitors with the highest 2016 design value are Bucks (BRIS), Pennsylvania and Philadelphia (NEA), Pennsylvania. All New Jersey's monitors are in compliance with the 84 and 75 ppb ozone standards.

Figure 2-2: 8-hour Ozone Design Values 2016
Northern NJ-CT-NY Nonattainment Area



Note: Excludes exceptional event data from May 25 and 26, 2016 for NJ monitors and Westport (Sherwood Island Connector) CT.

Figure 2-3: 8-hour Ozone Design Values 2016
Southern NJ-PA-DE-MD Nonattainment Area



Note: Excludes May 25 and 26, 2016 exceptional event data from NJ monitors, July 21 and 22, 2016 exceptional event data from all MD monitors, and exceptional event data from May 25 and 26, 2016 and July 21 and 22 2016 for all PA monitors except for Philadelphia (LAB).

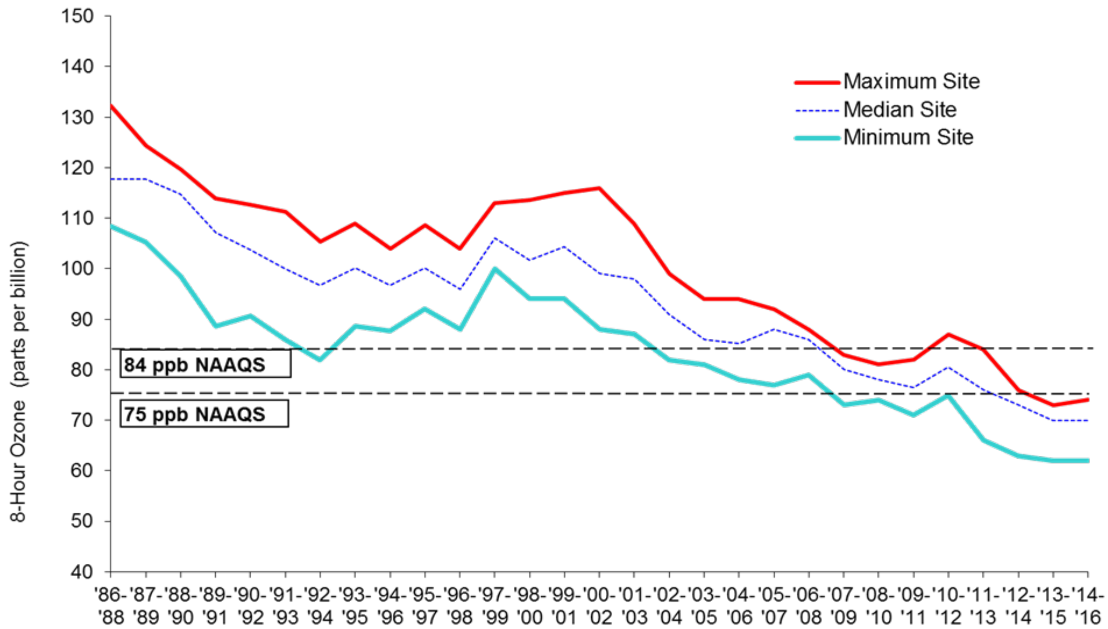
2.2.2 8-Hour Ozone Design Value Historical Trends

Historical trends of New Jersey's statewide 8-hour ozone design values, and New Jersey's multi-state northern and southern nonattainment area design values are shown in Figures 2-4, 2-5 and 2-6, respectively. Historical and current tabulated ozone design values for New Jersey and its multi-state nonattainment areas are included in Appendix 2-1.

As shown in Figure 2-4, 8-hour ozone design values in New Jersey have decreased approximately 39 percent from 1988-2016.

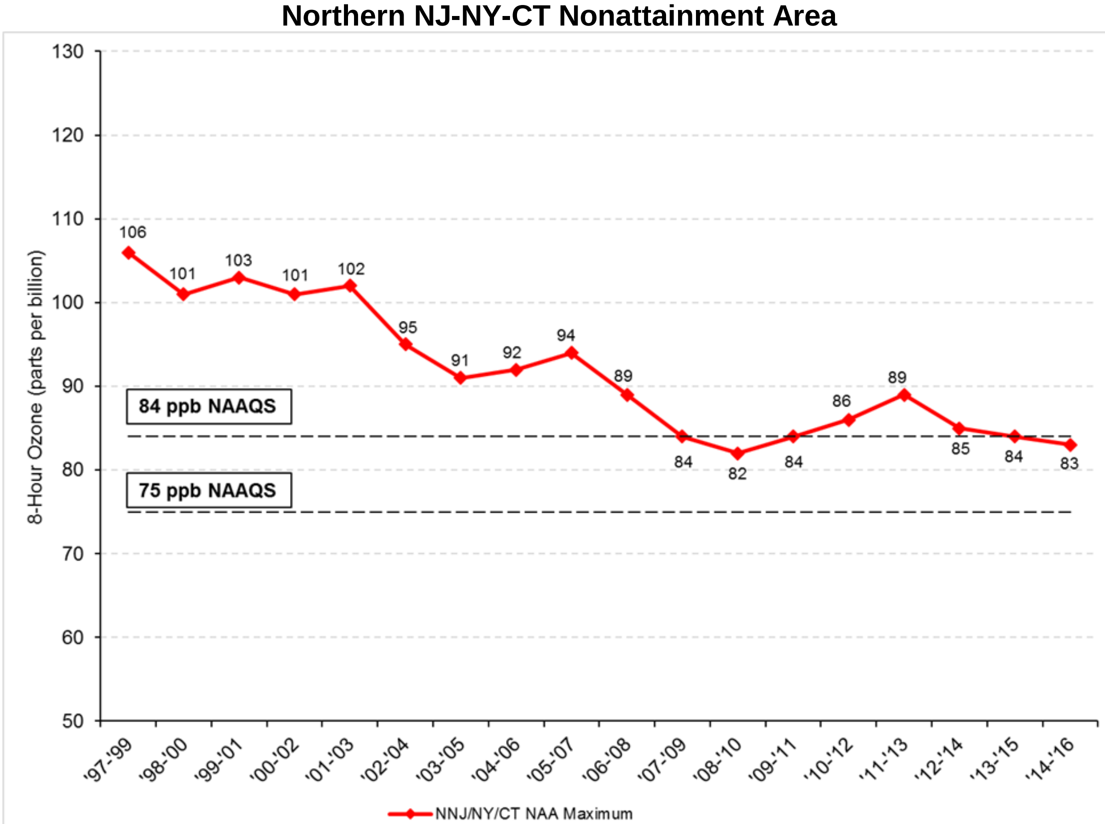
Figures 2-5 and 2-6 show that the 8-hour ozone design values in the Northern NJ-NY-CT and the Southern NJ-PA-DE-MD Nonattainment Areas have decreased approximately 22 percent and 34 percent, respectively, from 1999-2016.

Figure 2-4: 8-Hour Ozone Design Values 1988-2016
New Jersey Statewide



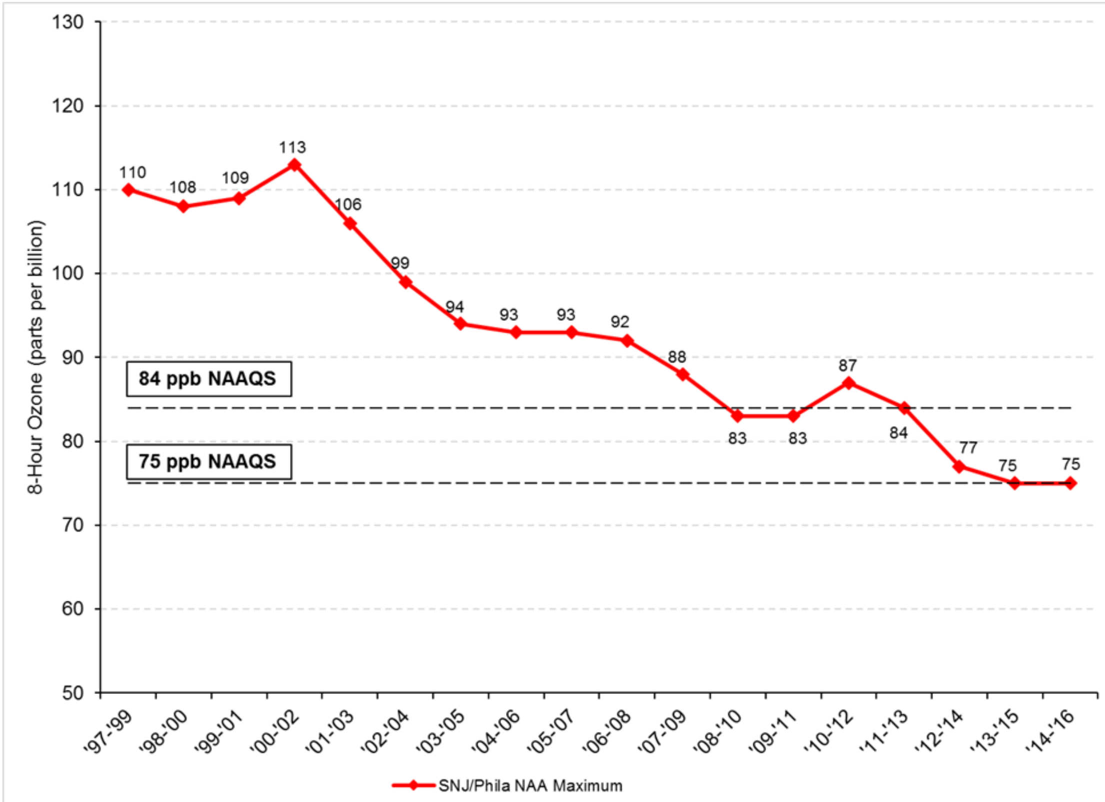
Note: Excludes May 25 and 26, 2016 exceptional event data.

Figure 2-5: 8-Hour Ozone Design Values 1999-2016
Northern NJ-NY-CT Nonattainment Area



Note: Excludes exceptional event data from May 25 and 26, 2016 for NJ monitors and Westport (Sherwood Island Connector) CT.

Figure 2-6: 8-Hour Ozone Design Values 1999-2016
Southern NJ-PA-DE-MD Nonattainment Area



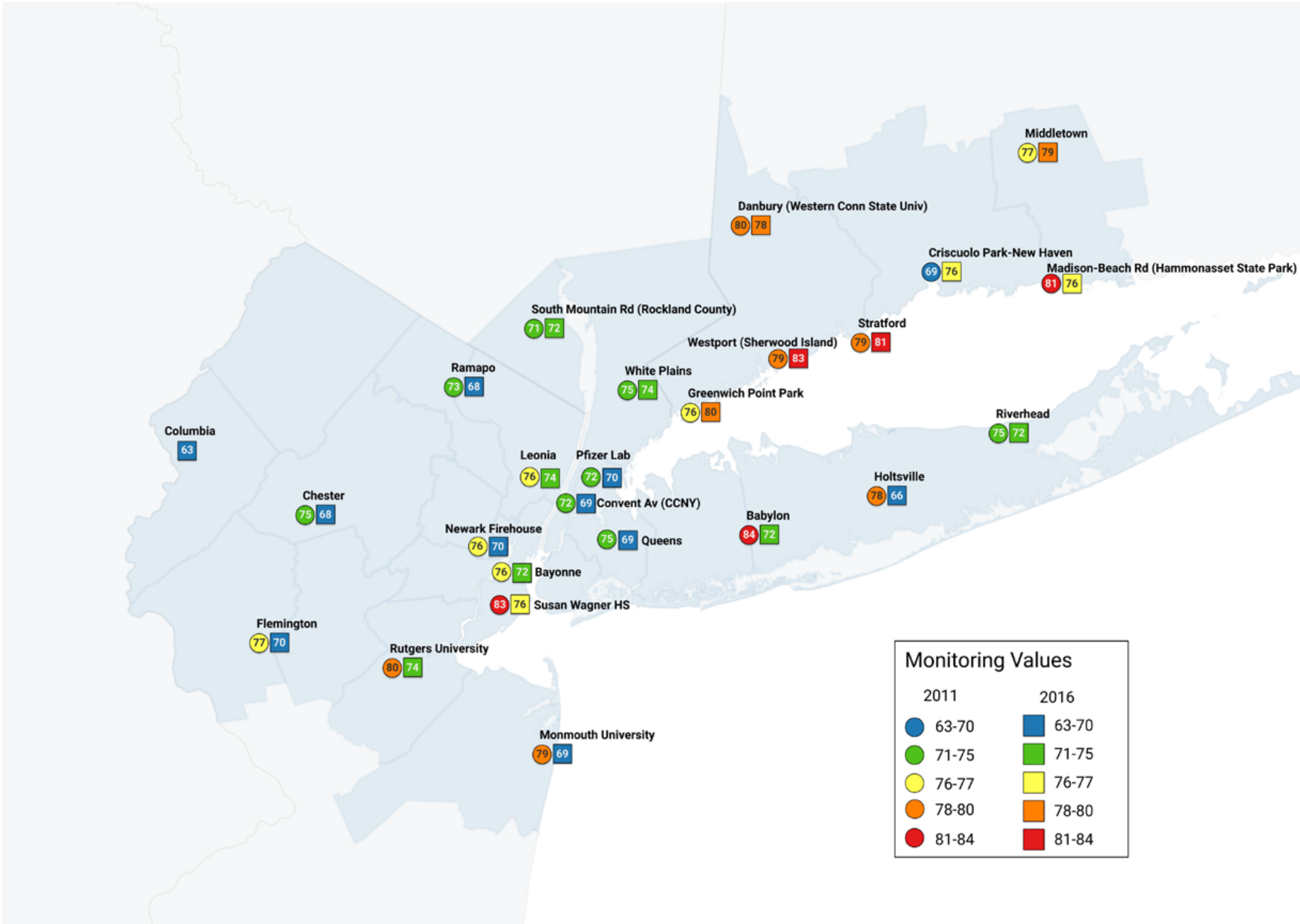
Note: Excludes May 25 and 26, 2016 exceptional event data from NJ monitors, July 21 and 22, 2016 data from all MD monitors, and data from May 25 and 26, 2016 and July 21 and 22 2016 for all PA monitors except for Philadelphia (LAB).

Historical data for the monitors in the Northern NJ-NY-CT Nonattainment Area that are not in compliance with the 2008 75 ppb ozone NAAQS, based on the latest 2016 design values, were plotted on several graphs to evaluate trends and are included in Appendix 2-2 as Figures A2-2.12-7 through A2-2.8. A map summarizing the 2011 and 2016 air monitoring design values for the nonattainment area is included as Figure 2-7. There are six monitors in CT and one in NY that are not in compliance based on 2016 design values.

As shown in the graphs, the monitors are showing an increasing trend in the annual 4th highest values and from the 2011 design values when plotted from 2009 and from the 2009/2010/2011 design value, respectively, but are showing a decreasing trend in the 4th highest values when plotted from 2011 and 2012, and a slight decreasing to flat trend in design values when plotted from the 2010/2011/2012 design values.

These observations are indicating that the low 2009 ozone concentrations, which were much lower than average, are significantly influencing any data that includes 2009 such as the 2011 design values. To date, preliminary 2017 values are consistent with observed trends.

Figure 2-7:
8-hour Ozone Design Values, 2011 and 2016
Northern NJ-NY-CT Nonattainment Area

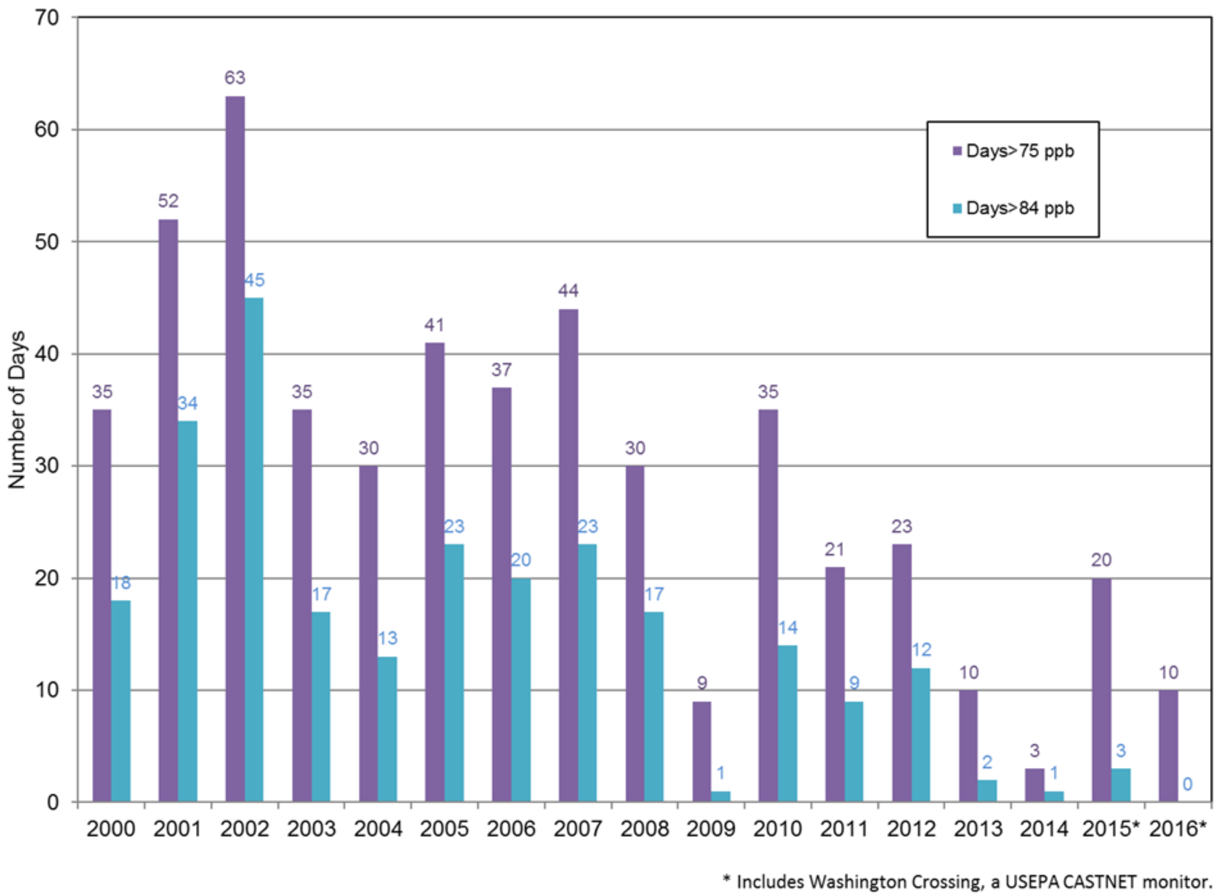


Note: Excludes exceptional event data from May 25 and 26, 2016 for NJ monitors and Westport (Sherwood Island Connector) CT.

2.2.3 New Jersey 8-Hour Ozone Exceedances Historical Trend

One way to measure improvement in ozone air quality is by looking at the number of days' ozone is above the NAAQS across the State. Monitored exceedances occur whenever an 8-hour ozone concentration is greater than or equal to the standard. A historical trend of the number of days the 8-hour ozone concentrations exceeded the 84 ppb and 75 ppb ozone standards is shown in Figure 2-8. The total number of monitored exceedances of the 8-hour ozone standards has decreased significantly in New Jersey from 2000 to 2016.

<u>Figure 2-8:</u> Number of Days the 8-Hour Ozone Standard was Exceeded 2000-2016 New Jersey Statewide



Note: Excludes May 25 and 26, 2016 exceptional event data.

2.3 Ozone Precursor Concentrations

As discussed in the Introduction, ozone is formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight. This section summarizes the monitoring trends for these ozone precursors.

In 1993, Federal revisions to air monitoring regulations required states to enhance monitoring for ozone and its precursors.[38] In accordance with these new regulations, New Jersey has historically monitored three locations through the Photochemical Assessment Monitoring Station (PAMS) program as part of New Jersey's Ambient Air Monitoring Network: Rutgers University, Rider University and Camden. Currently one monitor at Rutgers University is collecting PAMs

[38] 58 Fed. Reg. 8452 (February 12, 1993).

data. The Rutgers University monitor is both a Type 1 upwind/background site PAMS monitor for the New York City Metropolitan Statistical Area (MSA) and a Type 4 extreme downwind site PAMS monitor for the Philadelphia MSA. Measurements recorded by PAMS include ozone, individual VOCs (including several carbonyls), NO_x, nitric oxide (NO), nitrogen dioxide (NO_2), and some meteorological parameters. The objectives of the PAMS program include providing a speciated ambient air database which is both representative of and useful for ascertaining ambient profiles and distinguishing among various individual VOCs and which is characteristic of source emissions impacts. In addition, PAMS sites contribute to a better understanding of the ozone problem in metropolitan areas while taking into account meteorological and transport factors.

2.3.1 Volatile Organic Compounds (VOCs)

VOCs are organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air, a trait known as volatility. The term volatile in VOCs indicates that the compounds evaporate easily at room temperature and organic indicates that they contain carbon. They include compounds known as hydrocarbons, which only contain carbon and hydrogen, and carbonyls, which contain a carbon atom double-bonded to an oxygen atom. Some VOCs are more harmful than others and are considered hazardous air pollutants, toxics or carcinogens (cancer causing). The USEPA and New Jersey regulatory definition of VOC, as it relates to ozone, exempts certain VOCs due to their low reactivity with sunlight to form ozone.[39]

VOCs are emitted from a wide variety of sources such as manufacturing processes, gasoline stations, autobody repair shops, motor vehicles, recreational boating, lawn and garden equipment and consumer product use including household cleaners, paints, cosmetic and hair products, cleaning solvents, adhesives and insecticides. Sources of VOCs also include natural biogenic emissions.

The VOC and carbonyl measurements at the PAMs sites are only taken during the peak part of the ozone season, from June 1 to August 31 each year (the full monitoring ozone season in New Jersey runs from March 1 to October 31).[40] Historical total non-methane organic carbon (TNMOC) concentrations are summarized in Figures 2-9 and 2-10 for the New York and Philadelphia metropolitan areas. TNMOC is identical to VOCs, but excludes methane (a regulatory exempt VOC).

Figures 2-9 and 2-10 show that overall concentrations of TNMOC at the PAMS monitors have decreased with time, similar to monitored ozone concentrations, with some monitors showing a more significant decrease than others. The concentrations appear to have leveled off around 2006.

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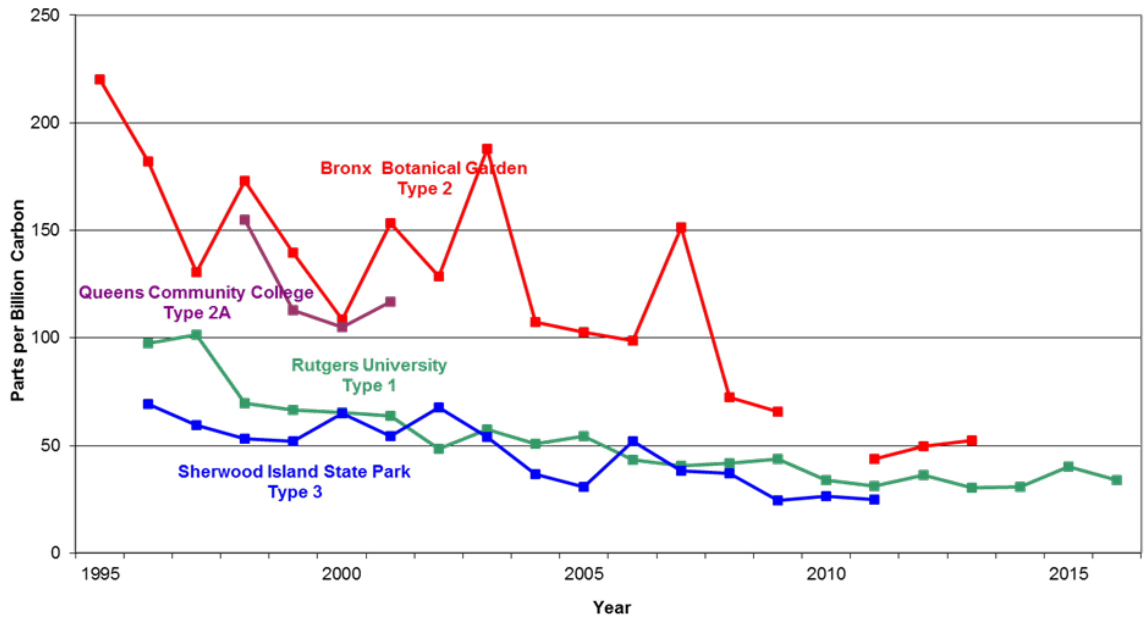
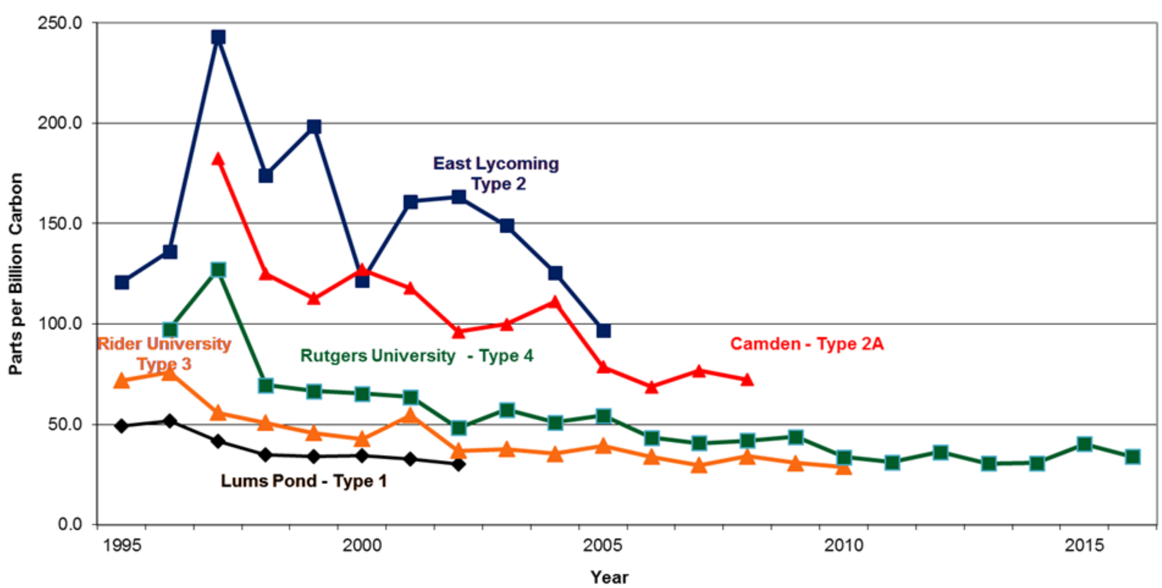
[39] USEPA's ozone air quality definition of volatile organic compounds is defined at 40 CFR 51.100(s). New Jersey's ozone air quality rules reference USEPA's definition.
[40] 80 Fed. Reg. 65291 (October 26, 2015)

<u>Figure 2-9:</u> Total Non-Methane Organic Carbon (TNMOC), Peak Ozone Season Average 1995-2016, New York Metropolitan Area



<u>Figure 2-10:</u> Total Non-Methane Organic Carbon (TNMOC), Peak Ozone Season Average, 1995-2016, Philadelphia Metropolitan Area



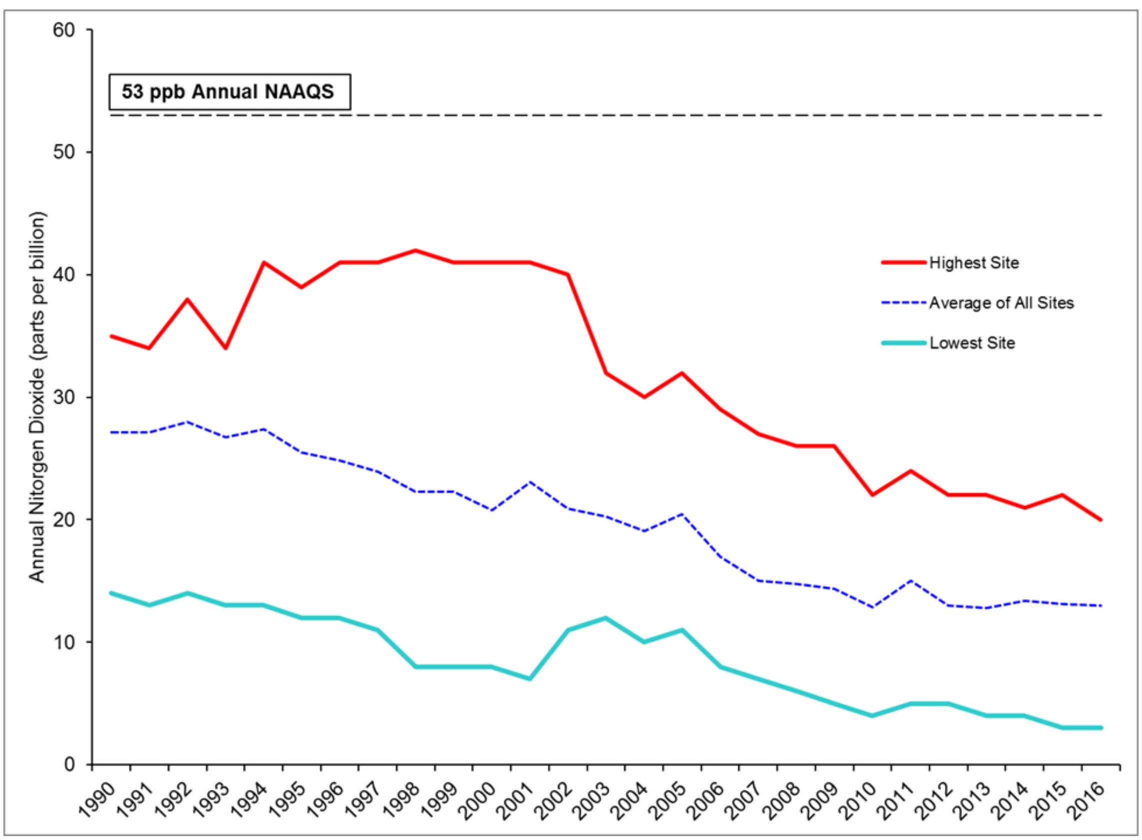
2.3.2 Nitrogen Dioxide

Nitrogen oxides consist of a mixture of gases comprised mostly of nitric oxide (NO) and nitrogen dioxide (NO_2). Although most NO_x is emitted as NO, it is readily converted to NO_2 in the atmosphere. NO_2 is a reddish-brown highly reactive gas that is formed in the air through the oxidation of NO. In the troposphere, near the Earth's surface, NO_2, not molecular oxygen, provides the primary source of the oxygen atoms required for ozone formation. These gases are emitted from a variety of sources such as the exhaust of motor vehicles, boats, planes and locomotives, the burning of coal, oil or natural gas, residential wood burning, forest fires, manufacturing and industrial processes.

NO_x concentrations are higher in the winter compared to the summer partially because poorer local dispersion conditions caused by light winds and other weather conditions that are more prevalent in the colder months of the year. On average, peak concentrations of NO_x (NO_2 and NO) have been observed in the morning and afternoon hours. This trend coincides with motor vehicle rush hours.

Currently, New Jersey monitors NO_2 and NO levels at 10 locations in the Continuous Air Monitoring Network, separate from the PAMS measurements of NO_x, NO_2, and NO. NO_2 concentrations are summarized in Figure 2-11. The annual mean measured at the highest and lowest sites are shown along with the 12-month average for all the sites. As shown in Figure 2-11, NO_2 levels have decreased in New Jersey from 1990-2016, similar to monitored ozone concentrations.

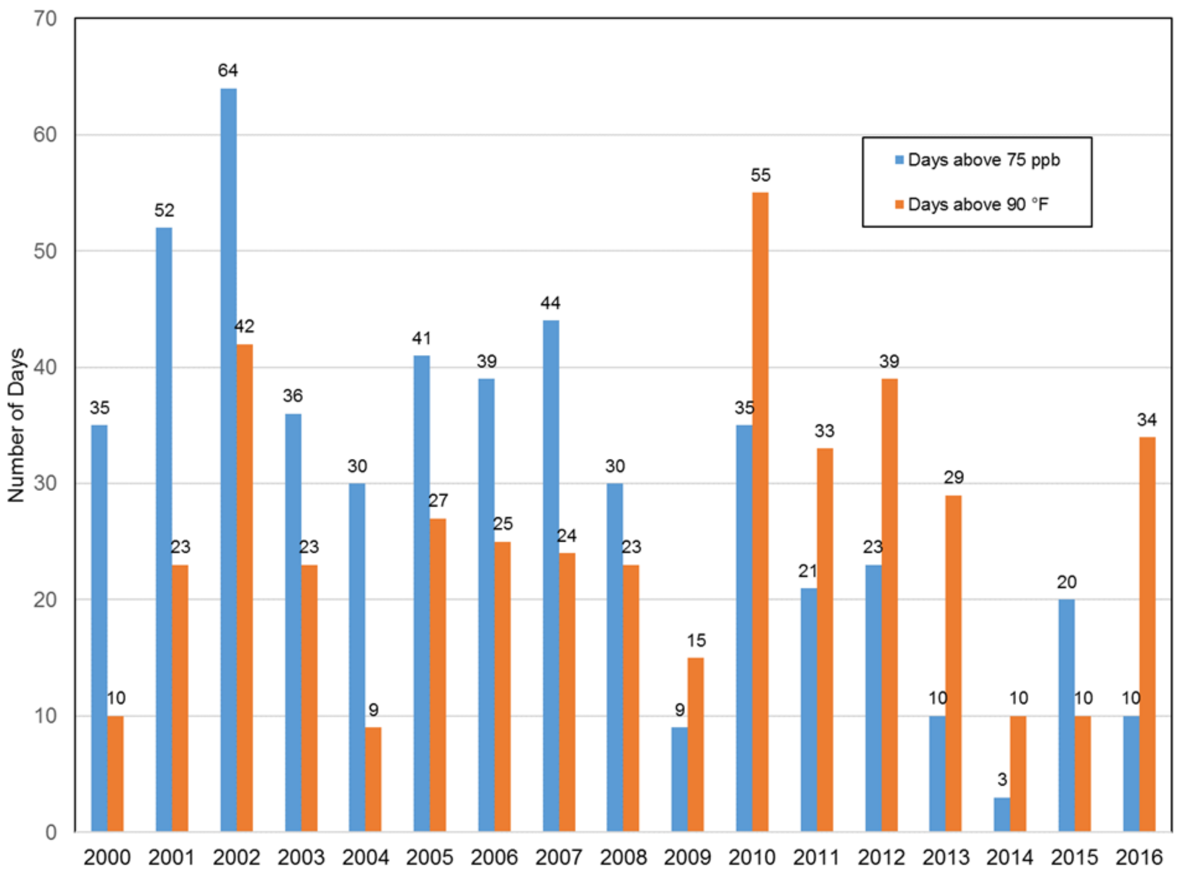
<u>Figure 2-11:</u> Nitrogen Dioxide 12-Month (Calendar Year) Average Concentration, 1990-2016, New Jersey Statewide



2.4 New Jersey Meteorological Trends

Ozone formation is influenced by many factors including weather conditions, transport, and growth in emissions, in addition to changes brought about by air quality control strategies. Of these factors, weather has a significant effect on year to year variations in ozone levels. As previously stated, ozone is not emitted directly to the atmosphere, but is formed by photochemical reactions between VOCs and NO_x in the presence of sunlight. The hot days of summer are particularly conducive to ozone formation, and as such ozone levels are of general concern during the months of May through September. Hot summers usually produce long periods of elevated ozone concentrations, while ozone production is usually limited during cool and wet summers. A comparison of the number of days the 8-Hour ozone standard was exceeded to days above 90 degrees Fahrenheit is shown in Figure 2-12. As shown in Figure 2-12, from 2000 to 2008, there were more days when the 8-hour ozone NAAQS was exceeded than “hot” days, however, from, 2009 to 2016, there were more “hot days” than ozone exceedances. This indicates that there are other factors besides meteorology that contribute to decreasing ozone levels in New Jersey, such as New Jersey’s rules to control emissions from power plants that operate on High Electric Demand Days.

Figure 2-12: Number of Days the 8-Hour Ozone Standard was Exceeded vs. Days Above 90 Degrees Fahrenheit 2000-2016 New Jersey Statewide



Note: Excludes May 25 and 26, 2016 exceptional event data.

2.5 Exceptional Event Analysis

The USEPA allows states to exclude air quality monitoring data from use in determining exceedances or violations when that data was influenced by exceptional events. According to 40 CFR 50.1(j), the definition of an "exceptional event" (EE) means "an event(s) and its resulting emissions that affect air quality in such a way that there exists a clear causal relationship between the specific event(s) and the monitored exceedance(s) or violation(s), is not reasonably controllable or preventable, is an event(s) caused by human activity that is unlikely to recur at a particular location or a natural event(s), and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event."

During the period of May 25 and 26, 2016, the ozone air quality in New Jersey, and throughout its shared Northern NJ-NY-CT Nonattainment Area, experienced uncommonly high exceedances of the 75 ppb ozone NAAQS at 10 to 16 monitors on any one day during that period. New Jersey is seeking the exclusion of ozone air quality data for the May 25 and 26, 2016-period due to its impact on the 4th high maximum 8-hour ozone value, which is used to calculate the ozone design values for determining attainment of the NAAQS. New Jersey's exceptional event analysis was posted on its website for a 30-day public review on April 3, 2017 and can be found at http://www.nj.gov/dep/baqp/ee.html.

Table 2-1 compares the 4th high 8-hour maximum values including and excluding the exceptional event days of May 25 and 26 at all New Jersey monitors and the Westport monitor in Connecticut. The 4th high maximum 8-hour ozone values excluding exceptional event influences indicate a change in the 4th high monitors across the Northern NJ-NY-CT Nonattainment Area up to 6 ppb.

Table 2-2 compares the design values at the monitors including and excluding the exceptional event days of May 25 and 26. The adjusted design values due to the exclusions of the exceptional event influences are lowered by as much as 2 ppb.

Table 2-1: Comparison of 4th High Maximum 8-Hour Including and Excluding the May 25 and 26, 2016 Exceptional Event

State	Monitor Site Name	Site No.	2016 Ozone 4th Max (ppb) Including EE Data (A)	2016 Ozone 4th Max (ppb) Excluding EE Data (B)	Change in Ozone (ppb) (A-B)
CT	Westport	090019003	87	81	6
NJ	Bayonne	340170006	69	68	1
NJ	Chester	340273001	69	68	1
NJ	Columbia	340410007	66	65	1
NJ	Flemington	340190001	78	73	5
NJ	Leonia	340030006	75	73	2
NJ	Monmouth University	340250005	70	68	2
NJ	Newark Firehouse	340130003	70	68	2
NJ	Ramapo	340315001	72	68	4
NJ	Rutgers University	340230011	76	75	1

Table 2-2: Comparison of 8-Hour Design Value (DV) Including and Excluding the May 25 and 26, 2016 Exceptional Event

State	Monitor Site Name	Site No.	2016 Ozone DV (ppb) Including EE Data (A)	2016 Ozone DV (ppb) Excluding EE Data (B)	Change in Ozone (ppb) (A-B)
CT	Westport	090019003	85	83	2
NJ	Bayonne	340170006	72	72	0
NJ	Chester	340273001	69	68	1
NJ	Columbia	340410007	64	63	1
NJ	Flemington	340190001	72	70	2
NJ	Leonia	340030006	74	74	0
NJ	Monmouth University	340250005	70	69	1
NJ	Newark Firehouse	340130003	70	70	0
NJ	Ramapo	340315001	69	68	1
NJ	Rutgers University	340230011	74	74	0

2.6 Monitoring Summary

Northern NJ-NY-CT Nonattainment Area 84 ppb 8-Hour Ozone NAAQS

The Northern NJ-NY-CT Nonattainment Area attained the 1997 84 ppb 8-hour ozone standard by its applicable attainment date, June 15, 2010. On June 18, 2012, the USEPA issued a clean data determination[41] for the Northern NJ-NY-CT Nonattainment Area, based on 2010 design values. Design Values for 2011 continued to attain the standard.

Design values for 2012 and 2013 showed that the area was no longer attaining the 1997 84 ppb standard. For the 2010-2012 period, the 8-hour ozone design value was 86 ppb at the Madison monitor in Connecticut and for the 2011-2013 period was 89 ppb at the Stratford monitor in Connecticut.

On May 15, 2014[42], USEPA proposed to rescind the previously issued clean data determination for the 1997 8-hour ozone standard for the Northern NJ-NY-CT ozone Nonattainment Area. On May 4, 2016, USEPA finalized this proposal.[43]

Design values for 2014 show non-compliance with the 84 ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area with a design value of 85 ppb at the Westport (Sherwood Island Connector) monitor in Connecticut, however the design values for 2015 showed compliance with the 84 ppb ozone standard.

Including the exceptional event data, the design values for 2016 showed noncompliance with the 84 ppb standard with a design value of 85 at the Westport monitor in Connecticut. However, after adjusting the value to exclude exceptional event data, the design value at the Westport monitor is in compliance with the standard with a value of 83 ppb.

The impact of the exceptional event to the 4th high maximum 8-hour ozone monitor value and its changes to the design values at the monitors within the Northern NJ-NY-CT Nonattainment Area should be considered when evaluating the attainment demonstration for the 1997 ozone NAAQS. Therefore, the area is attaining the 1997 84 ppb ozone NAAQS. In addition, all monitor's in New Jersey have remained in compliance with the 1997 84 ppb NAAQS since 2013.

Northern NJ-NY-CT Nonattainment Area 75 ppb 8-Hour Ozone NAAQS

The 8-hour ozone Northern NJ-NY-CT Nonattainment Area's monitor with the highest 2016 design value is in Westport (Sherwood Island Connector), Connecticut. The design value for that monitor during that period is 83 ppb, after adjusting the value to exclude exceptional event data. Though that design value means the Northern NJ-NY-CT is not in compliance with the 2008 75 ppb ozone standard for the 2014-2016 period, all monitors in the New Jersey portion of the nonattainment area were below 75 ppb during that same period and have been below the 75 ppb standard since 2014.

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[41] 77 Fed. Reg. 36163 (June 18, 2012)
[42] 79 Fed. Reg. 27830 (May 15, 2014)
[43] 81 Fed. Reg. 26697 (May 4, 2016)

Southern NJ- PA-DE-MD Nonattainment Area 84 ppb 8-Hour Ozone NAAQS

The Southern NJ-PA-DE-MD Nonattainment Area originally had an attainment date of June 15, 2010 for the 1997 84 ppb 8-hour ozone standard, but qualified for a 1 year extension of its attainment date. The extension was approved by USEPA on January 21, 2011, making the new attainment date for the area June 15, 2011. The Southern NJ-PA-DE-MD Nonattainment Area attained the 1997 84 ppb 8-hour ozone standard by its applicable attainment date, June 15, 2011. On March 26, 2012, the USEPA issued a clean data determination[44] for the Southern NJ-PA-DE-MD Nonattainment Area based on 2010 design values.

For the 2010-2012 period, the 8-hour ozone design value for the Southern NJ-PA-DE-MD Nonattainment Area was 87 at three sites, showing noncompliance with the 84 ppb ozone standard. All 8-hour ozone design values in the Southern NJ- PA-DE-MD Nonattainment Area since this period have shown compliance with the 84 ppb ozone standard.

Southern NJ- PA-DE-MD Nonattainment Area 75 ppb 8-Hour Ozone NAAQS

The Southern NJ-PA-DE-MD Nonattainment Area originally had an attainment of July 20, 2015 for the 2008 75 ppb 8-hour ozone standard, but qualified for a 1 year extension of its attainment date. The extension was approved by USEPA on May 4, 2016, making the new attainment date for the area July 20, 2016. On April 18, 2017,[45] USEPA proposed that the Southern NJ-PA-DE-MD Nonattainment Area attained the 2008 75 ppb ozone NAAQS by the July 20, 2016 attainment date based on data for the 2013–2015 monitoring period.

All New Jersey monitors in the Southern NJ-PA-DE-MD Nonattainment Area are in compliance with the 75 ppb standard for the 2014-2016 period and have been complying since 2015. After adjusting the data to exclude exceptional event data, all monitors in the Southern NJ-PA-DE-MD Nonattainment Area are also in compliance with the 75 ppb standard.

[44] 77 Fed. Reg. 17341 (March 26, 2012)
[45] 82 Fed. Reg. 18268 (April 18, 2017)

Chapter 3 CONTROL MEASURES

3.1 Reasonably Available Control Measures (RACM)

This section provides a discussion of reasonably available control measures (RACM) for attainment of the ozone NAAQS. This includes a demonstration that New Jersey has adopted all reasonable measures (including RACT) to meet Reasonable Further Progress (RFP) requirements and to reach attainment as expeditiously as practicable. In addition, New Jersey demonstrates that no additional reasonably available measures would advance the attainment date by a minimum of one year.

In accordance with Section 172(c)(1) of the CAA (or 42 U.S.C. §7502(c)(1)) states are required to implement all RACM as expeditiously as practicable as part of their effort to attain the NAAQS. Specifically:

> "In general – Such plan provisions shall provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards."

In the USEPA 2015 75 ppb 8-hour Ozone Implementation Rule[46] the USEPA describes what states must include with their attainment demonstration regarding RACM. The USEPA decided to continue to apply the existing RACM guidance to the 2008 75 ppb ozone NAAQS, such that they interpret the RACM provision to require a demonstration that the state has adopted all reasonable measures (including RACT) to meet RFP requirements and to demonstrate attainment as expeditiously as practicable. They also require an additional analysis to determine if there are any additional RACM that will advance the attainment date by at least one year. USEPA stated in the 2015 Implementation Rule that states should consider all available measures, including those being implemented in other areas, and that a state must adopt measures for an area only if those measures are economically and technologically feasible and will advance the attainment date or are necessary for RFP.

RACM is further defined by the USEPA[47,48] as any potential control measure for application to point, area, onroad and nonroad emission source categories that meets the following criteria:

- The control measure is technologically feasible;
- The control measure is economically feasible;
- The control measure does not cause "substantial widespread and long-term adverse impacts";
- The control measure is not "absurd, unenforceable, or impracticable";
- The control measure can advance the attainment date by at least one year.

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[46] 80 Fed. Reg. 12282 (March 6, 2015)

[47] USEPA Memorandum, "Guidance on the RACM Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas", from John S. Seitz, USEPA Director Office of Air Quality Planning and Standards to the USEPA Regional Air Division Directors Regions I-IX, dated November 1999.

[48] USEPA Memorandum, "Additional Submission on RACM From States With Severe 1-hour Ozone Nonattainment Area SIPs", from John S. Seitz, USEPA Director office of Air Quality Planning and Standards and Marge Oge, USEPA Director Office of Transportation and Air Quality to Regional Air Division Directors, Regions I, II, III, V and VI, December 14, 2000.

The RACM analysis and conclusions for the 2008 75 ppb 8-hour ozone NAAQS rely and build on the RACM analysis conducted for the 1997 84 ppb 8-hour ozone NAAQS that was documented in New Jersey's 1997 84 ppb ozone attainment demonstration SIP[49] (2007 SIP) and the significant amount of control measures adopted and implemented by New Jersey since 2002.

The RACM analysis documented in the 2007 SIP includes:

- a compilation of an exhaustive list of potential control measures from numerous sources including a public workshop conducted by New Jersey;
- an evaluation of the feasibility of the measures in accordance with RACM guidance;
- an evaluation of the potential emission benefits from the measures;
- a list of measures adopted and implemented by New Jersey;
- an evaluation of the potential for additional measures to advance the attainment date.

This SIP expands on this analysis by documenting the additional RACM adopted and implemented by New Jersey since the 2007 SIP.

The list of potential and actual adopted measures was developed through a combination of several evaluations over several years that included State-specific and regional workgroups. As discussed in the 2007 SIP, New Jersey held a workshop and formed several workgroups with stakeholders to evaluate potential control measures. New Jersey participates in several regional workgroups with the goal of identifying RACM to help the States reach their 8-hour ozone attainment goals. New Jersey is an active member of four regional organizations, each with a unique focus with respect to either geographic area, air pollution or both. These organizations include the following:

Ozone Transport Commission (OTC): The OTC provides a forum through which states work together to evaluate new control measures and strategies for ozone control and create model rules for states to follow in their regulatory process. The 1990 CAA amendments established the OTC for this purpose. The OTC consists of 12 northeast states and the District of Columbia. New Jersey is an active member of all control specific workgroups and has been for several years.

As a member of the OTC, New Jersey has worked jointly with the other members to assess the nature and magnitude of the ozone problem in the region, evaluate potential new control strategies and recommend regional control measures to help towards the common regional goal of attainment and maintenance of the ozone NAAQS.

To support the goal of attainment of the ozone NAAQS, OTC staff and member states formed several workgroups to identify and evaluate candidate control measures. The OTC workgroups have reviewed over 1,000 candidate control measures. These control measures were identified through sources such as control measures in California (a leader in air quality), USEPA's Control Technique Guidelines (CTGs), STAPPA/ALAPCO's (now NACAA) "Menu of Options" documents, the AirControlNET database, emission control initiatives in other states and stakeholder input.

The control measures were evaluated for technical feasibility, emissions reductions, cost effectiveness and ease of implementation. Summaries of OTC/State evaluations and model rules developed since 2000 can be found on their website at http://www.otcair.org.

[49] The State of New Jersey, Department of Environmental Protection, State Implementation Plan Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard, Final 8-Hour Ozone Attainment Demonstration, October 29, 2007.

Mid-Atlantic Regional Air Management Association (MARAMA): MARAMA coordinates regional modeling inventories and projections.

Mid-Atlantic Northeast Visibility Union (MANE-VU): MANE-VU coordinates Regional Haze work and plans, including potential control measures for pollutants that also contribute to ozone formation.

Northeast States for Coordinated Air Use Management (NESCAUM): NESCAUM provides a forum through which states work together to evaluate new control measures and does technical projects and work that helps support the state's efforts towards ozone control.

3.1.1 Reasonably Available Control Technology (RACT)

A subset of RACM are the NO_x and VOC control measures that implement a RACT level of control on a major emission source or source category. The CAA Sections 184(b)(1) and 184(b)(2) (or 42 U.S.C. §§7511c(b)(1) and 7511c(b)(2)) and USEPA's March 6, 2015 75 ppb Ozone Implementation Rule[50] require moderate and above nonattainment areas and all states in the Ozone Transport Region, including New Jersey, to adopt RACT for all existing VOC and NO_x source categories covered by a Control Techniques Guideline (CTG), and for all other major sources of VOC and NO_x, including those covered by an Alternative Control Techniques (ACT).

RACT is defined by the USEPA 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.[51] RACT SIP requirements that must be addressed include revised RACT rules, if applicable, certifications where appropriate that existing rule provisions continue to be RACT, and negative declarations where there are no sources in the State applicable to a CTG.[52] States should provide for implementation of RACT as expeditiously as possible to help attain the 75 ppb ozone National Ambient Air Quality Standard.[53] For the purposes of RACT applicability in New Jersey, the major source thresholds are 25 tons per year (tpy) of VOC and NO_x, respectively.

New Jersey addressed these Reasonably Available Control Technology requirements for the 2008 75ppb 8-hour ozone NAAQS in a June 2015 RACT SIP Revision.[54] A summary of RACT measures adopted and implemented post 2011 is discussed in more detail below in Control Measures Section 3.2. New Jersey has met RACT requirements and has gone beyond RACT by adopting control measures more stringent than Federal rules, CTGs and neighboring state rules, especially those of most importance that address NO_x on high ozone days, setting the standard for what modern RACT should be. Of particular note are the following:

[50] 80 Fed. Reg, 12264, March 6, 2015
[51] 44 Fed. Reg. 53762, September 17, 1979
[52] 80 Fed. Reg. 12264, March 6, 2015
[53] Ibid.
[54] The State of New Jersey, Department of Environmental Protection, State Implementation Plan (SIP) Revisions, 75 ppb 8-Hour Ozone National Ambient Air Quality Standard
Reasonably Available Control Technology (RACT) Determination, 2011 Periodic Emission Inventory and 8-Hour Carbon Monoxide National Ambient Air Quality Standard Maintenance and Monitoring Plan, June 2015, http://www.state.nj.us/dep/baqp/ozoneco2011inv/ozone2011co-inv-sip-final.pdf

Power Plants

New Jersey has enforceable performance standards for NO_x and VOC emissions from power plants (or EGUs) that are among the most stringent and effective air pollution control regulations in the country. New Jersey has taken the lead by adopting measures to address emissions from EGUs that operate on HEDDs when ozone concentrations tend to be elevated. These sources are critically important contributors to episodes of elevated ozone in the Northern NJ-NY-CT Nonattainment Area.

All major facility permits for new EGU sources issued by the Department limit NO_x emissions based on hourly or daily averaging times, which are monitored by continuous emissions monitors (CEMs) and stack testing. These shorter averaging times lower NO_x emissions on a daily basis during the summertime (when they are needed to control outdoor ozone levels), rather than allowing facilities to emit high levels of NO_x during a summer day while still meeting an annual or ozone season cap. New Jersey's EGU rules include similar short-term emission limits for existing sources of NO_x, including all existing coal, oil and gas-fired EGU's.

New Jersey's EGU rules more effectively control ozone levels than the 2016 CSAPR Update because New Jersey's facilities must meet daily NO_x performance standards for all units, while facilities in other states may, under the Federal rules, purchase allowances to cover their excess emissions on high energy demand days. New Jersey's daily enforceable emission limitations better address ozone nonattainment than emission trading programs that allow the averaging of NO_x emissions over the entire summer. Five-month compliance periods are insufficient to ensure attainment of the ozone NAAQS because emissions can be high on days when ozone levels are high. Five-month averaging does not sufficiently lower emissions on the hottest summer days when peak electric demand and peak ozone levels usually occur. Unlike other states that significantly impact New Jersey's air quality, New Jersey power plants cannot turn off their NO_x pollution controls and use excess NO_x allowances to meet emission limits.

USEPA's ozone season trading program in the 2016 CSAPR Update is inadequate to address NO_x emissions from HEDD units that are preferentially used on high temperature, high ozone days. New Jersey has reduced NO_x emissions from power plants an estimated 64 tons per day on HEDD since implementation of the rule, with Phase I in 2009 and Phase II in 2015.

Distributed Generation/Demand Response (DG/DR)

New Jersey's rules for stationary reciprocating internal combustion engines (RICE) do not allow the use of uncontrolled engines for the purpose of distributed electric generation or demand response in non-emergency situations. However, in some states these engines are used to assist the electric grid during high electric demand periods. The emissions from these units are not properly accounted for in states inventories, or in the USEPA National Emissions Inventory (NEI) and they are not properly temporalized in the modeling. Like HEDD EGUs, many of these engines are operating on hot summer days which usually coincide with the high ozone days. Emissions from these units in the New York City Metropolitan/Long Island area on peak ozone days may be significantly contributing to ozone formation.

State of the Art (SOTA)

SOTA air pollution control must be implemented for significant equipment at minor facilities for new VOC and NO_x sources of air pollution.

Petroleum Storage

New Jersey has implemented one of the most stringent petroleum storage rules in the country, which established requirements to reduce VOC emissions from bulk petroleum storage facilities.

Municipal Waste Combustors

New Jersey has implemented measures to control NO_x emissions from Municipal Waste Combustors. New Jersey has taken significant actions to address these important sources while the USEPA and other nearby states, including upwind states that significantly contribute to ozone nonattainment, have not.

Other States need to adopt the RACT that has been established in New Jersey. In the USEPA 2015 75 ppb 8-hour Ozone Implementation Rule[55], USEPA continues to allow states to certify that existing RACT determinations are RACT for the current ozone standard if appropriate. Although in some cases a recent RACT analysis may result in such a certification, the 120 ppb 1-hour ozone RACT should not be considered RACT for the 2008 75 ppb 8-hr ozone standard. Such certifications of 20-year old RACT determinations put states that have implemented more stringent RACT measures at a disadvantage for attainment.

Many of the CTGs and ACTs are outdated and no longer represent RACT due to technological advances. Updating these guidelines would set a nationwide baseline for "presumptive norms" and provide consistency in states' RACT determinations for CTG and ACT source categories. While states have the responsibility to develop RACT rules based on currently available control technologies, having updated Federal guidance would help promote consistency and reduce conflict when USEPA reviews and proposes RACT plans. This would especially be useful for gas, oil, and coal-fired EGUs.

USEPA stated in their 75 ppb 8-hour ozone Implementation Rule Proposal[56] that "it is not sufficient for states to rely on previous RACT determinations without considering more recent information." They also stated that USEPA "generally considers controls that have been achieved in practice by other existing sources in the same source category to be technologically and economically feasible."

USEPA allows states to demonstrate that nonattainment area-wide weighted NO_x average emission rates, from sources subject to RACT, meet RACT requirements. NJDEP does not support averaging over an entire nonattainment area. A nonattainment area-wide weighted NO_x averaging demonstration that exempts HEDD EGUs from NO_x control does not reduce NO_x emissions when and where such reductions are necessary to attain the ozone NAAQS.

NJDEP does not support ozone season trading of NO_x emissions. States currently have the option to show that a regional trading program (such as the NO_x SIP Call or CAIR) would achieve RACT-level reductions for certain participating sources within a nonattainment area. The CAA requires RACT for areas classified as "moderate" and for states in the Ozone Transport Region (OTR). A trading program that allows higher NO_x emissions on high ozone days makes it difficult for states that are subjected to upwind sources of NO_x to achieve the ozone standard. During the ozone season, some power plants that are upwind contributors to New Jersey's ozone levels tum off their Selective Catalytic Reduction (SCR) NO_x controls and simply buy NO_x allowances to meet their emissions requirements. This practice – which has

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[55] 80 Fed. Reg. 12282 (March 6, 2015)
[56] 78 Fed. Reg. 34178 (June 6, 2013)

been allowed by USEPA - adversely impacts New Jersey air quality, and New Jersey opposes any regulation that would perpetuate this practice.

In the 2015 RACT SIP Revision, NJDEP committed to address four CTGs, and two NO_x ACT categories as follows:

1. Industrial Cleaning Solvents (2006 CTG);
2. Paper, Film, and Foil Coatings (2007 CTG);
3. Fiberglass Boat Manufacturing Materials (2008 CTG);
4. Misc. Metal and Plastic Parts Coatings (2008 CTG);
5. Stationary RICE (NO_x ACT) and Stationary gas turbines (NO_x ACT) as they relate to natural gas compressors.

NJDEP proposed rules addressing these categories on January 3, 2017. A copy of the rule proposal can be found at http://www.state.nj.us/dep/aqm/curformp.html. A summary of these rules is included below in Section 3.2. NJDEP anticipates adoption of these rules by November 6, 2017.

3.1.2 RACM to Advance the Attainment Date

As discussed above, the USEPA requires an additional analysis to determine if there are any additional RACM that will advance the attainment date by at least one year. If there are, the state is required to adopt those measures.

For the 2008 75 ppb ozone standard, New Jersey has an attainment date of no later than July 20, 2018. Therefore, in order for emission reductions to contribute towards attainment they must be achieved prior to the end of the 2017 ozone season because the attainment design value will be based on the 2015, 2016 and 2017 maximum ozone levels. To advance the attainment date by one year, the potential RACM measures would have to achieve emission reductions before the end of the 2016 ozone season.

New Jersey has determined that there are no additional RACMs (in addition to what New Jersey has already adopted and implemented) available that meet the criteria discussed in Section 3.1.1 that can provide emission reductions sufficient to advance the attainment date by one year. In addition to this determination, no additional measures could be implemented in time to take effect prior to the end of the 2016 ozone season.

3.1.3 RACM Conclusions

New Jersey has adopted extensive measures, RACM, RACT, and beyond RACM and RACT, statewide to control criteria pollutant and ozone precursor emissions from sources located in New Jersey. New Jersey has met RACM and RACT requirements and has gone beyond RACM and RACT by adopting control measures more stringent than Federal rules, CTGs and neighboring state rules, especially those of most importance that address NO_x on high ozone days, setting the standard for what RACT should be. Other States must adopt the RACT that has been established in New Jersey. The New Jersey measures adopted and implemented since 2002 are summarized in Table 3-1. These measures constitute RACM and RACT for the 2008 75 ppb 8-hour ozone NAAQS. Additional details on the control measures implemented for the 2008 75 ppb 8-hour ozone NAAQS are discussed below.

Table 3-1: New Jersey's Post 2002 Control Measures

Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code	USEPA Approval
Adhesives & Sealants	2009	VOC	NJAC 7:27-26	7/22/10
Architectural Coatings 2005	2005	VOC	NJAC 7:27-23	11/30/05
Asphalt Paving (cutback and emulsified)	2009	VOC	NJAC 7:27-16.19	8/3/10
Asphalt Production Plants	2009, 2011	NO_x	NJAC 7:27-19.9	8/3/10
Case by Case NO_x and VOC (FSELs/AELs)	2009	NO_x, VOC	NJAC 7:27-16, 19	8/3/10
Consumer Products 2005	2005	VOC	NJAC 7:27-24	1/25/06
Consumer Products 2009	2009	VOC	NJAC 7:27-24	7/22/10
CTG: Fiberglass Boat Manufacturing Materials (2008 CTG);	2018	VOC	7:27-16.14	Pending
CTG: Industrial Cleaning Solvents (2006 CTG);	2018	VOC	7:27-16.24	Pending
CTG: Misc. Metal and Plastic Parts Coatings (2008 CTG);	2018	VOC	7:27-16.15	Pending
CTG: Paper, Film, and Foil Coatings (2007 CTG);	2018	VOC	7:27-16.7	Pending
CTG: Printing	2009	VOC	NJAC 7:27-16.7	8/3/10
Diesel Vehicle Retrofit Program	2008-2015	PM	NJAC 7:27-32, 14	NA
EGU: BL England ACO	2000-2015	NO_x, PM, SO_2	NA	NA
EGU: Coal-fired Boilers, Oil and Gas Fired Boilers	2013	NO_x, PM, SO_2	NJAC 7:27-4.2, 10.2, 19.4	8/3/10
EGU: High Electric Demand Day (HEDD)	2009, 2015	NO_x	NJAC 7:27-19.29	8/3/10
EGU: PSEG-Consent Decree	2002-2010	NO_x, PM, SO_2	NA	Filed 7/26/02; amended 11/30/06
Glass Manufacturing	2012	NO_x	NJAC 7:27-19.10	8/3/10
ICI Boilers 2009	2009-2011	NO_x	NJAC 7:27-19.7	8/3/10
ICI Boilers, Turbines and Engines 2005	2007-2010	NO_x	NJAC 7:27-27.19	7/31/07
IM: Program Revisions 2009	2010	VOC, NO_x, CO	NJAC 7:27-15	9/16/11
IM: Diesel Smoke Cutpoint	2010, 2011	PM, NO_x	NJAC 7:27-14	Pending
IM: Heavy Duty OBD	2018	All	NJAC 7:27-14	Pending
Low Sulfur Fuel Oil	2014, 2016	PM, SO2, NO_x	NJAC 7:27-9	1/3/12
Mercury Rule	2006-2012	Hg, PM, SO_2, NO_x	NJAC 7:27-27	NA
Mobile Equipment Refinishing (Autobody)	2005	VOC	NJAC 7:27-16	7/2/04
Municipal Waste Combustors (Incinerators)	2009, 2010	NO_x	NJAC 7:27-19.13	8/3/10
New Jersey Low Emission Vehicle (LEV) Program	2009 (1)	All	NJAC 7:27-29	2/13/08
NO_x Budget	1999, 2003	NO_x, SO_2	NJAC 7:27-30	10/1/07
Permitting/Nonattainment New Source Review (NNSR)	Ongoing	All	7:27-8,18, 22	NA
Petroleum Storage	2010-2019	VOC	NJAC 7:27-16.2	8/3/10
Portable Fuel Containers 2005	2005-2015 (1)	VOC	NJAC 7:27-24	1/25/06
Portable Fuel Containers 2009	2009-2019 (1)	VOC	NJAC 7:27-24	7/22/10
Refinery Consent Decree: ConocoPhillips	2006-2014	PM, SO_2, NO_x, VOC	NA	Filed 1/27/05
Refinery Consent Decrees: Valero (Paulsboro)	2006-2014	PM, SO_2, NO_x, VOC	NA	Filed 6/16/05
Sewage and Sludge Incinerators	2009	NO_x	NJAC 7:27-19.28	8/3/10
Solvent Cleaning	2005	VOC	NJAC 7:27-16	7/2/04
Stage I and II	2003	VOC	NJAC 7:27-16	7/2/04
Stationary Gas Turbines and Engines (NO_x ACT)	2020	NO_x	7:27-19.5, 19.8	Pending

Table 3-1: New Jersey's Post 2002 Control Measures

Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code	USEPA Approval
Vehicle Idling Rule Amendments	2011	PM, NO_x	NJAC 7:27-14.1, 14.3	4/14/09
Voluntary Mobile Measures	2017 (1)	All	NA	NA

Legend/Notes:
NA = Not Applicable
EGU - Electric Generating Unit
ICI = Industrial, Commercial and Institutional Boilers
IM = Inspection and Maintenance for Motor Vehicles
OBD = On-board Diagnostics
RICE = Reciprocating Internal Combustion Engines
MACT = Maximum Achievable Control Technology
CTG = Control Technology Guideline
All = NO_x, VOC, CO, PM2.5, PM10
1. Turnover rule which means measure has cumulative benefits each year until complete fleet or equipment turnover

3.2 Control Measures In The SIP

This chapter summarizes the post 2011 control measures implemented in New Jersey's ozone attainment demonstration. The post 2011 control measures are summarized in Table 3-2. The benefits from the implementation of these measures, and the benefit calculations, are included in Chapter 4 Inventory.

<u>Table 3-2:</u> Control Measures in the SIP Post 2011

State or Federal	Sector	Control Measure	Effective Start Date of Benefits	Pollutant	New Jersey Admin-istrative Code (NJAC)	USEPA Approval	In 2017 Attain-ment Modeling/RFP	Not in 2017 Attain-ment Modeling	RACT	RACM	2017 RFP Contin-gency	2017 Attain-ment Contin-gency
State	Point, Area	CTG: Fiberglass Boat Manufacturing Materials (2008 CTG);	2018	VOC	7:27-16.14	Pending		x	x			
State	Point, Area	CTG: Industrial Cleaning Solvents (2006 CTG);	2018	VOC	7:27-16.24	Pending		x	x			
State	Point, Area	CTG: Misc. Metal and Plastic Parts Coatings (2008 CTG);	2018	VOC	7:27-16.15	Pending		x	x			
State	Point, Area	CTG: Paper, Film, and Foil Coatings (2007 CTG);	2018	VOC	7:27-16.7	Pending		x	x			
State	Point, Area	Low Sulfur Fuel Oil Phase 1	2014	PM, SO_2, NO_x	7:27-9	1/3/12	x			x		
State	Point, Area	Low Sulfur Fuel Oil Phase 2	2016	PM, SO_2, NO_x	7:27-9	1/3/12	x			x		
State	Point, Area	Permitting/Nonattainment New Source Review (NNSR)	Ongoing	All	7:27-8,18, 22	NA	x					
State	Point, Area	Stationary Gas Turbines and Engines (NO_x ACT)	2020	NO_x	7:27-19.5, 19.8	Pending		x	x			
State	Point	EGU: BL England ACO	2007 - 2019	NO_x, PM, SO_2	NA	NA	x		x			
State	Point	EGU: Coal-fired Boilers, Oil and Gas Fired Boilers	2013	NO_x, PM, SO_2	7:27-4.2, 10.2, 19.4	8/3/10	x		x			
State	Point	EGU: High Electric Demand Day (HEDD)	2009, 2015	NO_x	7:27-19.5	8/3/10	x		x			
State	Point	Glass Manufacturing	2012	NO_x	7:27-19.10	8/3/10	x		x			
State	Point	Petroleum Storage	2009-2017	VOC	7:27-16.2	8/3/10	x		x			
State	Area	Portable Fuel Containers	2009-2019	VOC	7:27-24	7/22/10	x			x		
State	Onroad	IM: Diesel Smoke Cutpoint	2011	All	7:27-14	Pending		x				
State	Onroad	IM: Heavy Duty OBD	2018	All	7:27-14	Pending		x				

Table 3-2: Control Measures in the SIP Post 2011

State or Federal	Sector	Control Measure	Effective Start Date of Benefits	Pollutant	New Jersey Admin-istrative Code (NJAC)	USEPA Approval	In 2017 Attain-ment Modeling/RFP	Not in 2017 Attain-ment Modeling	RACT	RACM	2017 RFP Contin-gency	2017 Attain-ment Contin-gency
State	Onroad	New Jersey Low Emission Vehicle (LEV) Program	2009 (1)	All	7:27-29	2/13/08	x			x		
State	Onroad, Nonroad	Voluntary Mobile Measures	2017 (1)	All	NA	NA		x				
Federal	Point, Area	Boiler/Process Heater NESHAP	2016	All	NA	NA	x					
Federal	Point, Area	Natural Gas Turbine NSPS	2017	NO_x	NA	NA	x					
Federal	Point, Area	RICE NESHAP	2017	All	NA	NA	x					
Federal	Point, Area	RICE NSPS	2017	NO_x, CO	NA	NA	x					
Federal	Point	EGU: CSAPR	2017	NO_x	NA	NA		x				
Federal	Point	EGU: Mercury and Air Toxics Standards (MATS), Coal- and oil-fired	2016	PM, SO_2, NO_x	NA	NA		x				
Federal	Point	Process Heater NSPS	2017	NO_x	NA	NA	x					
Federal	Point	Refinery Consent Decree: ConocoPhillips	2014	NO_x	NA	NA	x					
Federal	Point	Refinery Consent Decree: Valero (Paulsboro)	2014	PM	NA	NA	x					
Federal	Area	Refueling ORVR	1998 (1)	All	NA	NA	x					
Federal	Area	Residential Woodstove NSPS	2014	All	NA	NA	x					
Federal	Onroad	Fleet Turnover 2018	2018	All	NA	NA		x			x	x
Federal	Onroad	Heavy-Duty Vehicle Standards and Diesel Fuel Sulfur Control	2004-2010 (1)	All	NA	NA	x					
Federal	Onroad	National Low Emission Vehicle Program (NLEV)	1999 (1)	All	NA	NA	x					
Federal	Onroad	Tier 1 Vehicle Program	1994 (1)	All	NA	NA	x					
Federal	Onroad	Tier 2 Vehicle Program/Low Sulfur Fuels	2004 (1)	All	NA	NA	x					
Federal	Onroad	Tier 3 Vehicle Program/ Fuel Standards	2017 (1)	All	NA	NA	x					

<u>Table 3-2:</u> Control Measures in the SIP Post 2011

State or Federal	Sector	Control Measure	Effective Start Date of Benefits	Pollutant	New Jersey Administrative Code (NJAC)	USEPA Approval	In 2017 Attainment Modeling/RFP	Not in 2017 Attainment Modeling	RACT	RACM	2017 RFP Contingency	2017 Attainment Contingency
Federal	Nonroad	Diesel Compression Ignition Engines	1996 - 2015 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 1 Tier 2, Category 3 Tier 1	2004 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 2 Tier 2	2007 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 3 Tier 2	2011 (1)	All	NA	NA	x					
Federal	Nonroad	Diesel Marine Engines over 37 kW: Category 3 Tier 3	2016 (1)	All	NA	NA	x					
Federal	Nonroad	Large Industrial Spark-Ignition Engines over 19 kW (>50 hp) Tier 1	2004 (1)	All	NA	NA	x					
Federal	Nonroad	Large Industrial Spark-Ignition Engines over 19 kW (>50 hp) Tier 2	2007 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 0	1998 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 2	2002 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 3	2008 (1)	All	NA	NA	x					
Federal	Nonroad	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder Tier 4	2014 (1)	All	NA	NA	x					
Federal	Nonroad	Recreational Vehicles (Snowmobiles, Off-road Motorcycles, All-terrain Vehicles)	2006 - 2012 (1)	All	NA	NA	x					
Federal	Nonroad	Spark Ignition Engines, Equipment, and Vessels at or below 19 kW (Lawn and Garden and Small Watercraft)	1997 - 2016 (1)	All	NA	NA	x					

Table 3-2: Control Measures in the SIP Post 2011

Legend/Notes:
NA = Not Applicable
EGU - Electric Generating Unit
ICI = Industrial, Commercial and Institutional Boilers
IM = Inspection and Maintenance for Motor Vehicles
OBD = On-board Diagnostics
RICE = Reciprocating Internal Combustion Engines
MACT = Maximum Achievable Control Technology
CTG = Control Technology Guideline
All = NOx, VOC, CO, PM2.5, PM10
1. Turnover rule which means measure has cumulative benefits each year until complete fleet or equipment turnover

State Rules: Point and Area Sources

Control Techniques Guidelines (CTG): Fiberglass Boat Manufacturing Materials (2008 CTG):

USEPA issued a CTG in 2008 that provides control recommendations for reducing VOC emissions from the use of gel coats, resins, and materials used to clean application equipment in fiberglass boat manufacturing operations. The CTG recommends the use of low-VOC content (monomer and non-monomer VOC) resin and gel coats with specified application methods. The CTG recommends the use of covers on mixing containers to further reduce VOC emissions from gel coats and resins. The CTG also recommends the use of low-VOC and low vapor pressure cleaning materials. Because the CTG recommendations are based on the 2001 National Emission Standards for Hazardous Air Pollutants (NESHAP) for boat manufacturing, those facilities that are major sources of HAP are already complying with the 2001 NESHAP and have already adopted these control measures. Because the 2001 NESHAP does not apply to area sources, area source fiberglass boat manufacturing facilities are not currently required to implement the measures provided in the NESHAP and recommended in the CTG. There are boat manufacturing facilities in ozone nonattainment areas that meet the applicability threshold in the CTG and would provide VOC emission reductions when the CTG recommended controls are applied. These control approaches are recommended for all fiberglass boat manufacturing facilities where total actual VOC emissions from all fiberglass boat manufacturing operations are equal to or exceed 15 pounds per day.

The NJDEP proposed new rules at N.J.A.C. 7:27-16.14 on January 3, 2017, based on the USEPA CTG, which establish an applicability limit of actual VOC emissions, before add-on control, of 15 pounds per day from all fiberglass boat manufacturing operations. Exemptions include production of vessels that must meet military specifications and production of parts of boats that do not involve the manufacture of fiberglass. Compliance can be achieved by meeting a maximum monomer VOC content standard, meeting a maximum monomer VOC mass emission rate, or installation of a VOC control apparatus. Recordkeeping must be maintained which demonstrates compliance.

Control Techniques Guidelines: Industrial Cleaning Solvents (2006 CTG):

USEPA issued a CTG for industrial cleaning solvents in 2006 that includes recommended control techniques. This category includes the industrial cleaning solvents used by many industries. It includes a variety of products that are used to remove contaminants such as adhesives, inks, paint, dirt, soil, oil and grease. The recommended measures for controlling VOC emissions from the use, storage and disposal of industrial cleaning solvents includes work practice standards, limitations on VOC content of the cleaning materials, and an optional alternative limit on composite vapor pressure of the cleaning materials. They also include the use of add-on controls with an overall emission reduction of at least 85 percent by mass. The first two recommendations and the last one are based on the Bay Area AQMD rule.

The NJDEP proposed new rules at N.J.A.C. 7:27-16.24 on January 3, 2017, based on the USEPA CTG, which specifies VOC content and vapor pressure limits for solvents used in solvent cleaning activities conducted to remove material through wiping, flushing, or spraying. Facilities can be exempt based on annual industrial cleaning solvent usage and source operation type. Compliance can be achieved by meeting a maximum VOC content, a maximum VOC composite vapor pressure, or a minimum control efficiency. Applicable facilities must implement best management practices, which include keeping cleaning materials in closed containers when not in use. Recordkeeping must be maintained which demonstrates compliance.

Control Technique Guidelines: Misc. Metal and Plastic Parts Coatings (2008 CTG):

In the 2008 USEPA CTG for miscellaneous metal and plastic parts coatings three options were recommended for controlling VOC emissions: (1) VOC content limits for each coating category based on the use of low-VOC content coatings and specified application methods to achieve good transfer efficiency; (2) equivalent VOC emission rate limits based on the use of a combination of low-VOC coatings, specified application methods, and add-on controls; or (3) an overall VOC control efficiency of 90 percent for facilities that choose to use add-on controls instead of low-VOC Content coatings and specified application methods. In addition, USEPA recommended work practices to further reduce VOC emissions from coatings as well as to minimize emissions from cleaning materials used in miscellaneous metal product and plastic part surface coating processes. The recommendations in this CTG are similar to the South Coast regulations governing miscellaneous metal product and plastic part surface coating operations, and Michigan Rule 336.1632.

The NJDEP proposed new rules at N.J.A.C. 7:27-16.15 on January 3, 2017, based on the USEPA CTG, which specify an applicability limit of 2.7 tons of actual VOC emissions during any consecutive 12-month period from all miscellaneous metal and plastic part coating operations, including related cleaning activities. Compliance can be achieved by either meeting the maximum allowable VOC content, achieving a minimum 90 percent overall control efficiency, or meeting a minimum overall control efficiency which is based upon the characteristics of the coating. Exemptions include surface coating operations that exclusively use powder coating and metal part coatings which must comply with a military specification that has been formulated to meet a higher, less stringent VOC content. Applicable facilities must implement best management practices, which include keeping cleaning materials in closed containers when not in use. Recordkeeping must be maintained which demonstrates compliance.

Control Technique Guidelines: Paper, Film, and Foil Coatings (2007 CTG):

USEPA issued a 2007 CTG for paper, film and foil coatings. Previous Federal actions that affected this source category included a 1977 CTG for controlling VOC emissions from surface coating of paper, the 1983 new source performance standards (NSPS) for surface coating of pressure sensitive tape and labels (a subset of this category), and a 2002 NESHAP for paper and other web coating. USEPA recommends applying the control recommendations for coatings only to individual paper, film and foil surface coating lines with the potential to emit at least 25 tpy of VOC from coatings, prior to controls. USEPA recommends an overall VOC control efficiency of 90 percent as RACT for each coating line. This level of control is based on current rules in San Diego and Ventura air districts in California, as well as the NSPS. The CTG does not recommend the 95 percent control level that is currently required by the NESHAP and seven State's regulations.

The NJDEP proposed amendments to N.J.A.C. 7:27-16.7 on January 3, 2017, based on the CTG, which requires paper, film, and foil coating operations to implement best management practices if the actual VOC emissions exceed 15 pounds per day for all coating operations.

Permitting/Nonattainment New Source Review (NNSR):

The CAA Section 173(a)(2) requires new or modified major sources to install the Lowest Achievable Emission Rate (LAER) control equipment. In addition, CAA Section 173(c) requires new or modified major stationary sources to obtain equal or greater emission offsets in order to operate in a nonattainment area. Thus, the LAER and offset provisions of the NNSR program provides for continual emission reductions to help improve the air quality in the nonattainment area and further downwind. In New Jersey, any new, reconstructed, or modified significant source is also required to install state of the art (SOTA) control technology. SOTA, pursuant to

New Jersey's minor NSR program, also provides for emission reductions from the facilities. New Jersey's SOTA requirements, referred to in the New Jersey Air Pollution Control Act as "advances in the art of air pollution control," mandate best available control technology (BACT) if the equipment or control apparatus is subject to the Prevention of Significant Deterioration (PSD) or LAER if the equipment or control apparatus is subject to the Nonattainment New Source Review (NNSR) regulations.

Stationary Natural Gas Compressor Turbines and Engines:

On January 3, 2017, NJDEP proposed amendments to its rules for stationary gas turbines and engines. At N.J.A.C. 7:27-19.5, NJDEP proposed new standards for NO_x emissions from existing simple cycle combustion turbines combusting natural gas compressing gaseous fuel at major NO_x facilities (compressor turbines). At N.J.A.C. 7:27-19.8, NJDEP proposed new standards for NO_x emissions from stationary reciprocating engines combusting natural gas and compressing gaseous fuel at major NO_x facilities (compressor engines). The effective date of the emission benefits is anticipated to be in 2020.

State Rules: Point Sources

Electric Generating Units (EGUs) Administrative Consent Order (ACO) B.L. England:

On January 24, 2006, an ACO was signed with B.L.England to reduce air pollutants from its EGUs. The ACO was amended on October 31, 2006, January 13, 2010 and May 18, 2012. Under the ACO agreement, B.L. England has/will reduce air pollutants by shutting down one of its coal-fired units (Unit 1) and converting (or replacing) two others to natural gas (Unit 2 burns coal and Unit 3 burns residual fuel oil). The agreement requires the cessation of coal-fired Unit 1 by the fall of 2013 and for the conversion (or replacement) of Units 2 and 3 to natural gas by May 2017. Unit 1 has been shut down since 2013. The agreement also allows units 2 and 3 to continue operation if cessation would adversely affect transmission of electricity in the region. Per the request of PJM Interconnection LLC, B.L. England will continue to operate until May 1, 2019 to maintain reliability and for emergencies. Operations will be limited to reduce pollution during the time leading up to the conversions. A copy of the Administrative Consent Order can be found online at: http://www.nj.gov/dep/docs/20120613104728.pdf.

EGU Rule, Coal, Oil and Gas Fired Boilers:

In addition to NJDEP's mercury rule at N.J.A.C. 7:27-27.7(d), which reduced multiple pollutants from EGUs, the NJDEP adopted amendments to N.J.A.C. 7:27-4.2 and 7:27-10.2 on April 20, 2009, which set performance standards to reduce allowable NO_x, SO_2 and particulate emissions from all ten coal-fired boilers in New Jersey. The NJDEP required compliance by 2012 (2013, if the Department grants a one year extension due to a demonstrated need). The NJDEP also adopted amendments to 7:27-19.4, on April 20, 2009, which set performance standards for NO_x emissions for gas and oil-fired boilers serving EGUs.

EGU Rule, High Electrical Demand Day (HEDD) Units:

The NJDEP adopted amendments to N.J.A.C. 7:27-19.5, on April 20, 2009, which set performance standards to reduce NO_x emissions from EGUs that primarily operate on HEDDs. On these high electric demand days, increased power generation is needed, usually on short notice. In Connecticut, Delaware, Maryland and Pennsylvania, boilers and turbines that primarily run to follow electrical load needs supply HEDD power generation. In New Jersey and New York, combustion turbines primarily supply HEDD power generation. The majority of the HEDD units in these six states were not controlled and produced significant NO_x emissions on HEDDs. For example, on a typical summer day (June 4, 2005), NO_x emissions for the six states for all Electric Generating Units (EGUs) were 551 tons per day (tpd). On a HEDD (July 26, 2005), NO_x emissions were 1,349 tpd. Most of this increase in emissions was due to power production from uncontrolled HEDD units.

The New Jersey rule Phase 1 was effective April 20, 2009 and reduced NO_x emissions by approximately 19.8 tpd on these high electrical demand days. Specifically, power generators in New Jersey were responsible for securing these reductions and were required to submit a plan on how they would reduce NO_x. The New Jersey rule Phase 2 was effective May 1, 2015 and required that all HEDD units meet performance standards that reflect modern low NO_x. Many of the existing units in New Jersey shutdown if they were not able to meet these standards.

Glass Manufacturing:

The NJDEP adopted amendments to N.J.A.C. 7:27-19.10, on April 20, 2009, which set performance standards to reduce NO_x emissions from glass manufacturing facilities. The glass manufacturing process requires that raw materials, such as sand, limestone, soda ash, and cullet (scrap and recycled glass), be fed into a furnace at temperatures between 2,700 degrees Fahrenheit to 3,100 degrees Fahrenheit. The raw materials then chemically react creating the molten material known as glass. The main product types are flat glass, container glass, pressed and blown glass, and fiberglass. The reaction of nitrogen and oxygen in the furnace creates NO_x emissions.

New Jersey's rules prior to the amendments specified NO_x emission limits for a glass manufacturing furnace used to produce a container-type glass of 5.5 pounds (lbs) NO_x per ton of pulled glass and 11 lbs NO_x per ton of pulled glass for specialty container glass.[57] Pulled glass is the total output from the furnace and includes the glass produced, including the rejected glass. New Jersey's rules prior to the amendments did not specify a NO_x emissions limit for a glass manufacturing furnace used to produce flat glass.

New Jersey's adopted amendments require the NO_x emission rates to reduce emissions consistent with the installation of oxy-fuel firing at the time of the next furnace re-build. Although several alternative NO_x control technologies exist, including combustion modifications (low NO_x burners, oxy-fuel firing, oxygen-enriched air staging), process modifications (fuel switching, batch preheat, electric boost), and post combustion modifications (fuel reburn, SNCR, SCR), oxy-fuel firing is consider the most effective because it not only reduces NO_x emissions by as much as 85 percent, but also reduces energy consumption, increases production rates by 10-15 percent, and improves glass quality by reducing defects. In addition, oxy-fuel firing is demonstrated technology and has penetrated all segments of the glass industry.

Petroleum Storage:

The NJDEP adopted amendments to N.J.A.C. 7:27-16.2, on April 20, 2009, which established requirements to reduce VOC emissions from bulk petroleum storage facilities. Some petroleum and VOC products are stored in large storage tanks that are capped with floating roofs. Evaporative VOC emissions from floating roof tanks are the result of standing storage and working losses. Standing storage losses are evaporative losses through rim seals, deck fittings, and or deck seams. Floating roof storage tanks move vertically on slotted guide pole legs. VOCs escape from gaps at the juncture of the roof and legs. Working losses, including landing losses,[58] are due to changes in the stored liquid levels due to filling and draining operations.

[57] "Specialty container glass" means clear or colored glass made of soda-lime recipe, which is produced to meet the specifications of any standard set forth by The United States Pharmacopeia or The National Formulary, and which is used for pharmaceutical, cosmetic or scientific purposes.
[58] "Landing losses" refer to emissions that occur from floating-roof tanks whenever the tank is drained to a level where its roof rests on its deck legs (or other supports).

There are several control techniques now available to limit emissions due to standing storage and working losses including vapor recovery systems, retrofitting slotted guide poles with covers or sleeves, retrofitting to domed roof, and lower landing heights.

New Jersey's amendments include the following:

- Cover or dome external floating roof tanks;
- Implement measures to reduce VOC emissions emitted during degassing, cleaning, and landing operations, and from slotted guide poles;
- Apply to existing tanks the NSPS for floating roof seal and deck fitting specifications; and tank preventive inspection and maintenance requirements.

State Rules: Area Sources

Portable Fuel Containers (PFCs):

The NJDEP adopted amendments to N.J.A.C. 7:27-24, on May 3, 2004 and December 1, 2008, which regulate VOC emissions from PFCs. PFCs are designed for transporting and storing fuel from a retail distribution to a point of use and the eventual dispensing of the fuel into equipment. Commonly referred to as "gas cans," these products come in a variety of shapes and sizes with nominal capacities ranging in size from less than one gallon to over six gallons. VOC emissions from PFCs are classified by five different activities: transport-spillage, diurnal emissions, permeation, and equipment refueling vapor displacement and spillage emissions. Diurnal evaporative emissions are the largest category. Diurnal evaporative emissions are evaporative emissions resulting from the daily cycling of ambient temperatures.

Specifically, the New Jersey rule contains requirements that address VOC emissions from PFCs, effective January 1, 2005 and 2009. The rule requires that PFCs and/or spouts be equipped with an automatic shut-off device, an automatic device that closes and seals when it is removed from the fuel tank and sets a permeability limit. The rule also requires that a PFC have a fuel flow rate and fill level standards. The USEPA promulgated a similar Federal rule with an effective date of January 1, 2009.

State Rules: Onroad Mobile Sources

IM: Diesel Smoke Cutpoint:

The NJDEP adopted amendments to N.J.A.C. 7:27 - 14.2, 14.4, 14.6, and 7:27B - 4.5 on April 3, 2009, which reduce the allowable smoke from heavy-duty diesel vehicles during inspections. Smoke opacity, which is used as a surrogate for particulate matter, is the degree to which a plume of smoke will obstruct transmission of visible light. Newer trucks are equipped with emission control equipment which reduces the exhaust emissions. Smoke opacity is an indicator that maintenance is needed.

IM: Heavy Duty OBD:

The NJDEP adopted amendments to N.J.A.C. 7:27 – 14, 15, and N.J.A.C. 7:27B-4, B-5 on September 9, 2016, which added on-board diagnostic (OBD) inspection and maintenance requirements for heavy duty vehicles. OBD equipment monitors the status of vehicle emission controls and engine performance, alerting the driver via a dashboard indicator if there is a vehicle malfunction. The new rules require heavy duty vehicles with OBD systems installed, model years 2014 and newer, to pass an OBD inspection every year for commercial vehicles and every two years for passenger vehicles. The estimated start date of the program is in 2018.

New Jersey Low Emission Vehicle Program:

The NJDEP's Low Emission Vehicle (LEV) program (or Clean Car Program) rule was adopted on November 28, 2005, with an operative date of January 27, 2006.[59] The rule requires all new vehicles offered for sale in New Jersey to be California certified for emissions beginning January 1, 2009. This rule also establishes a zero-emission vehicle (ZEV) sales requirement for New Jersey and requires that each auto manufacturer's sales fleet in New Jersey meet a declining fleet average non-methane organic gas (NMOG) emission standard.

State Voluntary Mobile Measures

Transportation Control Measures (TCMs)

An important class of mobile source control measures which States are authorized to implement is Transportation Control Measures (TCMs). TCMs are transportation strategies, specific to mobile sources, which reduce emissions by reducing the number and/or length of vehicle trips and/or improve traffic flow. After the passage of the CAA Amendments of 1990, New Jersey made a full-scale commitment to TCMs. To this day New Jersey's transportation capital program continues to stress transit projects, system preservation, and systems management over the provision of new highway capacity. The NJDOT has continued to commit to the support and implementation of air quality-friendly transportation projects and programs.

Transportation Management Associations (TMAs) are non-profit organizations that work with businesses, commuters, county and local governments, and state agencies to implement programs that reduce traffic congestion and improve air quality. There are eight TMAs currently operating in the state of New Jersey. Seven TMAs operate in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area. They are: EZRide (Meadowlink), TransOptions, Ridewise of Raritan Valley, Keep Middlesex Moving, HART Commuter Information Services, Greater Mercer TMA and Hudson TMA. TMAs carefully apply selected approaches to facilitating the movement of people and goods within an area. NJTPA coordinates the activities of the TMAs within the NJTPA region. In New Jersey, many TCMs are organized and operated by the TMAs with additional assistance from NJTPA on more encompassing projects (such as ride match services.) Details on these TCM programs are available on the web sites for each of the TMAs.

North Jersey Transportation Planning Authority Measures

The North Jersey Transportation Planning Authority (NJTPA) works with partner agencies to develop and implement projects that benefit air quality through the Transportation Clean Air Measures (TCAM) program. The NJTPA Board approved seven onroad and nonroad projects to receive a total of $10 million in Federal Congestion Mitigation and Air Quality funding on July 13, 2015, which were partially implemented in 2016. The projects include:

NJTPA Onroad Mobile Measures in Northern NJ-NY-CT Nonattainment Area:

- Traffic Signals:
    - Replace traffic signals along the length of Route 21-McCarter Highway in Newark, Essex County, with adaptive signals that adjust to traffic conditions in real time.
    - Implement a coordinated "smart" traffic signal system including adaptive signals in the Central Business District of Hackensack, Bergen County.

[59] 38 N.J.R. 497(b) (January 17, 2006).

- Truck Replacement Program:

  The North Jersey Regional Truck Replacement Program will make grant incentives available for private truck owners to replace old, high-emissions trucks with newer fuel-efficient vehicles. Sponsored by the Port Authority of New York & New Jersey (PANYNJ), this private/public partnership with independent truck owner-operators, has replaced 80 trucks from the 1994-1995 model year. The PANYNJ plans to allow trucks up to model year 2000 to qualify for replacement. This will increase the pool of eligible trucks in the program from approximately 400 to 3000 trucks.

- Charging Stations:

  Meadowlink's Workplace Charging Challenge will allow the Transportation Management Association to educate businesses about the positives of installing charging stations at their offices.

NJTPA Nonroad Mobile Measures in Northern NJ-NY-CT Nonattainment Area:

- Construction Replacements:

  The New Jersey Clean Construction Program is implemented by the NJDEP. The New Jersey Clean Construction Program provides funding for the modernization of off-road construction equipment, which provides reductions in particulate matter, VOC and NO_x emissions. Grant money is used to aid in the purchasing of replacement equipment (up to 30 percent of the purchase, not to exceed $100,000). The New Jersey Clean Construction Program prioritizes projects by construction equipment used on projects that are conducted in urban/sensitive areas; construction equipment with the highest use; and older construction equipment. Replacing older equipment with equipment that meets USEPA's Tier 4 standards will achieve a NO_x benefit of approximately 27 tons of NO_x and 1.6 tons of VOC over 20 years starting in 2018. Emissions benefits for the vehicle replacements were calculated using the USEPA Diesel Emission Quantifier (DEQ).

- Ferry Repower:

  The SeaStreak Vessel Repower Project supported the replacement of engines with cleaner burning units on passenger ferries operated by SeaStreak Ferries between Atlantic Highlands, NJ and downtown Manhattan. The proposed project consisted of removing four propulsion engines and installing two higher horsepower engines certified to USEPA Tier 3 emission standards. The existing engines were manufactured in 2003 and carry an USEPA Tier 1 rating. Lifetime (10 years) emission reductions from this project are estimated to be about 132 tons/year of NO_x starting in 2017. The project is sponsored by the NJDEP.

- Cargo Handling Equipment:

  A Fleet Modernization and Replacement Program for Cargo Handling Equipment will replace approximately 100 old yard tractors or similar yard equipment that serve the Port Authority's marine terminals located in Essex and Union counties with new cleaner burning equipment. This project is sponsored by the Port Authority of New York & New Jersey.

Total NO_x reductions from these NJTPA projects are estimated to be approximately 0.5 tons/day.

Electric Vehicles:

New Jersey is supportive of the roll-out of Electric Vehicle (EV) support infrastructure (primarily vehicle charging stations) and seeks to encourage greater adoption of EVs statewide. Although the penetration of EVs is not yet significant enough for measures to increase their use to be considered RACM, EV related measures do hold promise in the future as the number of electric vehicle options increase, the vehicle capabilities improve and pricing becomes more competitive with conventional vehicles. A significant state measure that encourages the purchase of EVs is the New Jersey Sales and Use Tax Act (N.J.S.A. 54:32B-8.55) that provides a sale and use tax exemption for zero emission vehicles (ZEVs), which are vehicles certified pursuant to the California Air Resources Board zero emission standards for the model year.

In addition, on June 15, 2016 New Jersey announced a new grant program that can help employers offset the cost for electric vehicle charging stations across the state. The first phase of the program offers $725,000 in reimbursement grants to employers to offset some of the costs to purchase and install the stations, while also encouraging employees to ultimately purchase and drive electric vehicles to work. Reimbursement grants are offered on a first-come, first-serve basis of up to $250 for each Level 1 charging station installed, and up to $5,000 for each Level 2 charging station installed. Level 2 stations provide more mileage range for electric vehicles than Level 1 stations. Eligible employers include public, private, for-profit, nonprofit, educational and governmental entities. Owners of parking facilities used by commuters or employees of other companies are also eligible.

Nonroad Mobile Measures in Southern NJ-PA-DE-MD Nonattainment Area:

Forklift Replacements:

The South Jersey Port Corporation (SJPC), in Camden County, New Jersey, an agency of the State of New Jersey, operates and maintains two of the port terminals in this area. Cargo handling equipment, such as forklifts, are essential in the day-to-day operation of the marine terminals along the Delaware River. These forklifts work many hours to keep the cargo moving between ship, rail and highway. SJPC will replace nine of their oldest (22 to 50 years old), highest use forklifts with new Tier 4 engine forklifts. The new equipment will have a minimum useful life of 20 years, though it is expected that the equipment will be in use for many more years. It is estimated that the replaced equipment will yield lifetime emission benefits of: 11 tons of PM (96 percent reduction), 63 tons of NO_x (95 percent reduction), 9.5 tons of hydrocarbons (95 percent reductions), and 29 tons of carbon monoxide (97 percent reductions) starting in 2017 in the New Jersey portion of the Southern NJ-PA-DE-MD Nonattainment Area. These benefits were calculated with the USEPA Diesel Emissions Quantifier.

Federal Rules: Point and Area Sources

Boiler/Process Heater NESHAP:

The Federal Industrial/Commercial/Institutional (ICI) Boilers and Process Heaters NESHAP rule promulgates national emission standards for the control of hazardous air pollutants (HAP) for new and existing industrial, commercial, and institutional (ICI) boilers and process heaters at major HAPs sources. The final rule was published in the Federal Register in January 2013 and requires existing major sources to comply with the standards by January 2016. In addition, there is an area source Boiler NESHAP rule that requires tune-ups for smaller boilers. It is expected that many boilers that burn coal or oil will be replaced by new natural gas boilers because of the rule. The expected co-benefit for criteria air pollutants at these facilities is expected to be significant.

New Jersey adopted amendments to rules regulating boilers on October 17, 2005 and on April 20, 2009 at N.J.A.C. 7:27-19.7. The amendments revised the NO_x emission limits for both point and area source ICI boilers and required boiler tune-ups for point and area source boilers. Under the amendments, owners and operators of any ICI boilers as small as 25 MMBtu/hr would be required to achieve emission limits specified in the rules and boilers greater than 5 MMBtu/hr are required to have annual tune-ups.

Due to New Jersey already having stringent boiler rules in place prior to 2011, minimal reductions are expected from the Federal rule in New Jersey after 2011.

<u>Natural Gas Turbine NSPS</u>:

The NSPS for stationary combustion turbines are outlined in the Code of Federal Regulations under 40 CFR Part 60 Subparts GG and KKKK. Subpart GG covers turbine engines that commenced constructed after October 3, 1977 and before February 18, 2005. Subpart KKKK covers both the combustion turbine engine and any associated heat recovery steam generator for units that commenced construction after February 18, 2005. The key pollutants USEPA regulates from these sources includes nitrogen oxides (NO_x) and sulfur dioxide (SO_2).

In 2006, USEPA promulgated standards of performance for new stationary combustion turbines in 40 CFR subpart KKKK. The standards reflect changes in NO_x emission control technologies and turbine design since standards for these units were originally promulgated in 40 CFR part 60, subpart GG. The 2006 NSPSs affecting NO_x and SO_2 were established at levels that bring the emission limits up-to-date with the performance of current combustion turbines. Stationary combustion turbines were also regulated by the NO_x SIP Call, which required affected gas turbines to reduce their NO_x emissions by 60 percent.

On August 29, 2012, USEPA proposed to amend the NSPS for stationary gas turbines (40 CFR 60 Subpart GG) and stationary combustion turbines (40 CFR 60 Subpart KKKK) in response to a petition for reconsideration. The proposed amendments are intended to clarify the intent in applying and implementing specific rule requirements. Those affected by this proposed rule include owners or operators of stationary combustion turbines on which construction, modification or reconstruction began after 18 February 2005 and that have a base load rating equal to or greater than 2.9 megawatts (MW) (10 million British thermal units per hour [MMBtu/h]). The proposed amendments would increase the environmental benefits of the existing requirements because the emission standards would apply at all times. The proposed amendments would also promote efficiency by recognizing the environmental benefit of combined heat and power and the beneficial use of low energy content gases.

<u>Reciprocating Internal Combustion Engine (RICE) NSPS</u>:

The CAA requires USEPA to set NSPS for stationary internal combustion engines, which are generally diesel engines. The standards must consider available emission control technologies and costs of control. On July 11, 2006, USEPA issued standards of performance for stationary reciprocating internal combustion engines. These engines are used at facilities such as power plants, and chemical and manufacturing plants, to generate electricity and to power pumps and compressors. They are also used in emergencies to produce electricity and to pump water for flood and fire control. The final standards, limited emissions of NO_x, PM, SO_2, CO, and hydrocarbons (HC) from stationary RICE to the same stringent levels required by USEPA's nonroad diesel engine regulations. The final rule also limited the amount of sulfur in the diesel fuel used to run these engines.

In June 2011, USEPA amended the standards to align emission limits for certain categories of stationary internal combustion engines with similar sized engines used in marine applications. These amendments are effective in 2016.

RICE NESHAP:

USEPA developed control factors for three NESHAP rulemakings for RICE. These rules reduce HAPs from existing and new RICE sources. In order to meet the standards, existing sources with certain types of engines will need to install controls. In addition to reducing HAPs, these controls have co-benefits that also reduce CAPs, specifically, CO, NO_x, VOC, PM, and SO_2. The RICE NESHAP rules apply to both point and area sources. These rules are effective in 2017.

Federal Rules: Point Sources

EGUs: CSAPR Update:

On September 7, 2016, the USEPA finalized its update to CSAPR for the 2008 75 ppb 8-hour ozone NAAQS.[60] The 2016 CSAPR Update rule establishes ozone season NO_x emission budgets for EGUs in 22 states in the eastern U.S. Implementation of the 2016 CSAPR Update began in May of 2017. The 2016 CSAPR Update is discussed in more detail in Chapter 6.

EGUs: Mercury and Air Toxics Standards:

On December 16, 2011, the USEPA promulgated the Mercury and Air Toxics Standards (MATS) to reduce emissions of toxic pollutants from power plants. The MATS are national CAA standards to reduce mercury and other toxic emissions from new and existing coal- and oil-fired electric utility steam generating units (EGUs). The standards will reduce emissions of metals, including mercury (Hg), arsenic (As), chromium (Cr) and nickel (Ni), acid gases, including hydrogen chloride (HCl) and hydrogen fluoride (HF). Emission controls to reduce air toxics will also reduce emissions of PM2.5 and SO_2. The MATS rule includes revisions to the Federal NSPS for new fossil fuel-fired electric generating units, including revised numerical emission limits for PM, SO_2, and NO_x.

Existing sources have 4 years, if needed, to comply with MATS. The USEPA estimates that there are approximately 1,400 units affected by this action, which includes approximately 1,100 existing coal-fired units and 300 oil fired units at about 600 power plants. USEPA listed 73 facilities in New Jersey, Pennsylvania, Delaware, New York and Connecticut that could potentially be affected by the MATS.

Process Heater NSPS:

Process heaters are used throughout refineries and chemical plants to raise the temperature of feed materials to meet reaction or distillation requirements. Fuels are typically residual oil, distillate oil, refinery gas, or natural gas. In some sense, process heaters can be considered as emission control devices because they can be used to control process streams by recovering the fuel value while destroying the VOC. The criteria pollutants of most concern for process heaters are NO_x and SO_2.

In 2011, process heaters have not been subject to regional control programs like the NO_x SIP Call, so most of the emission controls installed at refineries and chemical plants have resulted from RACT regulations that were implemented as part of SIPs to achieve ozone NAAQS

[60] 81 Fed. Reg. 74504 (October 26, 2016).

compliance in specific nonattainment areas, and from refinery consent decrees. The boiler/process heater NSPS established NO_x emission limits for new and modified process heaters. The boiler/process heater NSPS established NO_x emission limits for new and modified process heaters.

Refinery Consent Decrees:

The USEPA and various state and local agencies negotiated Consent Decrees with certain major refineries to elicit emission reductions from five major refinery processes. The processes are Fluid Catalytic Cracking Units (FCCUs) and Fluid Coking Units (FCUs), Process Heaters and Boilers, Flare Gas Recovery, Leak Detection and Repair (LDAR), and Benzene/Wastewater. The New Jersey refineries with settlements included Sunoco (now closed), Hess (now closed and owned by Buckeye), Valero and ConocoPhillips.

For FCCUs/FCUs, the Consent Decree control requirements generally require the installation of wet gas scrubbers for SO_2 control, and selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR), or other measures to reduce NO_x emissions.

For process boilers/heaters, the control requirements for SO_2 emissions generally require the elimination of burning solids/liquid fuels. For NO_x emissions, the control requirements generally apply to units greater than 40 MMBtu per hour capacity or larger. In many cases, the Consent Decrees establish NO_x emission reduction objectives across several refineries that are owned by the same firm. Therefore, the companies decide which individual boilers/heaters to control and the control techniques to apply.

The Consent Decrees also included enhanced leak detection and repair programs (e.g., reducing the defined leak concentration) and other VOC requirements. The settlements are expected to produce additional SO_2, NO_x, and VOC emissions reductions for flare gas recovery and wastewater operations. The Consent Decrees have various phase-in dates.

Federal Rules: Area Sources

Residential Woodstove NSPS:

On February 3, 2015, the USEPA strengthened its clean air standards for residential wood heaters to make new heaters significantly cleaner and improve air quality in communities where people burn wood for heat. The updates, which are based on improved wood heater technology, strengthen the emissions standards for new woodstoves, while establishing the first ever Federal air standards for several types of previously unregulated new wood heaters, including outdoor and indoor wood-fired boilers (also known as hydronic heaters), and indoor wood-burning forced air furnaces. The rule will not affect existing woodstoves and other wood-burning heaters currently in use in people's homes.

Federal Rules: Onroad Mobile Sources

Heavy Duty Vehicle Standards and Diesel Fuel Sulfur Control[61]:

On July 31, 2000, the USEPA issued a final rule for the first phase of its two-part strategy to significantly reduce harmful diesel emissions from heavy-duty trucks and buses. This rule finalized new diesel engine standards beginning in 2004, for all diesel vehicles over 8,500 pounds. Additional diesel standards and test procedures in this final rule began in 2007. This

[61] For more information, see the USEPA's Office of Transportation and Air Quality web site at http://www.epa.gov/otaq/hd-hwy.htm.

new rule required heavy-duty gasoline engines to meet new, more stringent standards starting no later than the 2005 model year. According to the USEPA, these new standards require gasoline trucks to emit 78 percent less NO_x and hydrocarbons, and diesel trucks to emit 40 percent less NO_x and hydrocarbons, than current models. The second phase of the program required cleaner diesel fuels and even cleaner engines, reducing air pollution from trucks and buses by another 90 percent. The USEPA issued the final rule, to take effect in 2006-2010 on January 18, 2001.[62]

National Low Emission Vehicle Program (NLEV):

The NLEV[63] program required automobile manufacturers to meet more stringent new car standards, starting with the 1999 model year in the OTC states and starting with the 2001 model year in the remainder of the nation except for California. New Jersey committed to participate in the NLEV Program ending with model year 2006, except as provided in 40 CFR. §86.1707. However, if by no later than December 15, 2000, the USEPA did not adopt standards at least as stringent as the NLEV standards for model years 2004, 2005 or 2006, the State's participation in NLEV would extend only until the model year 2004. The USEPA promulgated its Tier 2 new motor vehicle standards commencing with model year 2004 on February 10, 2000. These standards are more stringent than the NLEV standards provided for in 40 CFR Part 86, subpart R. As such, New Jersey's participation in the NLEV program extended through model year 2006, after which New Jersey came under the Federal Tier 2 program.

Tier 1 Vehicle Program:

Pursuant to 42 U.S.C. §7521, the USEPA promulgated regulations which revised the tailpipe/extended useful life standards of the Federal Motor Vehicle Control Program (FMVCP) for light duty vehicles and light duty trucks.[64] These standards, known as Tier 1, were implemented in phases beginning with the 1994 model year. The Tier 1 standards encompassed pollutants previously regulated (that is, carbon monoxide, nitrogen oxides, and particulate matter), as well as the addition of non-methane hydrocarbons (NMHC). The standards themselves are a function of vehicle class, pollutant, useful life, engine cycle, and fuel. The Tier 1 rulemaking also established new intermediate and full useful life[65] levels for light-duty vehicles and light-duty trucks, as well as new vehicle weight classes. The regulation affected petroleum and methanol fueled motor vehicles.

Tier 2 Vehicle Program/Low Sulfur Fuels: On February 10, 2000, the USEPA promulgated rules for its comprehensive Tier2/Low Sulfur Gasoline program.[66] These regulations are designed to treat a vehicle and its fuel as a system, resulting in multiple efforts to reduce highway source emissions. In addition to requiring new tailpipe emissions standards for all passenger vehicles, sport utility vehicles (SUVs), minivans, vans and pick-up trucks, the USEPA simultaneously promulgated regulations to lower the sulfur standard in gasoline. These regulations phased in between 2004 - 2007.

[62] 66 Fed. Reg. 5002 (January 18, 2001).
[63] For more information on NLEV, see USEPA website at http://www.epa.gov/otaq/lev-nlev.htm.
[64] 56 Fed. Reg. 25724 (June 5, 1991).
[65] Useful life is the number of years that the vehicle is expected to be in use.
[66] 65 Fed. Reg. 6698 (February 10, 2000).

Tier 3 Motor Vehicle Emission and Fuel Standards:

On April 28, 2014, the USEPA promulgated Tier 3 motor vehicle emissions and fuel standards.[67] The Tier 3 program is part of a comprehensive approach to reducing the impacts of motor vehicles on air quality and public health. 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 lower gasoline sulfur standard will enable more stringent vehicle emissions standards and will make emissions control systems more effective.

Federal Rules: Nonroad Mobile Sources

Diesel Compression Ignition Engines:

In June 1994, the USEPA promulgated regulations to control VOC, NO_x and carbon monoxide emissions from diesel-powered compression ignition engines at or greater than 50 horsepower (hp) (i.e., bulldozers).[68] These Tier 1 standards phased in from 1996 to 2000. In October 1998, the USEPA promulgated regulations to control VOC, NO_x and carbon monoxide (CO) emissions from diesel-powered compression ignition engines for all engine sizes.[69] This rule includes Tier 1 standards for engines under 50 horsepower (hp) (i.e., lawn tractors), Tier 2 standards for all engine sizes, and more stringent Tier 3 standards for engines rated over 50 hp. The new Tier 3 standards are expected to lead to control technologies similar to those that will be used by manufacturers of highway heavy-duty engines to comply with the 2004 highway engines standards.[70] The new Tier 1 standards were phased in between the years 1999 and 2000, Tier 2 standards between 2001 and 2006, Tier 3 between 2006 and 2008, and Tier 4 standards between 2011 and 2015.

Diesel Marine Engines over 37 KW (Commercial Marine Engines)[71] :

In December 1999, the USEPA promulgated regulations for commercial marine diesel engines over 37 kilowatts (kW), including engines with per cylinder displacement up to 30 liters.[72] This rule established VOC and NO_x emission standards, starting in 2004, for new engines with per cylinder displacement up to 2.5 liters. This rule also established standards in 2007 for engines with per cylinder displacement between 2.5 and 30 liters.[73] The engines covered by this rule are divided into two categories: Category 1: rated power at or above 37 kW - specific displacement of less than 5 liters per cylinder. These engines are primarily found in fast ferries. Category 2: rated power at or above 37 kW - specific displacement greater than or equal to 5, but less than 30 liters per cylinder. These engines are primarily found in tug and towboats.
In February 2003, the USEPA promulgated regulations for commercial marine diesel engines at or above 30 liters per cylinder.[74] This rule established Tier 1 NO_x emission standards to meet the International Maritime Organization (IMO) Annex VI to the International Convention for the

[67] 79 Fed. Reg. 23414 (April 28, 2014).
[68] 59 Fed. Reg. 31306 (June 17, 1994).
[69] 63 Fed. Reg. 56968 (October 23, 1998).
[70] USEPA. Regulatory Announcement: New Emission Standards for Nonroad Diesel Engines. United States Environmental Protection Agency Office of Mobile Sources, EPA420-F-98-034, August 1998.
[71] For more information, see the USEPA's regulatory announcement on Emission Standards for New Commercial Marine Diesel Engines at http://www.epa.gov/otaq/regs/nonroad/marine/ci/fr/f99043.pdf.
[72] 64 Fed. Reg. 73300 (December 29, 1999).
[73] USEPA. Technical Highlights: Organization of Gasoline and Diesel Marine Engine Emission Standards. United States Environmental Protection Agency Office of Mobile Sources, EPA420-F-99-046. December 1999.
[74] 68 Fed. Reg. 9746 (February 28, 2003).

Prevention of Pollution from ships (also called MARPOL) requirements for Category 3 marine diesel engines. These standards apply to new Category 3 marine diesel engines manufactured January 1, 2004 or later. These engines range in size from about 2,500 to 70,000 kilowatts (3,000 to 100,000 horsepower). These are very large marine diesel engines used for propulsion power on ocean-going vessels such as container ships, oil tankers, bulk carriers, and cruise ships.

In April 30, 2010, the USEPA adopted new standards to regulate new Category 3 marine diesel engines which are equivalent to the current MARPOL ANNEX VI standards.[75] These standards add two new tiers of NO_x emission standards and fuel sulfur limits. The Tier 2 standards will begin in 2011 and the Tier 3 standards will begin in 2016. Also, new fuel requirements will generally forbid the production and sale of other fuels above 1,000 ppm sulfur for use in most U.S. waters.

<u>Large Industrial Spark-Ignition Engines over 19 kilowatts</u>:

Spark-ignition nonroad engines are mostly powered by liquefied petroleum gas, with others operating on gasoline or compressed natural gas. These engines are used in commercial and industrial applications, including forklifts, electric generators, airport baggage transport vehicles, and a variety of farm and construction applications.

In November 8, 2002, the USEPA adopted new standards to regulate these engines.[76] The emission standards are two-tiered. The Tier 1 standards, which started in 2004, are based on a simple laboratory measurement using steady-state procedures. The Tier 2 standards starting in 2007 are based on transient testing in the laboratory, which ensures that the engines will control emissions when they operate under changing speeds and loads in the different kinds of equipment.

Also included is an option for manufacturers to certify their engines to different emission levels to reflect the fact that decreasing NO_x emissions tend to increase carbon monoxide emissions (and vice versa). In addition to these exhaust-emission controls, manufacturers must take steps starting in 2007 to reduce evaporative emissions, such as using pressurized fuel tanks. Tier 2 engines are also required to have engine diagnostic capabilities that alert the operator to malfunctions in the engine's emission-control system. Finally, the rule also includes special standards to allow for measuring emissions without removing engines from equipment.

<u>Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder</u>:

In April 1998, the USEPA adopted three sets of emission standards for locomotives, with applicability of the standards dependent on the date a locomotive is first manufactured.[77] The first set of standards (Tier 0) applies to locomotives and locomotive engines originally manufactured from 1973 through 2001, any time they are manufactured or remanufactured. The second set of standards (Tier 1) apply to locomotives and locomotive engines originally manufactured from 2002 through 2004. These locomotives and locomotive engines will be required to meet the Tier 1 standards at the time of original manufacture and at each subsequent remanufacture. The final set of standards (Tier 2) applies to locomotives and locomotive engines originally manufactured in 2005 and later. Tier 2 locomotives and locomotive engines will be required to meet the applicable standards at the time of original manufacture and at each subsequent remanufacture.

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[75] 75 Fed. Reg. 22896 (April 30, 2010).
[76] 67 Fed. Reg. 68241 (November 8, 2002).
[77] 63 Fed. Reg. 18978 (April 16, 1998).

On June 30, 2008, the USEPA adopted more stringent exhaust emission standards for locomotives and marine diesel engines less than 30 liters per Cylinder.[78] The standards include: tightening emission standards for existing locomotives and marine vessels when they are remanufactured; setting near-term engine-out emission standards (Tier 3 standards) for newly-built locomotives and marine diesel engines; and setting longer-term standards (Tier 4 standards) for newly-built locomotives and marine diesel engines that reflect the application of high-efficiency after treatment technology. The USEPA is also proposing provisions to eliminate emissions from unnecessary locomotive idling.

The standards for remanufactured locomotives and marine vessels will take effect as soon as certified remanufacture systems are available (as early as 2008). Tier 3 standards for newly-built locomotive and marine engines would phase in starting in 2009. Tier 4 standards for newly-built locomotives and marine diesel engines would phase in beginning in 2014 for marine diesel engines and 2015 for locomotives.

Recreational Vehicles: Recreational vehicles include snowmobiles, off-highway motorcycles, and all-terrain-vehicles (ATVs). In November 2002, the USEPA adopted new standards to regulate nonroad recreational engines and vehicles.[79] These new engine standards were phased in from 2006 through 2012.

Spark Ignition Engines, Equipment, and Vessels at or below 19 kW (Lawn and Garden and Small Watercraft):

In July 1995, the USEPA promulgated the first phase of its regulations to control emissions from most new handheld and nonhandheld nonroad spark ignition engines that have a gross power output at or below 19 kilowatts.[80] This regulation established VOC and carbon monoxide emission standards beginning in model year 1997[81] for nonroad spark ignition engines that have a gross power output at or below 19 kilowatts. These engines are used principally in lawn and garden equipment, including, but not limited to lawn mowers, leaf blowers, trimmers, chainsaws, and generators.

In October 1996, the USEPA promulgated regulations applicable to new gasoline spark ignition marine engines that established VOC and NO_x standards. These new standards were phased in between the years 1998 to 2006.[82]

In March 1999, the USEPA promulgated Phase 2 regulations to control emissions from new nonroad spark ignition engines.[83] These regulations established tighter VOC and NO_x standards for non-handheld equipment such as lawn mowers and commercial turf equipment. The new standards were phased in between the years 2001 and 2007.

In April 2000, the USEPA promulgated additional Phase 2 regulations to control emissions from new nonroad spark ignition engines.[84] This regulation established tighter VOC, NO_x, and CO standards for handheld equipment such as string trimmers (i.e., weedwhackers), leaf blowers and chainsaws. The new standards were phased in between the years 2002 to 2007 with an allowance for small volume engine manufacturers to meet these standards from 2008 to 2010.

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[78] 73 Fed. Reg. 37096 (June 30, 2008).
[79] 67 Fed. Reg. 68242 (November 8, 2002).
[80] 60 Fed. Reg. 34582 (July 3, 1995).
[81] Ibid; Model year 1997 is defined as “The 1997 model year will run from January 2, 1996 to December 31, 1997.”
[82] 61 Fed. Reg. 52088 (October 4, 1996).
[83] 64 Fed. Reg. 1520715208 (March 30, 1999).
[84] 65 Fed. Reg. 24268 (April 25, 2000).

In October 8, 2008, the USEPA promulgated new rules that would set stricter standards for most lawn and garden equipment and small recreational watercraft.[85,86] Specifically, the proposal would establish new exhaust emission standards that manufacturers are expected to meet using catalytic converters in many types of small watercraft, lawn, and garden equipment. The new standards would apply as early as 2010 to 2011 for watercraft and 2011 to 2012 for most lawn and garden equipment (under 25 horsepower). This proposed rule also includes fuel evaporative standards for all the types of equipment and watercraft covered in the rulemaking to be phased in between 2009 to 2016.

3.3 CAA Required Control Measures: Motor Vehicle Inspection and Maintenance and Stage II Vapor Recovery

3.3.1 Motor Vehicle Inspection and Maintenance Program Certification

In 1974, New Jersey was among the first inspection and maintenance (IM) programs in the nation to implement mandatory emissions testing for motor vehicles, primarily in response to the CAA of 1970. Early generations of this vehicle testing program were basic IM programs that relied for the most part on exhaust emission testing using an idle test, which measured emissions in tailpipe exhaust while the vehicle was at idle. New Jersey's IM program remained largely unchanged, with only minor updates in equipment and test standards, from 1974 until 1999. The CAA Amendments of 1990 Section 182(c)3 for serious areas (182(b)(4) for moderate areas), required that certain areas in serious nonattainment of NAAQS for certain criteria pollutants implement an "enhanced" IM program; later codified in 1992 in USEPA regulations that prescribed the required elements of an enhanced IM program. New Jersey, to which the requirements applied, first promulgated rules to implement an enhanced program in 1995. This was followed by a series of rule amendments that further modified and defined the program. New Jersey vehicles were first subject to testing under the enhanced IM program in December 1999. The program was more than just an idle test, and included such major changes as the dynamometer-based ASM5015 testing and gas cap testing. In 2003, on-board diagnostics (OBD) testing was added for newer vehicles. The IM program is jointly implemented by the Department and the Motor Vehicle Commission (MVC).

There are four categories of vehicles that are subject to the enhanced IM program: light and heavy-duty gasoline-fueled vehicles, and light and heavy-duty diesel-powered vehicles. Within each category are commercial and non-commercial vehicles.

On April 3, 2009 and September 9, 2016, New Jersey adopted amendments to its enhanced IM Program. These amendments were shown to be consistent with New Jersey's SIP and its efforts to meet and/or maintain the 75 ppb ozone NAAQS. The April 3, 2009 amendments were approved by USEPA on March 15, 2012.[87] USEPA proposed approval of the September 9, 2016 amendments on October 6, 2017.[88]

New Jersey certifies that it's rules at N.J.A.C. 7:27-14 and 15, N.J.A.C. 7:27B-4 and B-5 and the Motor Vehicle Commission (MVC) rules at N.J.A.C. 13:20-43, satisfy Federal requirements for an enhanced motor vehicle IM Program for the 2008 75 ppb 8-hour ozone NAAQS.

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[85] 73 Fed. Reg. 59034 (October 8, 2008).
[86] For more information about the proposal, visit USEPA's websites at Lawn and Garden http://www.epa.gov/otaq/equip-ld.htm for lawn and garden equipment and http://www.epa.gov/otaq/marinesi.htm for gasoline boats and personal watercraft.
[87] 77 Fed Reg. 15263 (March 15, 2012)
[88] 82 Fed. Reg. 46742 (October 6, 2017).

3.3.2 Stage II Vapor Recovery Program Certification

New Jersey adopted its first statewide Stage II vapor recovery rules in 1988 based on the California program. California started developing vapor recovery control rules and programs in 1975. The 1990 CAA, sections 182(b)(3), (c), (d), and (e) or 42 U.S.C. 7511a(b)(3), 7511a(c), 7511a(d) and 7511a(e), required Stage II gasoline vapor recovery systems as an emissions control measure in areas that were classified as "moderate", "serious," "severe," and "extreme" nonattainment with the ozone NAAQS (serious and above after 1994.) USEPA approved New Jersey's Stage II rules at N.J.A.C. 7-27-16.3 on March 26, 1991.[89] New Jersey adopted amendments to its Stage II rules which were effective June 2, 2003. USEPA approved those amendments on August 2, 2004.[90]

Vapor recovery systems are installed at gasoline dispensing facilities to control hydrocarbon emissions from gasoline vapors during the delivery and dispensing of gasoline. These systems are comprised of two Stages, Stage I and Stage II (also referred to as Phase I and Phase II). Stage I systems control the emissions of gasoline vapors during the transfer of gasoline from the tanker truck to the gasoline dispensing facility storage tank by returning the vapors back to the truck. Stage II systems are designed to capture gasoline vapors displaced from the vehicle fuel tank during refueling and transport those vapors through the nozzle and vapor return lines back to the storage tank.

The CAA required two types of controls for capturing gasoline vapor during vehicle refueling: Stage II vapor recovery systems, and onboard refueling vapor recovery (ORVR) systems. The purpose of ORVR is to collect gasoline refueling emissions from within the vehicle fuel tank. During refueling, a carbon canister in the vehicle captures the fuel tank vapors and later releases them to the engine for combustion. CAA Section 202(a)(6), 42 U.S.C. 7521(a)(6) requires USEPA to develop standards for ORVR controls on light-duty vehicles and provides for the Phase-in of the ORVR requirement. On April 16, 1994, USEPA promulgated regulations setting standards for and requiring the Phase-in of ORVR controls on new vehicles. Installation of ORVR systems was Phased in over the 1998 to 2006 vehicle model years.

Congress recognized that ORVR and Stage II would eventually become largely redundant technologies, and provided authority to the USEPA to allow states to remove Stage II from their SIPs after the USEPA finds that ORVR is in widespread use. Effective May 16, 2012, the USEPA waived the CAA Stage II requirements after determining that ORVR is in widespread use. However, the widespread use date is not equivalent to a date where there is zero emission impact in every state. In order to remove existing Stage II requirements, states are required to do a state specific demonstration and have a USEPA-approved SIP revision in accordance with the demonstration requirements outlined in the widespread use rule (77 FR 28772, May 16, 2012) and USEPA's 2012 Guidance (Guidance on Removing Stage II Gasoline Vapor Control Programs from State Implementation Plans and Assessing Comparable Measures, EPA-457/B12-001, August 07, 2012). The Department proposed revisions to New Jersey's Stage II rules and SIP on July 3, 2017. This proposal can be found at: http://www.state.nj.us/dep/baqp/sip/siprevs.htm.

New Jersey certifies that it's Stage II vapor recovery rules at N.J.A.C. 7-27-16.3, and any associated proposed amendments and SIP revision, are in accordance with Federal requirements for the 2008 75 ppb 8-hour ozone NAAQS.

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[89] 56 Fed. Reg. 124500 (March 26, 1991)
[90] 69 Fed. Reg. 40321 (August 2, 2004)

Chapter 4 AIR EMISSION INVENTORY

4.1 Regional Modeling Air Emission Inventory

To perform this modeling demonstration, two regional air emission inventories were developed to represent the 2011 base inventory and the 2017 projected future grown and controlled inventory for input in the photochemical model.

The modeling inventories include:

1) Annual county-level emissions for criteria air pollutants and their precursors, NO_x, VOC, CO, PM2.5, PM10, SO_2, NH_3, by emission sector for the State and Local agencies included in the Mid-Atlantic Northeastern Visibility Union (MANE-VU) modeling domain shown in Table 4-1;

2) Hourly emissions for the electric generating unit sector consistent with the USEPA's Clean Air Markets Division (CAMD) for the 2011 base year and projected to 2017 using the ERTAC EGU Projection Tool;

3) Hourly emissions for the onroad sector consistent with USEPA MOVES 2014a and their 2011 v6.2 modeling platform;

4) Temporal allocation profiles, which convert annual emissions to monthly, daily or hourly; The temporal profiles and cross-reference files are consistent with the USEPA's 2011 v6.2 modeling platform, with the exception of the ERTAC EGU, Non-ERTAC IPM EGU, and Non-EGU point sectors;

5) Hourly temporal profiles for the electric generating unit sector consistent with CAMD;

6) Speciation profiles, which are used to disaggregate the total VOC and PM2.5 emissions to the chemical species expected by the air quality model; The speciation and cross-reference files were taken from USEPA's 2011 v6.2 modeling platform and are based on the Speciate 4.4 database;

7) Spatial allocation profiles, which assign fractions of county-total emissions to the model grid cells intersecting the county based on a "surrogate" data type (e.g., population, housing data); The spatial surrogates for the 12 km domain were extracted from the National Grid 12 km U.S. gridding surrogates provided with USEPAs 2011 V6.2 modeling platform;

8) Biogenic emissions calculated using the BEIS v3.6.1 model;

9) Inventories for other Regional Planning Organizations and Canada by state, region and country. These regions include Central States Air Resource Agencies (CENSARA), Lake Michigan Air Directors Consortium/ Midwest Regional Planning Organization (LADCO/ MWRPO) and Southeastern States Air Resource Managers (SESARM).

Further details about the modeling inventories can be found in the "Technical Support Document for the 2011 Ozone Transport Commission /Mid-Atlantic Northeastern Visibility Union Modeling Platform", prepared by the Mid-Atlantic Northeastern Visibility Union (MANE-VU Modeling TSD)) and the Ozone Transport Commission (OTC) and dated November 15, 2016, which is included as Appendix 4-1.

Table 4-1:
States and Regions in the MANE-VU Modeling Domain

REGION	STATE	In Domain
CENSARA	Arkansas	Partial
CENSARA	Iowa	Partial
CENSARA	Louisiana	Partial
CENSARA	Minnesota	Partial
CENSARA	Missouri	Partial
LADCO/MWRPO	Illinois	Yes
LADCO/MWRPO	Indiana	Yes
LADCO/MWRPO	Michigan	Yes
LADCO/MWRPO	Ohio	Yes
LADCO/MWRPO	Wisconsin	Yes
MANE-VU	Connecticut	Yes
MANE-VU	Delaware	Yes
MANE-VU	DC	Yes
MANE-VU	Maine	Yes
MANE-VU	Maryland	Yes
MANE-VU	Massachusetts	Yes
MANE-VU	New Hampshire	Yes
MANE-VU	New Jersey	Yes
MANE-VU	New York	Yes
MANE-VU	Pennsylvania	Yes
MANE-VU	Rhode Island	Yes
MANE-VU	Vermont	Yes
SESARM	Alabama	Partial
SESARM	Georgia	Partial
SESARM	Kentucky	Yes
SESARM	Mississippi	Partial
SESARM	North Carolina	Yes
SESARM	South Carolina	Yes
SESARM	Tennessee	Yes
SESARM	Virginia	Yes
SESARM	West Virginia	Yes

4.1.1 2011 Base Air Emission Modeling Inventory

The base emission inventory year for the attainment demonstration was chosen based on monitoring and meteorological data. Analyses of monitored data and meteorological data concluded that for the MANE-VU region, 2010, 2011 and 2012 were the candidate base years to model for future ozone NAAQS planning. Transport patterns of 2011 ozone events in the region confirmed that using 2011 would be appropriate. Other factors were considered including availability of a USEPA national emission inventory and consistency with the USEPA modeling platform, research data availability, and decisions on modeling base years by USEPA and nearby RPOs. As a result, 2011 was determined to be the best candidate base year for this multi-pollutant modeling platform (Ozone, Regional Haze and PM2.5). More details can be found in the document "Future Modeling Platform Base Year Determination" prepared by the MANE-VU Technical Support Committee October 9, 2013, which is included in Appendix 4-2

The 2011 air emissions modeling inventory was developed for the MANE-VU domain by each state and included portions of the USEPA emissions inventories and modeling platform. The Mid-Atlantic Regional Air Management Association (MARAMA) coordinated development of the regional inventory and quality assured the inventory data. The 2011 emissions for non-MANE-VU Region areas within the modeling domain were obtained from other Regional Planning Organizations for their corresponding areas. The MARAMA Beta2 version of the 2011 base year emission inventory was used in the regional modeling for the MANE-VU region.

A detailed description of the development of the MANE-VU 2011 and 2017 air emissions modeling inventories is included in the "Technical Support Document Emission Inventory Development for 2011 and 2017 for the Northeastern U.S. Beta2 Version", prepared by the Mid-Atlantic Regional Air Management Association (MARAMA) and CSRA International, Inc., and dated July 12, 2017 (MARAMA 2011/2017 TSD). This document can be found in Appendix 4-3 with select document appendices and references. The full document including all appendices and inventory summaries can be found on the MARAMA website at: http://www.marama.org/technical-center/emissions-inventory/2011-2017-beta-regional-emissions-inventory.

Additional details on the development of the New Jersey inventory can be found in Appendices 4-5 through 4-7.

4.1.2 2017 Projection Air Emission Modeling Inventory

The future projection year emission inventory for the attainment demonstration modeling was chosen based on the required attainment date for the 2008 75 ppb 8-hour ozone NAAQS. The Northern NJ-NY-CT Nonattainment Area has an attainment date of no later than July 20, 2018. Since July 20th is in the middle of the 2018 ozone season, attainment must be demonstrated for the last full ozone season. Compliance with the ozone NAAQS will be determined based on three years of data, 2015, 2016, and 2017. Therefore, the future projection year emission inventory selected for the attainment demonstration was 2017.

A detailed description of the development of the MANE-VU 2011 and 2017 air emissions modeling inventories is included in the MARAMA 2011/2017 TSD in Appendix 4-3. Additional details on the development of the New Jersey inventory can be found in Appendices 4-5 through 4-7.

In accordance with Section IV.C.3 (Emission Reduction Credits from Shutdowns and Curtailments) of Appendix S to 40 CFR Part 51, emissions were added to the 2017 projection modeling inventory to account for the potential use of emission offsets. Appendix S allows the use of pre-2011 shutdown and curtailment credits of VOC and NO_x, provided the projected emissions inventory used to develop the attainment demonstration explicitly includes emissions for offsets from such previously shutdown or curtailed emission units. A discussion of offsets in the 2017 projection inventory is included in Appendix 4-8.

4.1.3 Biogenics

Biogenic emission sources are emissions that come from natural sources. Biogenic emissions must be accounted for in photochemical grid modeling, as most types are widespread and ubiquitous contributors to background air chemistry. Biogenic emissions from vegetation and soils are computed using a model that utilizes spatial information on vegetation, land use and environmental conditions of temperature and solar radiation. The model inputs are typically horizontally allocated (gridded) data, and the outputs are gridded biogenic emissions that can be speciated and utilized as input to photochemical grid models. Biogenic emissions for VOCs, NO_x and CO were calculated for input into the modeling. The emissions are based on the USEPA BEIS version 3.61 model and USEPA's 2011 v6.2 modeling platform. This is an update from USEPA's 2011 NEIv2 modeling platform, which used BEIS version 3.60. As discussed further in Chapter 6, significant variations in the modeling were observed with the newer version of BEIS.

More details of how biogenic emissions were estimated using the BEIS 3.61 modeling platform are included in the MANE-VU Modeling TSD in Appendix 4-1 and the MARAMA 2011/2017 TSD in Appendix 4-3.

4.1.4 Modeling Inventory SMOKE Processing

The USEPA Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer (SMOKE) model was used to process the air emissions inventories to prepare them for input into the photochemical model. The purpose of SMOKE (or any emissions processor) is to convert the resolution of the emission inventory data to the resolution needed by an air quality model. Emission inventories are typically available with an annual-total emissions value for each emissions source. The models, typically require emissions data on an hourly basis, for each model grid cell (and perhaps model layer), and for each model species. Consequently, emissions processing involves transforming an emission inventory through temporal allocation, chemical speciation, and spatial allocation, to achieve the input requirements of the model. Additionally, a cross-reference file is needed to assign profiles to the inventory records by SCC, facility, geographic area such as state or county, or some other inventory characteristics. The USEPA provides a starting point for the profiles and cross-reference files as part of their latest modeling platforms. The USEPA has also developed a SMOKE utility program (Gentpro) that estimates temporal profiles for residential wood combustion (RWC), agricultural NH_3 from animals, and other generic (user defined) area sources by relating meteorology to air emission fluxes. Gentpro reads in hourly gridded meteorological data (temperature and wind) from the Meteorology-Chemistry Interface Processor (MCIP) and a gridded spatial surrogate to produce temporal profiles and cross-reference data.

For the MANE-VU Region, the modeling inventories were processed by the NYSDEC using the SMOKE (Version 3.7) model. NJDEP processed the onroad mobile source files through SMOKE-MOVES using the CB05 chemistry. A summary of the emission inventory files by sector pre-SMOKE processing and post-SMOKE processing is shown in Table 4-2. Additional details regarding SMOKE processing can be found in the MANE-VU Modeling TSD in Appendix 4-1.

Table 4-2:
Modeling Inventory Files Pre-SMOKE and Post-SMOKE

BETA2 Inventory Files Pre-Smoke	BETA2 Inventory Files Post-SMOKE
C3 Marine	C3 CMV
Small EGU	EGU-Point
ERTAC EGU	EGU-Point
Ethanol	NonEGU-Point
Point non-IPM	NonEGU-Point
Point oil&gas	NonEGU-Point
Refueling point	NonEGU-Point
Nonroad	Nonroad
Dust	Other Nonpoint-Area
Nonpoint oil&gas	Oil&Gas-Nonpoint
Onroad	Onroad
Agricultural (NH_3)	Other Nonpoint-Area
Agricultural Burning	Other Nonpoint-Area
Dust no precip	Other Nonpoint-Area
Nonpoint	Other Nonpoint-Area
PFCs	Other Nonpoint-Area
Refueling nonpoint	Other Nonpoint-Area
C1C2 Rail	Rail and C1/C2 CMV
Res Wood	Res Wood

4.1.5 Modeling Inventory Data

Details about the regional modeling inventories, including the file names and where they are located can be found in the MANE-VU Modeling TSD, which is included in Appendix 4-1. A summary of the pre-SMOKE New Jersey Modeling Inventory is included in Appendix 4-4.

4.2 Point Source Emission Statement Program Certification

Clean Air Act Section 183(a)(3)(B) requires that states have an emission reporting program called an emission statement program for VOC and NO_x sources for marginal and above classified ozone nonattainment areas. The required state program and associated regulation defines how states obtain emissions data directly from point source facilities and report it to the USEPA.

According to the USEPA 2008 75 ppb 8-hour ozone implementation rule[91], if an area has a previously approved emission statement rule in force for the 1997 ozone NAAQS or the 1-hour ozone NAAQS that covers all portions of the nonattainment area for the 2008 ozone NAAQS, such rule should be sufficient for purposes of the emissions statement requirement for the 2008 ozone NAAQS. The state should review the existing rule to ensure it is adequate and, if it is, may rely on it to meet the emission statement requirement for the 2008 ozone NAAQS. New

[91] 80 Fed. Reg. 12285 (March 6, 2015)

Jersey's emission statement rules at N.J.A.C. 7:27-21 were approved for the 1997 85 ppb 8-hour NAAQS on August 3, 2010.[92]

N.J.A.C. 7:27-21 requires the submission of annual emission statements from major facilities. From these statements, the Department develops reports of emissions of all criteria pollutants and submits them to the USEPA pursuant to the Federal Air Emission Reporting Requirements (AERR) Rule for uploading to the USEPA's National Emission Inventory (NEI).

New Jersey certifies that its rules at N.J.A.C. 7:27-21 satisfy Federal requirements for an emission statement program for the 2008 75 ppb 8-hour ozone NAAQS.

4.3 Ozone Season Air Emission Inventory

The Clean Air Act 42 U.S.C. §7410(a)(2)(F) (Section 110 (a)(2)(F)) requires the submission by states to the USEPA of periodic reports on the nature and amounts of emissions from pollutants with a NAAQS and emissions related data. CAA 42 U.S.C. §§7511a(1), 7511a(3) and 7502 (Sections 182(a)1, 182(a)(3) and 172(c)(3)) require that states submit periodic emission inventories for marginal and above nonattainment areas in accordance with USEPA guidance.

The USEPA periodic emission inventories or National Emissions Inventories (NEI) and the regional modeling inventories are annual county-level emission inventories for criteria air pollutants and their precursors, NO_x, VOC, CO, PM2.5, PM10, SO_2, NH_3. The periodic emission inventory requirements and guidance for ozone nonattainment areas and for Reasonable Further Progress (RFP) demonstrations require peak ozone season (June, July and August for New Jersey) tons per day emissions for ozone precursors VOC, NO_x and CO.[93]

As discussed above, 2011 was chosen as the base emission inventory year for the attainment demonstration and annual modeling inventory. For statewide and regional consistency purposes, 2011 was also chosen as the base year for the Reasonable Further Progress (RFP) demonstration. The USEPA's implementation rule for the 2008 75 ppb 8-hour ozone NAAQS[94] requires that states should use as the baseline year for RFP, the calendar year for the most recently available triennial emission inventory at the time ROP/RFP plans are developed. The New Jersey portion of the Northern NJ-NY-CT Nonattainment Area was designated nonattainment in 2012 and the 2011 regional inventory is the most recently available triennial emission inventory, therefore, 2011 was chosen as the base year.

New Jersey submitted a full annual and seasonal 2011 emission inventory for all criteria pollutants in a State Implementation Plan dated June 11, 2015.[95] The USEPA proposed to approve the 2011 inventory portion of this SIP on April 10, 2017.[96] Revisions to the 2011 base emission inventory have been conducted and are included in the regional modeling inventory and in this SIP for the New Jersey portion of the Northern NJ-NY-CT ozone Nonattainment Area emissions inventory. More details on these revisions are included in Appendix 4-5.

As discussed above, the future projection year emission inventory for the attainment demonstration modeling was chosen based on the required attainment date for the 2008 75 ppb

[92] 75 Fed. Reg. 45483 (August 3, 2010)
[93] Draft Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, USEPA, December 2016
[94] 80 Fed. Reg. 12285 (March 6, 2015)
[95] State Implementation Plan for the 75 ppb 8-Hour Ozone National Ambient Air Quality Standard (NAAQS) Reasonably Available Control Technology (RACT) Determination, 2011 Periodic Emission Inventory, and 8-Hour Carbon Monoxide NAAQS Maintenance and Monitoring Plan, New Jersey Department of Environmental Protection, June 11, 2015.
[96] 82 Fed. Reg. 17166 (April 10, 2017)

8-hour ozone NAAQS. The Northern NJ-NY-CT Nonattainment Area has an attainment date of no later than July 20, 2018. Since July 20th is in the middle of the 2018 ozone season, attainment must be demonstrated for the last full ozone season. Compliance with the ozone NAAQS will be determined based on three years of data, 2015, 2016, and 2017. Therefore, the future projection year emission inventory selected for the attainment demonstration, and corresponding RFP demonstration, was 2017. As discussed in more detail in Chapter 5, no additional future projection year emission inventories were required for the RFP demonstration.

In order to calculate a future projection inventory, the base inventory emissions are grown based on the estimated future activity of the source and then reduced to account for the benefits achieved from any applicable Federal or State control measures between the base and future year. The starting inventory for the projections is the 2011 peak ozone season or summer tons per day emission inventories for VOC, NO_x, and CO. The projected emission inventories are "grown" from the 2011 actual emission inventory and then "controlled".

The peak ozone season projection inventories for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area and their methodologies are discussed in detail in Appendices 4-5 to 4-7. Stationary source (point and area) projection inventories are discussed in Appendix 4-5. The 2017 nonroad mobile source projection inventory is discussed in Appendix 4-6. The 2017 onroad mobile source projection inventory is discussed in Appendix 4-7.

A summary of the 2011 and 2017 peak ozone season emission inventories for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area is shown in Tables 4-3 through 4-5. The peak ozone season air emission inventories for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area show overall decreases in VOC, NO_x and CO from 2011 to 2017. VOC emissions are estimated to decrease by 51 summer tpd or 14 percent. NO_x emissions are estimated to decrease by 118 summer tpd or 31 percent. CO emissions are estimated to decrease by 194 summer tpd or 10 percent. The largest decreases of VOC, NO_x and CO are in the onroad mobile source sector.

Table 4-6 summarizes the control measures in place between 2011 and 2017 and their emission reductions or benefits. Figures 4-1 and 4-2 shows a summary of the New Jersey statewide emission inventory trends VOC and NO_x in annual tons from 2002 to 2017.

Table 4-3:
VOC Inventory Summary for 2011 and 2017 by County and Sector
New Jersey Portion of the Northern New Jersey-New York-Connecticut Nonattainment Area

County	VOC Emissions (summer tons/day)											
	Point		Area		Onroad		Nonroad		County Totals		Change	Percent Change
	2011	2017	2011	2017	2011	2017	2011	2017	2011	2017	2011-2017	2011-2017
Bergen	1.46	1.41	25.04	23.96	12.29	7.50	14.41	10.19	53.20	43.07	-10.13	-19%
Essex	2.65	1.60	21.68	20.82	7.40	5.19	6.43	5.21	38.16	32.82	-5.34	-14%
Hudson	3.12	2.85	15.75	15.14	4.31	2.92	3.94	3.67	27.11	24.59	-2.53	-9%
Hunterdon	0.16	0.20	4.26	4.04	2.28	1.53	3.09	2.52	9.79	8.28	-1.50	-15%
Middlesex	16.86	15.86	25.02	23.89	10.38	7.29	9.19	6.94	61.46	53.98	-7.47	-12%
Monmouth	0.43	0.40	18.98	18.13	8.76	5.91	9.60	8.20	37.76	32.65	-5.12	-14%
Morris	0.58	0.54	15.63	15.03	7.07	4.57	9.08	7.43	32.36	27.57	-4.78	-15%
Passaic	0.90	0.85	14.38	13.82	5.27	3.47	5.07	4.01	25.62	22.15	-3.47	-14%
Somerset	0.96	0.93	10.34	9.90	4.48	2.90	6.21	4.62	21.98	18.36	-3.62	-16%
Sussex	0.14	0.14	4.45	4.27	1.96	1.35	4.07	3.34	10.62	9.10	-1.51	-14%
Union	3.70	3.75	16.89	16.09	6.90	4.59	5.96	4.38	33.45	28.80	-4.65	-14%
Warren	0.41	0.39	3.96	3.79	1.83	1.48	2.32	1.79	8.52	7.44	-1.08	-13%
Totals	**31.36**	**28.93**	**176.39**	**168.89**	**72.91**	**48.69**	**79.38**	**62.31**	**360.03**	**308.83**	**-51.20**	**-14%**

Table 4-4:
NO_x Inventory Summary for 2011 and 2017 by County and Sector
New Jersey Portion of the Northern New Jersey-New York-Connecticut Nonattainment Area

County	NOx Emissions (summer tons/day)											
	Point		Area		Onroad		Nonroad		County Totals		Change	Percent Change
	2011	2017	2011	2017	2011	2017	2011	2017	2011	2017	2011-2017	2011-2017
Bergen	3.64	4.18	3.48	3.53	28.31	14.61	14.54	9.94	49.98	32.26	-17.71	-35%
Essex	12.07	4.94	2.81	2.84	17.71	10.85	15.28	13.62	47.88	32.25	-15.63	-33%
Hudson	17.00	11.00	2.07	2.10	9.17	5.19	14.09	9.69	42.34	27.98	-14.36	-34%
Hunterdon	6.23	9.45	0.49	0.46	8.54	4.89	3.52	2.45	18.78	17.26	-1.53	-8%
Middlesex	19.08	15.79	3.03	3.08	27.80	17.88	12.65	8.25	62.57	45.01	-17.56	-28%
Monmouth	0.58	0.60	2.15	2.18	17.51	9.74	11.54	8.81	31.78	21.33	-10.45	-33%
Morris	0.98	0.99	2.20	2.17	18.69	10.17	7.27	4.86	29.13	18.20	-10.93	-38%
Passaic	0.27	0.26	1.62	1.63	10.64	5.77	4.89	3.41	17.42	11.08	-6.35	-36%
Somerset	1.45	1.48	1.36	1.37	12.70	6.93	5.85	3.87	21.36	13.66	-7.71	-36%
Sussex	0.15	0.15	0.54	0.48	3.28	1.75	2.19	1.59	6.15	3.97	-2.18	-35%
Union	9.01	8.95	1.91	1.92	18.23	10.00	11.77	8.56	40.91	29.43	-11.48	-28%
Warren	1.78	1.75	0.41	0.38	7.13	5.44	1.56	1.06	10.88	8.63	-2.25	-21%
Totals	**72.25**	**59.56**	**22.07**	**22.15**	**179.71**	**103.22**	**105.15**	**76.11**	**379.18**	**261.05**	**-118.14**	**-31%**

Table 4-5:
CO Inventory Summary for 2011 and 2017 by County and Sector
New Jersey Portion of the Northern New Jersey-New York-Connecticut Nonattainment Area

County	CO Emissions (summer tons/day)											
	Point		Area		Onroad		Nonroad		County Totals		Change	Percent Change
	2011	2017	2011	2017	2011	2017	2011	2017	2011	2017	2011-2017	2011-2017
Bergen	1.49	1.40	3.47	3.50	150.73	109.05	198.37	187.86	354.06	301.81	-52.26	-15%
Essex	12.05	2.56	2.96	3.00	83.64	71.54	84.87	81.48	183.52	158.58	-24.94	-14%
Hudson	6.64	3.67	2.21	2.27	44.87	37.29	41.10	46.63	94.83	89.85	-4.98	-5%
Hunterdon	2.62	4.21	1.00	1.00	25.58	24.03	37.27	34.44	66.47	63.67	-2.80	-4%
Middlesex	22.30	16.13	3.59	3.61	127.08	121.14	132.73	124.00	285.69	264.89	-20.80	-7%
Monmouth	0.80	0.82	2.45	2.51	101.50	90.99	114.31	113.82	219.07	208.14	-10.92	-5%
Morris	0.42	0.37	2.28	2.30	88.12	73.15	121.29	111.55	212.10	187.37	-24.74	-12%
Passaic	0.17	0.16	1.74	1.72	59.98	47.75	62.20	59.26	124.10	108.90	-15.20	-12%
Somerset	0.79	0.70	1.46	1.48	50.39	42.01	90.37	82.69	143.02	126.87	-16.14	-11%
Sussex	0.40	0.43	0.85	0.84	19.68	16.94	28.70	27.45	49.63	45.66	-3.97	-8%
Union	2.85	2.81	2.05	2.04	79.95	65.69	81.39	75.46	166.25	146.00	-20.24	-12%
Warren	0.74	0.74	1.04	1.03	19.64	24.41	19.42	17.53	40.84	43.70	2.87	7%
Totals	**51.28**	**33.98**	**25.09**	**25.31**	**851.17**	**723.97**	**1,012.03**	**962.18**	**1,939.57**	**1,745.45**	**-194.13**	**-10%**

<u>Table 4-6</u>:
Projected Emissions and Control Measure Benefits Summary
New Jersey Portion of Northern New Jersey-New York-Connecticut Nonattainment Area

Federal or State	Control Measure	New Jersey Administrative Code	EPA Approval	Pollutants	2011 Inventory (summer tpd)		2017 Projection Inventory (summer tpd)	
					VOC	**NOx**	**VOC**	**NOx**
Non-EGU Point Sources								
Non-EGU Point Source Control Measure Benefits, post 2011								
State	Glass Manufacturing	7:27-19.10	08/03/10	NOx	NA	NA	NA	NA
State	Low Sulfur Fuel Oil	7:27-9	01/03/12	PM, SO2, NOx	NA	NA	NA	0.08
State	Petroleum Storage	7:27-16.2	08/03/10	VOC	NA	NA	0.62	NA
State	Permitting/Nonattainment New Source Review (NNSR)	7:27-8,18, 22	NA	All	NA	NA	NQ	NQ
Federal	Boiler/Process Heaters NESHAP	NA	NA	All	NA	NA	0.00	0.00
Federal	Natural Gas Turbine NSPS	NA	NA	NOx	NA	NA	NA	0.23
Federal	Process Heater NSPS	NA	NA	NOx	NA	NA	NA	0.00
Federal	RICE NESHAP	NA	NA	All	NA	NA	0.10	0.02
Federal	RICE NSPS	NA	NA	NOx, CO	NA	NA	NA	0.37
Federal	Refinery Consent Decree: ConocoPhillips	NA	NA	NOx	NA	NA	NA	0.17
Total Non-EGU Point Source Control Measure Benefits, post 2011					NA	NA	**0.73**	**0.87**
Non-EGU Point Source Emissions, Growth Only					NA	NA	**28.50**	**26.62**
NON-EGU Point Source Emissions Grown and Controlled					**27.58**	**25.74**	**27.78**	**25.75**
EGU Point Sources								
EGU Point Source Control Measure Benefits, post 2011								
State	EGU: BL England ACO (Note 1)	NA	NA	NOx, PM, SO2	NA	NA	NA	NA
State	EGU: Coal-fired Boilers, Oil and Gas Fired Boilers (Note 2)	7:27-4.2, 10.2, 19.4	08/03/10	NOx, PM, SO2	NA	NA	2.94	14.19
State	EGU: High Electric Demand Day (HEDD) (Note 2)	7:27-19.5	08/03/10	NOx	NA	NA		
Federal	EGU: CSAPR	NA	NA	NOx	NA	NA	NQ	NQ
Federal	EGU: Mercury and Air Toxics Standards (MATS), Coal- and oil-fired	NA	NA	PM, SO2, NOx	NA	NA	NQ	NQ
Total EGU Point Source Control Measure Benefits, post 2011					NA	NA	**2.94**	**14.19**
EGU Point Source Emissions Grown and Controlled					**3.78**	**46.51**	**1.16**	**33.81**
Area Sources								
Area Source Control Measures Benefits, post 2011								
State	Low Sulfur Fuel Oil	NJAC 7:27-27.9	1/3/2012	SO_2, NOx	NA	NA	NA	0.66
State	Portable Fuel Containers	NJAC 7:27-24	7/22/10	VOC	NA	NA	6.80	NA
Federal	Boiler/Process Heaters NESHAP	NA	NA	NOx, VOC	NA	NA	0.02	0.13
Federal and State	Refueling	NA	NA	VOC	NA	NA	0.96	0.00
Federal	Residential Woodstove NSPS	NA	NA	PM, NOx, CO, VOC	NA	NA	0.02	0.00
Total Area Source Benefits, post 2011					NA	NA	**7.80**	**0.66**
Area Source Emissions Grown and Controlled					**176.39**	**22.07**	**168.89**	**22.15**

Table 4-6:
Projected Emissions and Control Measure Benefits Summary
New Jersey Portion of Northern New Jersey-New York-Connecticut Nonattainment Area

Federal or State	Control Measure	New Jersey Administrative Code	EPA Approval	Pollutants	2011 Inventory (summer tpd)		2017 Projection Inventory (summer tpd)	
					VOC	**NOx**	**VOC**	**NOx**
Onroad Sources								
Onroad Source Control Measures								
State	IM: Diesel Smoke Cutpoint	NJAC 7:27-14	Pending	All	NA	NA	NQ	NQ
State	New Jersey Low Emission Vehicle (LEV) Program	NJAC 7:27-29	2/13/2008	All	NA	NA	Note 3	Note 3
Federal	Heavy-Duty Vehicle Standards and Diesel Fuel Sulfur Control	NA	NA	All	NA	NA	Note 3	Note 3
Federal	National Low Emission Vehicle Program (NLEV)	NA	NA	All	NA	NA	Note 3	Note 3
Federal	Tier 1, 2 and 3 Vehicle Program	NA	NA	All	NA	NA	Note 3	Note 3
Total Onroad Control Measure Benefits, post 2011					NA	NA	**24.22**	**76.49**
Onroad Emissions, Grown and Controlled					**72.91**	**179.71**	**48.69**	**103.22**
Nonroad Sources								
Nonroad Source Control Measures								
Federal	Diesel Compression Ignition Engines	NA	NA	All	NA	NA	Note 3	Note 3
Federal	Diesel Marine Engines over 37 kW	NA	NA	All	NA	NA	Note 3	Note 3
Federal	Large Industrial Spark-Ignition Engines over 19 kW (>50 hp)	NA	NA	All	NA	NA	Note 3	Note 3
Federal	Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder	NA	NA	All	NA	NA	Note 3	Note 3
Federal	Recreational Vehicles (Snowmobiles, Off-road Motorcycles, All-terrain Vehicles)	NA	NA	All	NA	NA	Note 3	Note 3
Federal	Spark Ignition Engines, Equipment, and Vessels at or below 19 kW (Lawn and Garden and Small Watercraft)	NA	NA	All	NA	NA	Note 3	Note 3
Total Nonroad Control Measure Benefits, post 2011					NA	NA	**19.12**	**28.77**
Nonroad Emissions, Grown and Controlled					**79.38**	**105.15**	**62.31**	**76.11**
All Sectors								
TOTAL BENEFITS, post 2011					NA	NA	**54.81**	**120.98**
TOTAL EMISSIONS, Grown and Controlled					**360.03**	**379.18**	**308.82**	**261.05**

Notes:
NA = Not Applicable
NQ = Not Quantified, not included in the benefit total
1. Benefits from the B.L England ACO are in New Jersey's southern nonattainment area
3. Included in total, not quantified individually
All = NOx, VOC, CO, PM2.5, PM10

Figure 4-1:
New Jersey Statewide Volatile Organic Compound Emission Trend 2002-2017
Tons Per Year

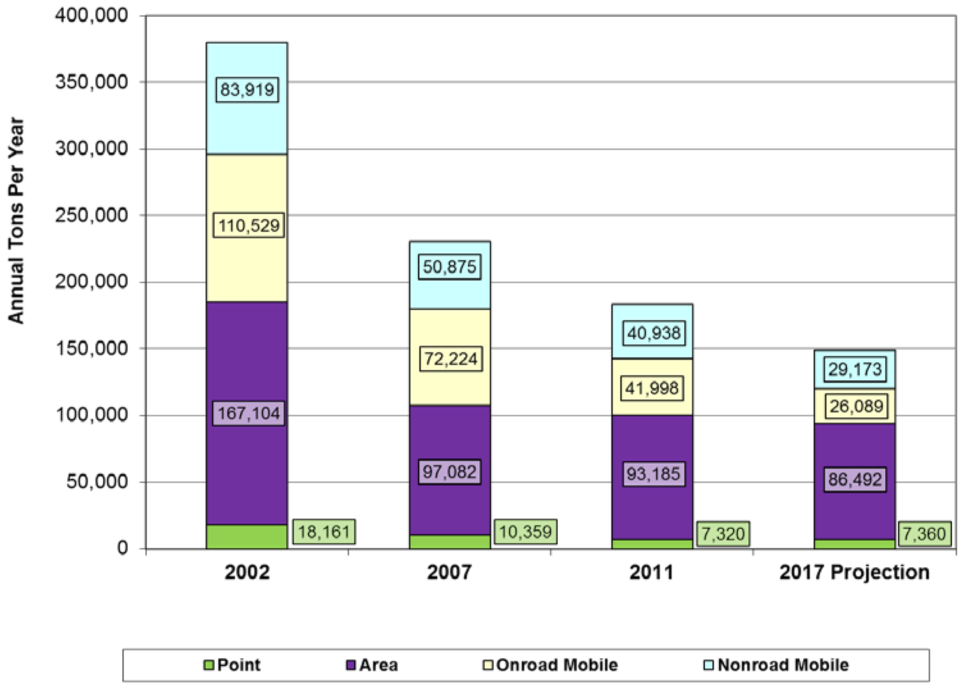
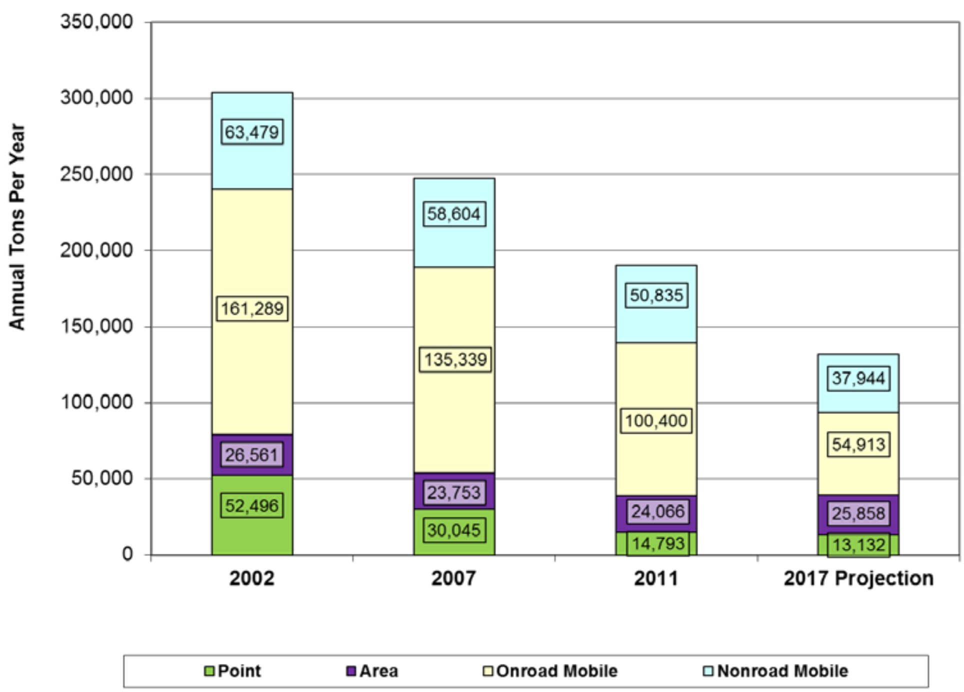


Figure 4-2:
New Jersey Statewide Nitrogen Oxides Emission Trend 2002-2017
Tons Per Year



Some emission calculation methodology changes in each emission inventory should be noted when evaluating trends. For the onroad sector, emissions were calculated with a new USEPA model (MOVES) in 2007, 2011 and 2017, which was different than the model used for the 2002 inventory (MOBILE6). The new model results in higher NO_x emission estimates, than those in 2002. USEPA Residential wood burning methodologies and calculations changed for each of the inventories shown, resulting in significantly different results, lower in 2007 and higher again in 2011. This would primarily affect annual trends, not summer day trends. There are also known issues with the USEPA county distribution of the statewide residential wood burning emissions. Wildfires are not included in the trends graphs, because they are considered events and are inconsistent from year to year.

There has been a significant statewide annual decrease of VOC and NO_x emissions from 2002 to 2017. There has been a 60 percent statewide decrease of VOC emissions in New Jersey from 2002 to 2017. There has been a 57 percent statewide decrease of NO_x emissions in New Jersey from 2002 to 2017.

VOC decreases were achieved in all sectors due to motor vehicle fleet turnover, Federal new engine standards for onroad and off road vehicles and equipment, the National and State low emission vehicle programs, area source rules such as consumer products, portable fuel containers, paints, autobody refinishing, asphalt paving applications, and solvent cleaning operations, and point source controls such as refinery consent decrees.

NO_x decreases were achieved in the onroad sector due to motor vehicle fleet turnover and the National and State low emission vehicle programs, and in the point source sector due primarily to the NO_x budget program for power plants, power plant and refinery consent decrees and New Jersey's high electric demand day and multi-pollutant power plant rules. NO_x decreases were achieved in the nonroad sector due to new engine standards for nonroad vehicles and equipment.

Chapter 5 REASONABLE FURTHER PROGRESS (RFP)

5.1 RFP Introduction

The CAA requires nonattainment areas to demonstrate continued progress to attain the ozone standard. The 2015 75 ppb 8-Hour Ozone Implementation Rule[97] defines reasonable further progress (RFP) as the emissions reductions required under CAA Section 172(c)(2), and contains requirements and updated guidance on how to demonstrate RFP for the 75 ppb standard. As discussed in the 2015 Implementation Rule, areas with an approved 1-hour or 1997 85 ppb 8-hour ozone NAAQS 15 percent VOC Rate of Progress (ROP) plan that are classified as Moderate or higher, such as New Jersey, shall submit a SIP revision that:

A. Provides for a 15 percent emission reduction from the baseline year within six years after the baseline year;
B. Provides for an additional emissions reduction of three percent per year from the end of the first six years up to the beginning of the attainment year if a baseline year earlier than 2011 is used; and
C. Relies on either NO_x or VOC emissions reductions (or a combination) to meet the requirements.

For the 2008 75 ppb 8-hour ozone NAAQS, the USEPA is recommending that states use as the baseline year for RFP, the calendar year for the most recently available triennial emission inventory at the time the RFP plan is are developed. In the case of areas designated nonattainment in 2012, this translates to 2011. They also allow an alternate year to be used. For a multistate nonattainment area, all states associated with the nonattainment area must consult and agree on the same year to use as the baseline year for RFP. New Jersey and the other states in the Northern NJ-NY-CT nonattainment year are using 2011 as the baseline year for RFP.

The RFP demonstration for the Northern NJ-NY-CT nonattainment area must show an emission reduction of VOC and/or NO_x of 15 percent from the baseline of 2011 to the future projection year of 2017. The 2015 75 ppb 8-Hour Ozone Implementation Rule requires that the creditable emission reductions for fixed percentage reduction RFP must be obtained from sources within the nonattainment area, a departure from previous requirements. Also, different from previous requirements, states no longer have to perform emission reduction calculations for the following four types of pre-1990 non-creditable control measure emission reductions listed under CAA section 182(b)(1)(D)(i) for exclusion from the RFP analysis:

1. Federal Motor Vehicle Control Program (FMVCP) tailpipe and evaporative standards applicable as of January 1, 1990;
2. Federal regulations limiting the Reid Vapor Pressure (RVP) of gasoline in ozone nonattainment areas applicable as of June 15, 1990;
3. State regulations correcting deficiencies in reasonably available control technology (RACT) rules; and
4. State regulations establishing or correcting inspection and maintenance (IM) programs for onroad vehicles.

In addition, CAA Sections 172(c)(9) and 182(c)(9) and the 2015 75 ppb 8-Hour Ozone Implementation Rule require that the SIPs for all 8-hour ozone nonattainment areas include contingency measures for RFP. Contingency measures are additional controls needed to further reduce emissions in the event an area fails to meet a RFP milestone or fails to attain by its attainment date. These contingency measures must be fully adopted rules or measures that

[97] 80 Fed. Reg. 12316 (March 6, 2015).

are ready for implementation quickly without further action by the State or the USEPA upon failure to meet a RFP milestone or reach attainment. For this attainment demonstration, the RFP milestone year and the attainment year are the same. Contingency measures for RFP and attainment for the New Jersey portion of the Northern NJ-NY-CT nonattainment area are discussed in Chapter 9.

This chapter describes the methodologies and calculations used to estimate RFP for 2017, utilizing a base year inventory of 2011.

Background

The USEPA uses the term ROP as well as RFP for clarity between requirements. The CAA defines RFP as “such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date” and does not use the term ROP. For clarity, the USEPA defined ROP in their October 1992 Guidance[98] as “The 15 percent VOC emission reduction required by 1996” and the SIP revision as the “15 Percent ROP Plan”. They further defined the post-1996 requirement in the 1992 Guidance and in their February 1994 ROP Guidance,[99] as the “Post-1996 ROP Plan”, which describes the requirement for three percent VOC (or NOx) emissions reductions averaged over each consecutive 3-year period from November 15,1996 until the attainment date.

In the March 6, 2015 Ozone Implementation Rule for the 75 ppb 8-hour ozone standard ROP is defined as “the15 percent progress reductions in VOC emissions over the first six years required under CAA section 182(b)(1).” Also in the 2015 Implementation Rule, RFP is defined as “both the emissions reductions required under CAA Section 172(c)(2), which USEPA interprets to be an average three percent per year emissions reductions of either VOC or NO_x and CAA Sections 182(c)(2)(B) and (c)(2)(C) and the 15 percent reductions over the first six years of the plan and the following three percent per year average under § 51.1110.”

5.2 RFP Calculations

This section describes the calculations performed to determine compliance with RFP requirements. The RFP calculations are shown in Table 5-1 for the New Jersey portion of the Northern NJ-NY-CT nonattainment area. The steps described below correspond with the rows in Table 5-1. The calculation steps are based on USEPA’s 1992 and 1994 guidance documents, adjusted to account for updated requirements in the 2015 ozone implementation rule.

<u>Step 1</u>: Calculate the 2011 base year anthropogenic emission inventory for the peak ozone season (tons per summer day.) This inventory does not include biogenic emissions. The base year inventory is developed as discussed in Chapter 4.

<u>Step 2</u>: Calculate the RFP emission reduction required (percent). As discussed above, NJDEP is required to reduce VOC or NO_x emissions by 15 percent from 2011 to 2017. An VOC reduction of 10 percent was assumed for the calculations, with the balance of 5 percent assigned to NOx.

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98 USEPA. Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 percent Rate of Progress Plans. United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-452/R-92-005, October 1992.

99 USEPA. Guidance on the Post-1996 Rate-of-Progress Plan and the Attainment Demonstration. United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-452/R-93-015, January 1994, Corrected Version as of February18,1994.

Step 3: Show RFP required VOC and NO_x emission target levels (tons per summer day) by reducing the 2011 base year emissions in Row 1 by the percent reduction in Row 2.

Steps 4 through 8: The projected (grown and controlled) VOC and NO_x inventories for the 2017 peak ozone season (tons per summer day) are presented by emission sector in Rows 4 through 7 and totaled in Rows 8. The inventories are derived as discussed in Chapter 4.

Step 9: The difference between the RFP target emissions in Row 3 and the estimated future year emissions in Row 8 is calculated.

Steps 10 and 11: The VOC and NO_x projected emission reductions from the 2011 base year inventory are presented in tons per summer day in Row 10 and as a percentage of the 2011 base year inventory in Row 11.

Step 12: The RFP % emission reductions achieved is calculated as the sum of the VOC and NOx emission reductions from the 2011 base year inventory.

Table 5-1:
Rate of Further Progress
New Jersey Portion of Northern NJ-NY-CT Nonattainment Area

ROW		2011 Inventory		2017 Projected	
		VOC tpd*	NOx tpd*	VOC tpd*	NOx tpd*
1	**2011 Base Year Emissions**	360	379		
2	**RFP % Reduction Required (VOC+NOx=15%)**			**10%**	**5%**
3	**RFP Target Emissions**			**324**	**360**
4	Point Emissions	31	72	29	60
5	Area Emissions	176	22	169	22
6	Onroad Emissions	73	180	49	103
7	Nonroad Emissions	79	105	62	76
8	**Total Future Year Emissions**			**309**	**261**
9	**Difference From Target Emissions**			**-15**	**-99**
10	**Emission Reductions Achieved**			-51	-118
11	**% Emission Reductions Achieved**			14%	31%
12	**RFP % Emission Reductions Achieved (VOC + NOx)**			**45%**	

5.3 RFP Summary and Conclusions

As shown in Table 5-1, the projected percent reduction of VOC and NO_x from the 2011 baseline is 45 percent in 2017, which exceeds the required 15 percent, for the New Jersey portion of the Northern NJ-NY-CT nonattainment area. The estimated future year emissions are lower than the RFP target emissions. Therefore, the New Jersey portion of the Northern NJ-NY-CT nonattainment area meets and exceeds the 2017 RFP requirement.

Chapter 6 ATTAINMENT DEMONSTRATION

6.1 Introduction

This chapter summarizes the results of the regional photochemical modeling for ozone conducted by the NJDEP and the Ozone Transport Commission (OTC) Modeling Centers, and other data and factors influencing air quality that are not included in the modeling. Attainment demonstration conclusions incorporate regional air quality monitoring, control measures and, air emission inventories discussed in previous chapters as well as transport.

USEPA's "Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze", dated December 2014 (hereafter referred to as the USEPA 2014 Modeling Guidance) recommends that the following be included in the technical documentation:

- Overview of the air quality issue being considered including historical background;
- List of the planned participants in the analysis and their expected roles;
- Schedule for completion of key steps in the analysis and final documentation;
- Description of the conceptual model for the area;
- Description of periods to be modeled, how they comport with the conceptual model, and why they are sufficient;
- Models to be used in the demonstration and why they are appropriate;
- Description of model inputs and their expected sources (e.g., emissions, met, etc.);
- Description of the domain to be modeled (expanse and resolution);
- Process for evaluating base year model performance (meteorology, emissions, and air quality) and demonstrating that the model is an appropriate tool for the intended use;
- Description of the future years to be modeled and how projection inputs will be prepared;
- Description of the attainment test procedures and (if known) planned weight of evidence;
- Expected diagnostic or supplemental analyses needed to develop weight of evidence analyses.

These items are discussed in more detail in the Technical Support Document for the 2011 Ozone Transport Commission/ Mid-Atlantic Northeastern Visibility Union Modeling Platform, November 5th, 2016, (MANE-VU Modeling TSD) in Appendix 4-1.

6.2 The Conceptual Model – The Nature of the Ozone Air Quality Problem in the Northeast

As recommended in the USEPA 2014 Modeling Guidance, the first step in developing an attainment demonstration should be to construct a conceptual description of the problem that is being addressed. Conceptual descriptions, which are also referred to as conceptual models, are comprehensive summaries of the "state of the knowledge" regarding the influence of emissions, meteorology, transport, and other relevant atmospheric processes on air quality in the area.

As discussed in the MANE-VU Modeling TSD, the interaction of meteorology, chemistry, and topography lead to a complex process of ozone formation and transport. Ozone episodes in the eastern United States often begin with an eastern moving large high-pressure area from the Midwest to the Ozone Transport Region (OTR), which collects pollution from stationary and mobile sources as it moves. When the air mass settles in the OTR, sometimes even for days, local pollution is added. The stagnant air mass under cloudless sky would exacerbate ozone levels, since it allows sunlight more time to increase reactions of ozone precursors (NO_x and VOCs) and promote ozone formation. Additional pollution can be introduced to the systems from the Southeast through the nocturnal low-level jet, a fast-moving air mass that resides below the nocturnal boundary layer. This highly polluted air can also be kept from dissipating along the coast due to bay and sea breezes that push pollution back to shore.

Some ozone is also natural, or transported internationally leading to ozone that is not considered relatable. This United States Background ozone in the Eastern United States is in the range of 30 to 35 ppb though it can be as high as 50 ppb in the Intermountain West[100].

Another complexity involves the nonlinear relationship between NO_x and VOC levels and ozone formation. Areas, such as the majority of the landscape in the OTR, that have extensive forests that produce high levels of isoprene and other VOCs during the summer month achieve the best ozone reduction through reductions in regional NO_x, but dense urban areas such as New York City that lack natural VOC production can be VOC limited, and in some cases NO_x reductions increase ozone levels due to less NO_x being available to destroy already formed ozone through titration.

To address this great level of complexity that occurs when evaluating the conceptual model of ozone, MANE-VU based the modeling exercise on the conceptual model as described in "The Nature of the Ozone Air Quality Problem in the Ozone Transport Region: A Conceptual Description (Hudson et al. October 2006)."

6.3 The Contribution of Transport to Nonattainment

6.3.1 Background

In addition to local sources of air pollution, air pollution transported hundreds of miles from distant sources in and outside the OTR, contribute to ozone pollution in New Jersey and its multi-state nonattainment areas. Transport of air pollution is an important factor in understanding how ground-level ozone is produced and what geographical areas influence ozone production. During ozone events, high levels of ozone extend beyond the OTR's borders and impact over 200,000 square miles across the eastern United States.

There are three meteorological mechanisms that contribute to the transport of air pollution into and within the Ozone Transport Region: ground level transport, transport by the nocturnal low-level jet, and westerly transport aloft.

Ground-level transport is the result of interaction between the broad meteorological feature and local effects, such as sea breeze and the Appalachian lee side trough.

Transport within the Ozone Transport Region can also occur via the nocturnal low-level jet that forms late at night or in the very early morning hours. The nocturnal low-level jet is a regional scale phenomenon of higher wind speeds that often forms a few hundred meters above the ground just above the stable nocturnal boundary layer. This phenomenon is a result of the differential heating of the air between the Appalachian Mountains and the Atlantic Ocean. The land, sea, mountain, and valley breezes can *selectively* affect relatively local areas and they play a vital role in drawing ozone-laden air into some areas, such as coastal areas, that are far removed from major emission source regions. The nocturnal low-level jet can transport ozone that formed within the Ozone Transport Region to other areas, can transport ozone formed outside the region into the Ozone Transport Region or can move locally formed ozone within the confines of the Ozone Transport Region. It extends the entire length of the Northeast corridor from Virginia to Maine, and has been observed as far south as Georgia.

[100] USEPA 2014b, "Policy Assessment for the Review of the O3 National Ambient Air Quality Standards." Research Triangle Park, NC

Finally, westerly transport aloft is dominated by the anti-cyclonic flow around a high-pressure system, which can lead to transport of an ozone reservoir, created by emissions in areas that lie outside the Ozone Transport Region, into the Ozone Transport Region. Local emissions within the Ozone Transport Region add to the polluted air mixing down from above that arrived from more distant locations.

6.3.2 Transport CAA Section 110 and CSAPR

CAA Section 110(a)(2)(D)(i) (or 42 U.S.C. § 7410(a)(2)(D)(i)), requires that each state's SIP (also referred to as the Good Neighbor SIP, which is a part of the Infrastructure SIP) contain adequate provisions prohibiting any source, or other type of emissions activity, within the State from emitting any air pollutants in amounts that will:

> "Contribute significantly to nonattainment of the National Ambient Air Quality Standards (NAAQS) for areas in another state or interfere with the maintenance of the NAAQS by another state."

On October 17, 2014, the NJDEP submitted a Multi-Pollutant Infrastructure SIP revision to USEPA, which addressed the requirements of CAA Section 110(a)(2)(D)(i) for the 2008 75 ppb ozone NAAQS. Subsequent to this submittal, on November 16, 2015, the USEPA proposed an update to its existing Cross-State Air Pollution Rule (CSAPR). The purpose of the CSAPR update is to ***partially*** address the requirements of Section 110(a)(2)(D)(i) and the transport of ozone and its precursors from upwind states that significantly contribute to ozone nonattainment or interfere with maintenance of the 2008 75 ppb ozone NAAQS in downwind areas and to act as a Federal Implementation Plan (FIP). On March 30, 2016, New Jersey withdrew the CAA Section 110(a)(2)(D)(i) transport portion of its October 17, 2014 Infrastructure SIP Revision as it related to the 2008 75 ppb ozone NAAQS at USEPA's request. This allowed USEPA to include New Jersey in the CSAPR FIP, and so as not to delay USEPA's progress in implementing the FIP on upwind states significantly contributing to ozone levels in New Jersey and its shared nonattainment areas. On September 7, 2016, the USEPA finalized its update to CSAPR for the 2008 75 ppb ozone NAAQS.[101]

The 2016 CSAPR update establishes lower ozone season NO_x emission budgets for electric generating units (EGUs). Implementation of the 2016 CSAPR update began in May of 2017, and is anticipated to reduce ozone season (May - September) NO_x emissions from power plants in 22 states in the eastern U.S. However, because CSAPR does not address daily NO_x emissions, there is uncertainty as to whether peak ozone day NO_x emissions will be reduced significantly.

USEPA acknowledges that the 2016 CSAPR update does not fully address the problem of upwind transport and only provides a ***partial*** remedy for the significant contribution of upwind states to downwind nonattainment and maintenance areas for the 2008 75 ppb ozone NAAQS.[102] As CSAPR does not address daily NO_x emissions, peak ozone day NO_x may not be reduced significantly or sufficiently.

[101] 81 Fed. Reg. 74504 (October 26, 2016).
[102] USEPA Final Fact Sheet for the Final Cross-State Air Pollution Rule Update for the 2008 NAAQS. https://www.epa.gov/airmarkets/fact-sheet-final-cross-state-air-pollution-rule-update-2008-naaqs

Significant Impact

The USEPA's technical support document in support of the 2016 CSAPR update[103] (USEPA 2016 CSAPR modeling TSD) indicates that the following states significantly contribute to ozone nonattainment or maintenance in New Jersey or one of the states associated with its Northern NJ-NY-CT multi-state Nonattainment Area:

- Connecticut
- Illinois
- Indiana
- Kentucky
- Maryland;
- Michigan
- New Jersey
- New York
- Ohio;
- Pennsylvania;
- Texas
- Virginia; and,
- West Virginia.

The USEPA's analysis also shows that New Jersey only significantly contributes to ozone nonattainment at monitors located in Connecticut and New York within the Northern NJ-NY-CT Nonattainment Area. New Jersey has implemented control measures effectively that emissions from sources located in New Jersey do not contribute significantly to areas outside our airshed.

As a part their 2016 CSAPR Update rule, USEPA conducted an assessment of significant contribution of ozone concentrations (defined as >0.75 ppb ozone) to each predicted nonattainment area monitor from out of states sources.[104] For the Northern NJ-NY-CT Nonattainment Area, the three monitors predicted to be in nonattainment in 2017 in the USEPA modeling are: Westport (Sherwood Island Connector) – Fairfield Co., CT (Monitor ID No. 090019003); Madison-Beach Rd. - New Haven Co., CT (Monitor ID No. 090099002); and Babylon – Suffolk Co., NY (Monitor ID No. 361030002). Table 6-1 below summarizes the results of the assessment including the following: the CSAPR rule modeling predicted 2017 Average Design Values (DVs), the current 2016 ozone design values based on air quality monitoring and the USEPA estimated ozone contributions from states that contribute significantly (>0.75 ppb) to these monitors. The individual state ozone contributions were obtained from the USEPA's "Data File with Ozone Design Values and Ozone Contributions."[105]

[103] USEPA. Air Quality Modeling Technical Support Document for the Final Cross State Air Pollution Rule Update – Data File with Ozone Design Values and Ozone Contributions. United States Environmental Protection Agency Office of Air Quality Planning and Standards, August 2016.
[104] 81 Fed. Reg. 74504 (October 26, 2016).
[105] Ibid.

Table 6-1: Significant Contributors to Nonattainment Monitors in Northern NJ-NY-CT Nonattainment Area

Monitor	State	CSAPR Modeling: 2017 Base Case Avg DV (ppb)	Monitoring: Preliminary 2016 Ozone DV (ppb)	Ozone Transport Region (OTR) States Ozone Contribution to Monitor (ppb)					Non-OTR States* Ozone Contribution (ppb)
				CT	NJ	NY	PA	MD	
Westport	CT	76.5	83	3.89	9.52	17.22	9.28	2.15	8.24
Madison-Beach Rd.	CT	76.2	76	7.55	7.27	18.50	7.37	1.72	6.24
Babylon	NY	76.8	72	0.46	11.07	16.82	8.77	1.43	9.62

*Includes Indiana, Michigan, Ohio, Virginia, and West Virginia for the Westport, CT and Babylon, NY monitors. Includes Ohio and Virginia for the Madison-Beach Rd, CT monitor.

The 8-hour ozone Northern NJ-NY-CT Nonattainment Area's monitor with the highest 2014-2016 monitored design value is the Westport (Sherwood Island Connector), Connecticut monitor. The monitored design value for that period is 83 ppb. The Westport monitor is the controlling monitor (or the last monitor predicted to reach attainment as emissions are generally reduced) for the area based on: the most recent monitoring data, the air quality modeling and the USEPA CSAPR modeling. The USEPA CSAPR modeling estimates the ozone contribution to the Westport monitor from the states within the Northern NJ-NY-CT Nonattainment Area to be approximately 30 ppb, with over half of that ozone concentration from New York. Pennsylvania's significant ozone contribution is estimated to be about equal to that of New Jersey yet Pennsylvania is not located within the nonattainment area. The combined significant ozone contribution from upwind states outside of the OTR is greater than the contribution attributed to Connecticut sources alone and nearly as much as New Jersey's estimated contribution.

New Jersey's remedy to transport is discussed below in Section 6.9 Attainment Demonstration and Transport Summary and Conclusions**.**

6.4 Photochemical Modeling and Inputs

6.4.1 Introduction

The CAA and Federal regulations[106] require that states use photochemical grid modeling or any other analytical method determined by the Administrator to be at least as effective as photochemical grid modeling as part of their demonstration of attainment of the ozone NAAQS by the required attainment date. The USEPA 2014 Modeling Guidance also recommends this approach. Therefore, New Jersey's attainment demonstration for the Northern NJ-NY-CT Nonattainment Area includes photochemical grid modeling. All the regional modeling was conducted in accordance with the USEPA 2014 Modeling Guidance.

[106] 42 U.S.C. § 7511a(c)(2)(A) and 40 CFR §51.908(c).

6.4.2 Air Quality Model: CMAQ

As recommended in the USEPA 2014 Modeling Guidance, the photochemical model selected for the attainment modeling demonstration was the USEPA's Models-3/Community Multi-Scale Air Quality (CMAQ) Model version 5.0.2. Photochemical modeling was performed with the CMAQ Chemical-Transport Model (CCTM) software that is part of the CMAQ modeling package.

The CMAQ modeling system was selected for the attainment demonstration primarily because it is a photochemical grid model capable of modeling a variety of pollutants over a range of time and space scales, i.e. a "one-atmosphere" photochemical grid model. The CMAQ model is peer reviewed, and has been validated and widely used by Federal, state, and local government, as well as research institutes and universities. Not only is CMAQ used to model ozone by OTC, but it is also being used to model particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$) and Regional Haze in the Northeast.

The CMAQ model requires specific inputs, including meteorological information and emissions information. The remainder of this section discusses, in general, the data inputs for the CMAQ model, the CMAQ model parameters chosen for the modeling runs, validation of the CMAQ model and the results of the modeling.

More detailed information is included in the MANE-VU Modeling TSD in Appendix 4-1.

6.4.3 Regional Modeling Coordination

Under the coordination of the OTC Modeling Committee, several states and modeling centers performed the regional modeling runs and/or contributed to the preparation of technical information for the regional modeling effort. Those organizations included:

1) the New York State Department of Environmental Conservation (NYSDEC);
2) the New Jersey State Department of Environmental Protection;
3) the Ozone Research Center at Rutgers University, New Jersey;
4) the Mid-Atlantic Regional Air Management Agency (MARAMA);
5) the Maryland Department of the Environment and the University of Maryland;
6) the Virginia Department of Environmental Quality; and
7) the New Hampshire Department of Environmental Services.

The lead agency for coordinating regional air quality modeling efforts and performing base year and future year CMAQ model runs for this ozone attainment demonstration was the NYSDEC. The NYSDEC ran the CMAQ model using the protocol discussed below and in the MANE-VU Modeling TSD, and performed post-processing of the results, including calculating the projected ozone design values using the relative response factor (RRF) method specified in the USEPA 2014 Modeling Guidance. The NJDEP ran SMOKE-MOVES to prepare onroad mobile emissions using USEPA's MOVES data. Both agencies conducted a series of sensitivity modeling studies together with Rutgers to support SIP modeling. The air emissions inventory work was completed by individual states, USEPA and MARAMA, and coordinated by MARAMA.

The CMAQ model was installed at all participating modeling centers and diagnostic tests were run to ensure that the model was operating as designed. In addition, the CMAQ model was benchmarked against other modeling platforms to ensure similar results.

6.4.4 Regional Emission Inventories and Control Measures

To perform this modeling demonstration, two regional air emission inventories were developed to represent the 2011 base inventory and the 2017 projected future grown and controlled inventory. The USEPA SMOKE model was used to process the air emissions inventory to prepare them for input into the CMAQ model. For the MANE-VU Region, the modeling inventories were processed by the NYSDEC using the SMOKE (Version 3.7) model. NJDEP processed the onroad mobile source files through SMOKE-MOVES using the CB05 chemistry.

A detailed description of the development of the MANE-VU 2011 and 2017 air emissions modeling inventories is included in Chapter 4. A detailed description of the control measures in the inventory is included in Chapter 3.

6.4.5 Meteorology Data

As discussed in Section 4.1.1, 2011 was designated as the base year for this 8-hour ozone attainment demonstration. The regional modeling used meteorological data from USEPA's 2011 photochemical modeling of the Continental/Contiguous United States (CONUS) (See Appendix 6-1.) The USEPA CONUS domain used meteorological field generated by Weather Research and Forecasting (WRF) v3.4. The northeast regional modeling extracted a subset of the USEPA CONUS domain as discussed below and illustrated in Figure 6-1 (USEPA 2014 Modeling TSD) using the Meteorology-Chemistry Interface Processor (MCIP).[107] MANE-VU retained the same 12 km square grid size and 35 layer column depth as was used by USEPA. Based on model evaluation of key parameters by both USEPA and OTC, it was determined by the modeling group that 2011 WRF v3.4 meteorological data developed by USEPA is appropriate for the regional modeling.

6.4.6 Episode Selection

The majority of the ozone season, April 15 to October 30, was simulated for the 2011 and 2017 modeling runs (with 2011 meteorology conditions). As a result, the total number of days examined for the complete ozone season far exceeds the USEPA 2014 Modeling Guidance, and provides for better assessment of the simulated pollutant fields.

6.4.7 Modeling Domain

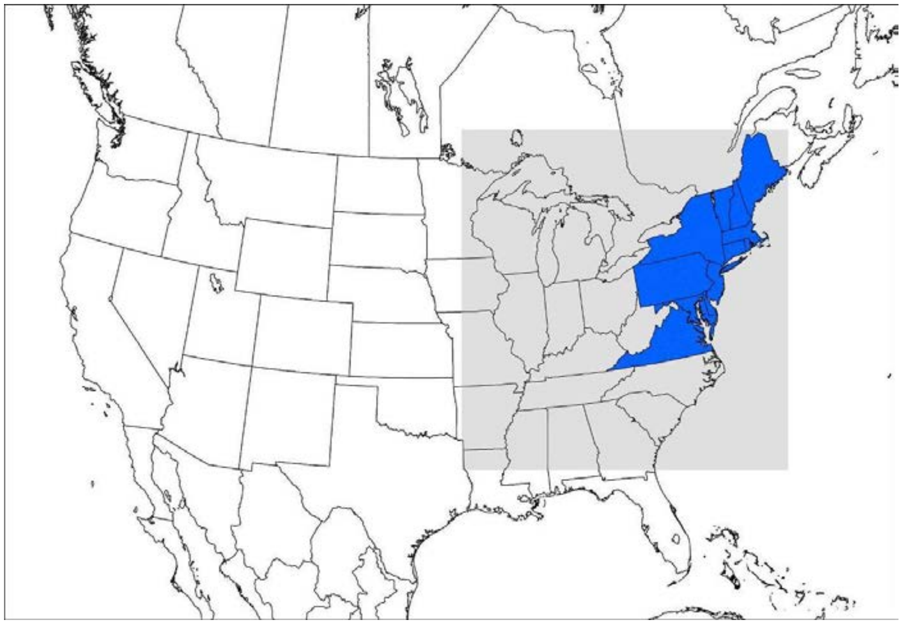
In defining the modeling domain, one must consider the location of the local urban area, the downwind extent of the elevated ozone levels, the location of large emission sources, and the availability of meteorological and air quality data. The domain or spatial extent to be modeled includes as its core the nonattainment area. Beyond this, the domain includes enough of the surrounding area such that major upwind sources fall within the domain and the emissions produced in the nonattainment area remain within the domain throughout the day.

Figure 6-1 shows the extent of USEPA CONUS and the MANE-VU modeling boundaries. The MANE-VU modeling domain includes states in MANE-VU (or the OTR), other Regional Planning Organizations and Canada. The MANE-VU modeling domain is shown in gray, with the MANE-VU states shown in blue. The modeling domain used in this application represented a subset of the USEPA continental-modeling domain that covered the entire 48-state region with emphasis on the OTR. This domain covers the Northeast region, including the Northeastern, Central and Southeastern United States as well as Southeastern Canada. The final SIP modeling analysis

[107] Otte and Pleim 2010, The Meteorology-Chemistry Interface Processor (MCIP) for the CMAQ modeling system: updates through MCIP v3.41

utilized this MANE-VU modeling domain shown in gray. A more detailed summary of the states and regional planning groups in the domain is included in Table 4-1 in Chapter 4.

Figure 6-1: MANE-VU 12-Kilometer CMAQ Modeling Domain



6.4.8 Horizontal Grid Size

The basic CMAQ modeling platform utilized a 12 km horizontal grid resolution for the CONUS domain. A larger domain was selected for the WRF simulations to provide a buffer of several grid cells around each boundary of the CMAQ 36 km domain. This was designed to minimize any errors in the meteorology from boundary effects. A 12 km inner domain was selected to better characterize air quality in the MANE-VU Region and surrounding Regional Planning Organization regions. The horizontal grid definitions for the CMAQ and WRF modeling domains are discussed in the MANE-VU Modeling TSD in Appendix 4-1.

6.4.9 Vertical Resolution

The vertical grid used in the CMAQ modeling was primarily defined by the WRF vertical structure. The WRF model employed a terrain-following coordinate system defined by atmospheric pressure. The layer averaging scheme adopted for CMAQ is designed to reduce the computational cost of the CMAQ simulations, therefore only the uppermost layers of the CMAQ domain were coalesced. All layers in the planetary boundary layer were left undisturbed in moving from the WRF to the CMAQ simulation. This ensures that the near-surface processes that affect air pollution the most are represented realistically in CMAQ, while the meteorological systems that are driven by upper level winds are allowed to develop properly in WRF. The effects of layer averaging have a relatively minor effect on the model performance metrics when compared to ambient monitoring data. The vertical layer definitions and other details related to the WRF and CMAQ modeling domains are discussed in the MANE-VU Modeling TSD in Appendix 4-1

6.4.10 Initial and Boundary Conditions

The objective of a photochemical grid model is to estimate the air quality given a set of meteorological and emissions conditions. When initializing a modeling simulation, the exact concentration fields are not known in every grid cell for the start time. Therefore, photochemical grid models typically begin with clean conditions within the domain and are allowed to stabilize before the period of interest is simulated. This was accomplished for the SIP modeling by starting the modeling 15 days prior to the period of interest (the ozone season); this is called "spin-up time".

The winds move pollutants into, out of, and within the domain. The model handles the movement of pollutants within the domain and out of the domain. An estimate of the concentration of pollutants at the edge of the domain, and therefore the quantity of pollutants moving into the domain, is needed as an input to the model. These are called boundary conditions. The boundary conditions for the 12 km grid were developed from a 2.5 x 2.5 degree Goddard Earth Observing System-Chem (GEOS-Chem) (version 8) global simulation produced by USEPA for use in the 2011 modeling platform.[108] GEOS-Chem is a global 3-D chemical transport model for atmospheric composition driven by meteorological input from the Goddard Earth Observing System (GEOS) of the NASA Global Modeling and Assimilation Office. To address the transport of the pollutants through the boundaries, the GEOS-Chem data were used to develop the initial and boundary condition for the 2011 modeling platform. As discussed above, the CMAQ simulations used a 15-day "spin-up" period, which is sufficient to establish pollutant levels that are encountered in the Eastern United States, to wash out the effect of the initial fields. Additionally, the predominating winds flow from west to east, thus New Jersey is not influenced by nearby boundary conditions. Additional information on the extraction of boundary conditions is provided in the MANE-VU Modeling TSD in Appendix 4-1.

6.5 Photochemical Modeling Results

6.5.1 Relative Response Factor (RRF)

The USEPA 2014 Modeling Guidance recommends the use of a modeled attainment test, which is described as a procedure in which an air quality model is used to simulate current and future air quality. For this modeled attainment test, model estimates are used in a "relative" rather than "absolute" sense. The ratio of the model's future year to baseline year ozone estimates are calculated at each ozone monitor. These ratios are called Relative Response Factors (RRF). RRF's are calculated with CMAQ output from the maximum modeled ozone of a 3X3 array of grid cells centered on the location of the monitor using the following equation:

> RRF = (average future year ozone over the highest 10 modeled ozone days selected based on base year ozone concentrations) / (average base year ozone over the highest 10 modeled ozone days)

More detail regarding RRF calculations is provided in the MANE-VU Modeling TSD in Appendix 4-1.

6.5.2 Baseline Design Values

The baseline design values used in modeling are calculated differently from the monitored design values used for NAAQS compliance, although both are based on monitored ambient air quality data. For modeling purposes, the USEPA 2014 Modeling Guidance recommends that

[108] Eyth and Vukovich 2015, p.2, USEPA Technical Support Document (TSD) Preparation of Emission Inventories for the Version 6.2, 2011 Emissions Modeling Platform

the baseline design value is calculated by averaging three air quality compliance design value periods, centered around the base inventory year of 2011. Specifically, the modeling baseline design value was calculated by averaging the 2009-2011, 2010-2012, and 2011-2013 air monitoring design values. Since the baseline design value is the anchor point for the future year projected concentrations it is believed that the average of the three design value periods best represents the baseline concentrations, while taking into account the variability of the meteorology and emissions (over a five year period). For more information regarding the modeling design values see the MANE-VU Modeling TSD in Appendix 4-1.

6.5.3 Modeling Results

Future estimated ozone design value concentrations are calculated for each monitoring site by multiplying the modeled RRF by the baseline ozone design values to obtain the future estimated value. Design values are truncated in accordance with 40 CFR Part 50.10, Appendix I.

A summary of the modeling design value results, compared to the latest air quality monitoring design values discussed in Chapter 2 is shown in Table 6-1. For more information regarding the modeling results see the MANE-VU Modeling TSD in Appendix 4-1.

Table 6-1:
Ozone Design Value Modeling vs Monitoring Summary
Northern NJ-NY-CT Nonattainment Area

8-hour Ozone Design Values (ppb)						
Site Name	**AQS Code**	**County**	**State**	**Modeling**		**Monitoring**
				2011 BETA2	**2017 BETA2**	**2016**
Westport (Sherwood Island Connector)	90019003	Fairfield	CT	83.7	83	83
Stratford	90013007	Fairfield	CT	84.3	77	81
Greenwich Point Park	90010017	Fairfield	CT	80.3	77	80
Middletown	90070007	Middlesex	CT	79.3	70	79
Danbury (Western Conn State Univ)	90011123	Fairfield	CT	81.3	74	78
Criscuolo Park-New Haven	90090027	New Haven	CT	74.3	67	76
Madison-Beach Rd (Hammonasset State Park)	90099002	New Haven	CT	85.7	77	76
Susan Wagner HS	360850067	Richmond	NY	81.3	78	76
Leonia	340030006	Bergen	NJ	77	68	74
Rutgers University	340230011	Middlesex	NJ	81.3	71	74
White Plains	361192004	Westchester	NY	75.3	73	74
Babylon	361030002	Suffolk	NY	83.3	77	72
Bayonne	340170006	Hudson	NJ	77	69	72
Riverhead	361030004	Suffolk	NY	78	71	72
South Mountain Rd (Rockland County)	360870005	Rockland	NY	75	67	72
Flemington	340190001	Hunterdon	NJ	78	68	70
Newark Firehouse	340130003	Essex	NJ	78	69	70
Pfizer Lab	360050133	Bronx	NY	74	71	70
Convent Av (CCNY)	360610135	New York	NY	73.3	70	69
Monmouth University	340250005	Monmouth	NJ	80	71	69
Queens	360810124	Queens	NY	78	74	69
Chester	340273001	Morris	NJ	76.3	67	68
Ramapo	340315001	Passaic	NJ	73.3	65	68
Holtsville	361030009	Suffolk	NY	78.7	73	66
Columbia	340410007	Warren	NJ	66	57	63

Notes:

1. All modeling: CMAQ, ozone season (April 15 to October 30), MARAMA BETA2, MOVES14, BEIS 3.6.1, ERTAC 2011v2.5 and 2017v2.5L2, USEPA 2014 Modeling Guidance for RRF/DV
2. 2011 Base, 5 year average
3. Monitoring values exclude May 25 and 26, 2016 exceptional event data.
4. Greenwich monitor data from CT, did not meet 2016 data completeness.
5. Values above the 75 ppb 8-hour ozone NAAQS are highlighted.

6.6 Model Performance Quality Assurance Evaluation

The USEPA 2014 Modeling Guidance states that “a model performance evaluation should be considered prior to using modeling to support an attainment demonstration” (USEPA, 2014). Specifically, at least a complete operational evaluation should be conducted, while diagnostic evaluation, dynamic evaluation, and probabilistic evaluation are encouraged.

All the air quality, emissions, and meteorological data within the MANE-VU Regional Planning Organization used in the regional modeling effort were reviewed to ensure completeness, accuracy, and consistency before proceeding with modeling. Any errors, missing data or inconsistencies, were addressed using appropriate methods that are consistent with standard practices. All modeling was benchmarked through the duplication of a set of standard modeling results across different modeling centers. Emissions inventories obtained from the other Regional Planning Organizations were examined to check for errors in the emissions estimates. If errors were discovered, the problems in the input data files were corrected, and the models were run again.

The first step in the modeling process is to verify the model’s performance in terms of its ability to predict ozone and precursor concentration fields in the right locations and at the right levels. To do this, model predictions for the base year simulation are compared to the actual ambient data observed in the historical episode. The purpose of the model performance evaluation is to assess how accurately the model predicts ozone levels observed in the historical episode and to use the knowledge of CMAQ’s performance to put CMAQ’s predictions of future year air quality in the appropriate context.

The CMAQ air quality model inputs and outputs were plotted and examined to ensure sufficiently accurate representation of the observed data in the model ready fields, and temporal and spatial consistency and reasonableness. The CMAQ model underwent operational and scientific evaluations in order to facilitate the quality assurance review of the meteorological and air quality modeling procedures and are discussed in greater detail in the MANE-VU Modeling TSD in Appendix 4-1.

The model evaluations demonstrated that the model performs reasonably well over the diurnal cycle and not just in terms of daily maximum or average values. Also, they demonstrated that the model can reliably reproduce concentrations above the ground level. The model performance for the Northern NJ-NY-CT Nonattainment Area averaged over all stations and all days met the guidelines in the USEPA 2014 Modeling Guidance. However, although the CMAQ modeling meets the USEPA guidelines, it should be noted that it may in fact under predict or over predict the magnitude of ozone change at a particular site and the results should not be viewed as exact. Additional discussion on the uncertainty associated with the CMAQ model results is provided below in Section 6.7.

6.6.1 Unmonitored Area Analysis

The USEPA 2014 Modeling Guidance and 75 ppb Implementation rule[109] recommend an unmonitored area analysis to examine ozone and/or PM2.5 concentrations in unmonitored areas. The unmonitored area analysis is intended to be a means for identifying high ozone and/or PM2.5 concentrations outside of traditionally monitored locations, particularly in nonattainment areas where modeling or other data analyses have indicated potential high concentration areas of ozone and/or PM2.5 outside of the existing monitoring network. The “unmonitored area analysis” describes an analysis that uses a combination of model output and

[109] 80 Fed. Reg. 12270 (March 6, 2015)

ambient data to identify areas that might exceed the NAAQS in areas that are not currently monitored. The analysis should include, at a minimum, all nonattainment counties and counties surrounding the nonattainment area, as appropriate.

An unmonitored area analysis was performed for New Jersey's multi-state nonattainment areas and included in New Jersey's 2007 Ozone Attainment Demonstration SIP.[110] This analysis concluded that all areas of maximum ozone concentration in the ozone nonattainment areas associated with New Jersey are adequately reflected by the monitoring locations and the modeling performed. This analysis is also applicable to this demonstration, as the monitored areas are the same. In addition, New Jersey's monitored locations far exceeds that of USEPA's minimum requirements and there is no reason to believe there are areas with potentially high concentrations that are not already reflected in the existing monitoring network.

6.7 Model Results Evaluation and Uncertainties

Modeling Design Value Results Compared to Monitoring

A summary of the MANE-VU 2017 modeling results compared to 2016 monitoring design values presented in this SIP for the Northern NJ-NY-CT nonattainment area is discussed below and shown in Table 6-1 above and Figures 6-2 through 6-4 below. The USEPA 2017 modeling results are also shown in the Figures based on the modeling conducted by USEPA for their "Ozone Transport Policy Analysis Final Rule."[111]

- The MANE-VU 2017 modeling design values are higher than 2016 monitoring values at eight sites. Three of the sites were higher by five to seven ppb. These sites are all in New York within the interior of Long Island (Queens, Babylon and Holtsville, location shown in Figure 2-7). The USEPA 2017 modeling also over predicted these sites by four to six ppb compared to the 2016 monitoring.

- The MANE-VU 2017 modeling design values are lower than 2016 monitoring values at 16 sites. Seven of the sites were lower by four to nine ppb. These sites are all in Connecticut and New Jersey except one in Rockland County (which is not in the New York Metropolitan area). Four of the Connecticut sites are in the top five 2016 ambient monitored design values (Danbury, Stratford, Criscuolo Park-New Haven, Middletown)

- Similarly, the USEPA 2017 modeling design values are lower than 2016 monitoring values at 18 sites. Eleven of the sites were lower by four to ten ppb. These sites are generally the same as those in the MANE-VU 2017 modeling, except for Westport, Connecticut, the controlling monitor, where the USEPA 2017 modeling under predicted by seven ppb compared to 2016 monitoring and the MANE-VU 2017 modeling matches the 2016 monitoring values.

- The USEPA 2017 modeling design values are lower than the MANE-VU 2017 modeling design values at all but four sites ranging from a difference of one to seven ppb. The sites with the largest difference are also generally those with the highest design values based on 2016 monitoring at Westport, Danbury, Greenwich and Stratford in Connecticut, but also include White Plains and Susan Wagner in New York.

[110] State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard 8-Hour Ozone Attainment Demonstration, The State of New Jersey Department of Environmental Protection, October 29, 2007.
[111] Technical Support Document (TSD) for the Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS Docket ID No. USEPA-HQ-OAR-2015-0500, "Ozone Transport Policy Analysis Final Rule TSD," U.S. Environmental Protection Agency Office of Air and Radiation (August 2016).

- As discussed in Chapter 2 Air Monitoring, data indicates that the low 2009 ozone concentrations, which were much lower than average, are significantly influencing any data that includes 2009 such as the 2011 design values for monitoring and modeling. This data could be contributing to model underpredictions.

<u>Figure 6-2:</u> Ozone Design Value Comparison Modeling vs. Monitoring Sites Exceeding 75 ppb Standard in 2016 Northern NJ-NY-CT Nonattainment Area

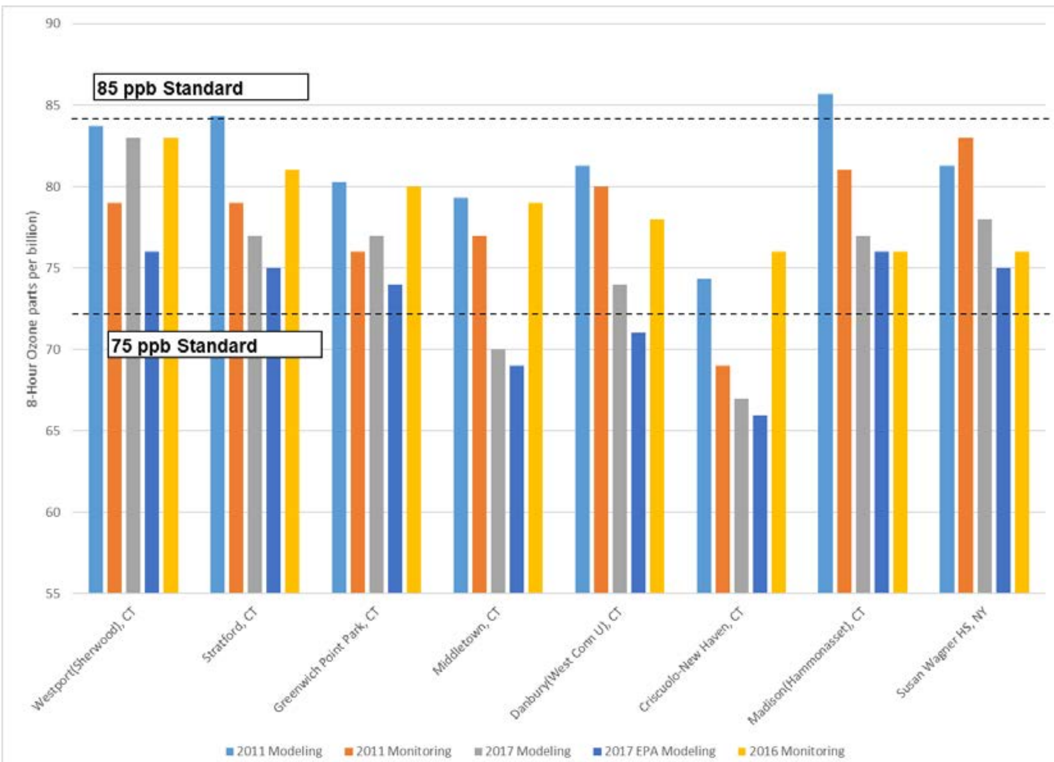


Figure 6-3: Ozone Design Value Comparison Modeling vs. Monitoring Sites Higher in Modeling than 2016 Monitoring Northern NJ-NY-CT Nonattainment Area

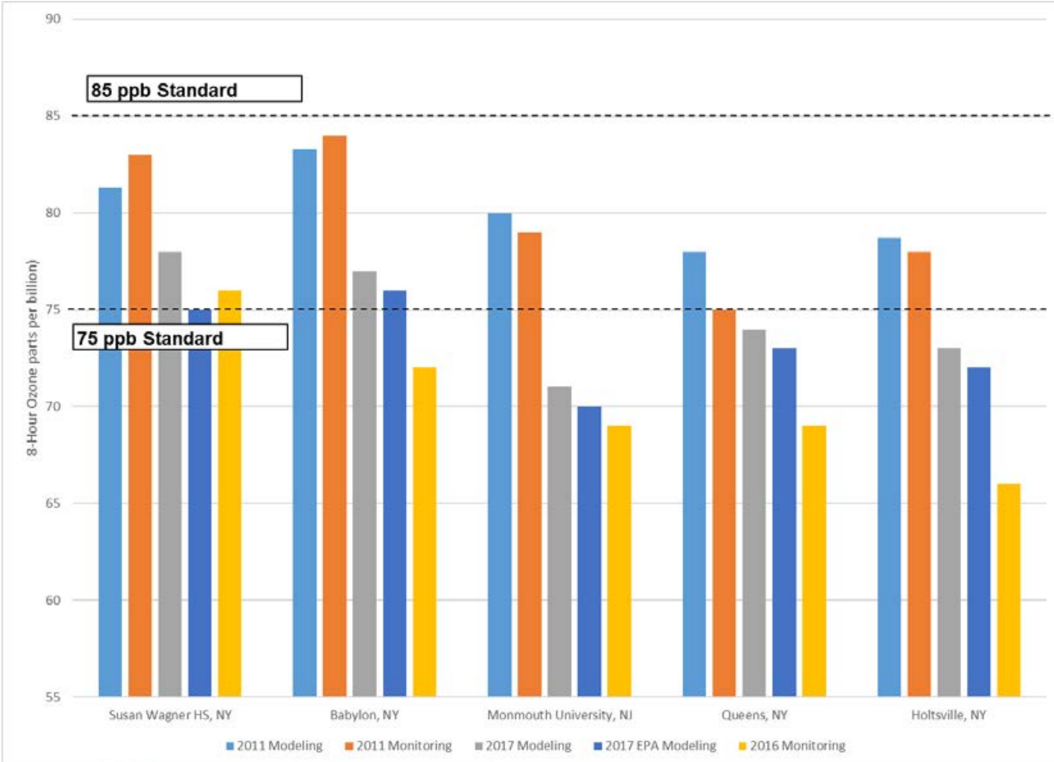
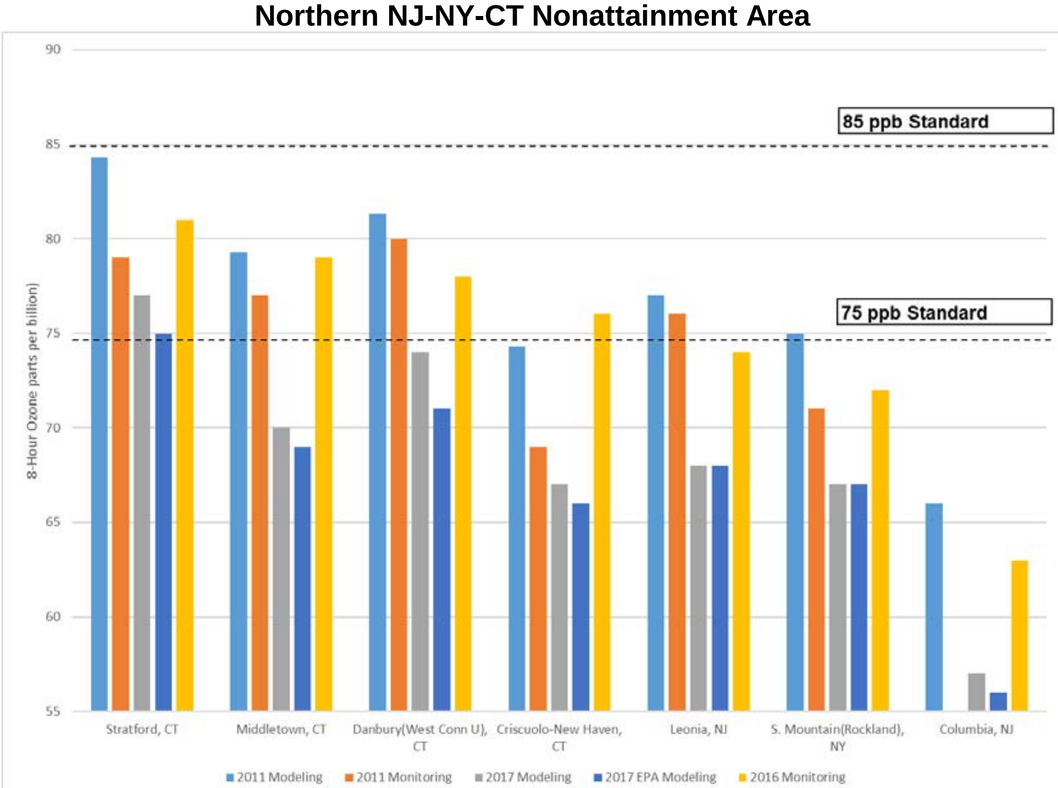


Figure 6-4: Ozone Design Value Comparison Modeling vs. Monitoring Sites Lower in Modeling than 2016 Monitoring Northern NJ-NY-CT Nonattainment Area



BEIS 3.6 vs. BEIS 3.61

Several modeling screening runs were performed prior to final SIP modeling with draft emission inventories. During these screening runs a pattern was observed in certain New York monitors, Pfizer Lab, White Plains, Convent Av (CCNY) and Queens, that showed an increasing trend in the modeling design values, but a decreasing trend in the monitoring design values. Different modeling runs conducted with CMAQ, CMAX, BEIS 3.6 and BEIS 3.61 (The USEPA biogenic emissions model) were evaluated. The data indicated that when CMAQ was run with BEIS version 3.61 the trend was no longer inconsistent between modeling and monitoring at these sites, as observed when run with BEIS version 3.6.

Sea Breeze Effect

The highest monitored 8-hour ozone design value in the Northern NJ-NY-CT Nonattainment Area is at Westport, Fairfield County, Connecticut. The Westport monitoring site is located directly downwind from a major highway, I-95, and the major metropolitan area of New York City, which makes it heavily influenced by local transported air pollutants. Also, the Westport monitoring site is situated on the perimeter of the Long Island Sound making it susceptible to a bay breeze effect that is similar to a sea breeze effect.

Field studies and numerical modeling efforts around the country and internationally have shown that a sea breeze circulation can influence local ozone concentrations.[112,113,114,115,116,117,118] A sea breeze may exacerbate air pollution levels by constricting horizontal and vertical ventilation, and re-circulating air that would otherwise move offshore. On other occasions, a sea breeze may move relatively clean air onshore, which will rapidly lower ozone concentrations. The Maryland Department of the Environment examined the theoretical impact of the Chesapeake Bay sea breeze on the ozone monitor site in Edgewood, Maryland.[119] The conclusions of this analysis were that a local-scale sea breeze circulation can exacerbate peak ozone concentrations not only during regional-scale high ozone episodes, but also during periods when local scale circulation is more significant than regional transport.

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[112] Seaman, N. L. and Michelson, S.A. Mesoscale Meteorological Structure of a High-Ozone Episode during the 1995 NARSTO-Northeast Study. *Journal of Applied Meteorology*, 39, 384-398, 1998.
[113] McElroy, M.B. and Smith, T.B. Vertical Pollutant Distributions and Boundary Layer Structure Observed by Airborne LIDAR near the Complex California Coastline. *Atmospheric Environment*, 20, 1555-1566, 1986.
[114] Bornstein, R.D., Thunis, P., and Schayes, G. Simulation of Urban Barrier Effects on Polluted Urban Boundary-Layers Using the Three Dimensional URBMET/TVM Model with Urban Topography-New Results from New York City. In: Zanetti, P. (Ed), Air Pollution, Computational Mechanics Publications, Southampton, Boston, 15-34, 1993.
[115] Cheng, W. L. Ozone Distribution in Coastal Central Taiwan under Sea-Breeze Conditions. *Atmospheric Environment*, 36, 3445-3459, 2002.
[116] Boucouvala, D. and Bornstein, R. Analysis of Transport Patterns during an SCOS97-NARSTO Episode. *Atmospheric Environment*, 37(S2), S73-S94, 2003.
[117] Martilli, A., Roulet, Y.A., Junier, M., Kirchner, F., Mathias, W. R., and Clappier, A. On the Impact of Urban Surface Exchange Parameterizations on Air Quality Simulations: The Athens Case. *Atmospheric Environment*, 37, 4217-4231, 2003.
[118] Evtyugina, M. G., Nunes, T., Pio, C., and Costa, C. S. Photochemical Pollution under Sea Breeze Conditions, during Summer, at the Portuguese West Coast. *Atmospheric Environment*, 40, 6277-6293, 2006.
[119] Maryland Department of the Environment. Appendix G-11: The Role of Land-Sea Interactions on Ozone Concentrations at the Edgewood, Maryland Monitoring Site, Cecil County, Maryland 8-Hour Ozone State Implementation Plan and Base Year Inventory. Maryland Department of the Environment, June 15, 2007.

Evaluation of modeling data shows that CMAQ does not always accurately predict ozone concentrations at monitors on the land/water interface. As discussed in the MANE-VU 2014 Modeling TSD, when monitors are located so as to result in one or more of the eight additional grid cells falling over a body of water OTC has found that those monitors are often not responsive to changes in emissions. Research conducted by the University of Maryland on the calculation of future design values has demonstrated some potential flaws with USEPA modeling guidance in regards to calculating RRFs for these particular monitors.[120] It is often the case that due to slower dry deposition of ozone, fewer clouds being over bodies of water, Planetary Boundary Layer (PLB) (also known as the atmospheric boundary layer (ABL) venting, PBL height, and emissions from marine vessels, ozone measurements are much higher over bodies of water than nearby land masses. As a result, the maximum values in the 3x3 grid occur in a grid cell over water where ozone pollution is higher and less responsive to changes in emissions.

Electric Generation on HEDD

It is difficult to accurately represent the effect of electric generating units (EGU) in photochemical modeling. Great strides have been accomplished in recent years by using the ERTAC EGU program and upgrading to hourly temporal profiles in the modeling. Actual continuous emission monitoring (CEM) of hourly data is used for the EGU temporal profiles. For the 2011 base year, EGU actual hourly emissions from CAMD are input into the modeling. However, the effect of peaking electric generating unit emissions on hot summer days, which usually coincide with high ozone days, is still difficult to accurately portray when modeling over the entire ozone season. The effect of the emissions from power plants on these peak days is still most likely underpredicted in the CMAQ modeling.

A study of the August 2003 Northeast Blackout demonstrated the effect of what happened when the power was not being generated.[121] University of Maryland flight data collected 24 hours into the Northeast Blackout showed that ozone was 30 ppb lower throughout the 0.5-1.5 km section of the atmosphere and 38 ppb lower at ground level, than on a meteorologically similar day. When the ozone levels on the blackout day were compared to a reference day it was shown that the blackout caused a drop of at least 7 ppb ozone, and likely considerably more. However, a modeling study of the same event using CMAQ predicted only a 2 ppb change.[122] These results demonstrated that CMAQ greatly under predicted the ozone reductions achieved when the power generating plants were not operating by a factor of approximately 3. However as stated above, improvements in EGU inputs in the modeling have been made since this analysis.

Distributed Generation/Demand Response

Distributed Generation/Demand Response (DG/DR) (also known as behind the meter electricity generation or back-up generators) is electric power generated from small stationary reciprocating internal combustion engines (RICE) fueled by natural gas, diesel fuel, or gasoline that is used during emergencies in New Jersey. However, in some states these engines are also used to assist the electric grid during high electric demand periods. New Jersey's rules for stationary RICE (or emergency generators) do not allow the use of uncontrolled engines for the

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[120] Goldberg, DL, CP, Tzortziou, M, Stehr, JW, Pickening, KE, Morufu, LT and Dickerson RR 2014, 'Higher surface ozone concentrations over the Chesapeake Bay than over the adjacent land: Observations and models from Discover-AQ and CBODAQ campaigns', Atmospheric Environment, vol. 84 pp, 9-19

[121] Marufu, L.T., Taubman, B. F., Bloomer, B., Piety, C. A., Doddridge, B. G., Stehr, J. W., and Dickerson, R. R. The 2003 North American Electrical Blackout: An Accidental Experiment in Atmospheric Chemistry. *Geophysical Research Letters*, 31, L13106, 2004.

[122] Hu, Y., Odman, M. T., and Russell, A. G. Re-examination of the 2003 North American Electrical Blackout Impacts on Regional Air Quality. *Geophysical Research Letters*, 33, 2006.

purpose of demand response/distributed electric generation. Some other states in New Jersey's multi-state nonattainment areas do allow this type of emissions. The emissions from these units are not properly accounted for in states inventories, or in the USEPA National Emissions Inventory (NEI). It is difficult to quantify these emissions as they are not always reported to the states and many are in the area source inventory, which is based on statewide fuel consumption, not unit specific emissions. Like HEDD EGUs, many of these engines are operating on hot summer days that typically coincide with the high ozone days.

In general, DG/DR units were originally installed to provide power to a facility in the event that service from the electrical grid was interrupted (e.g. due to a grid failure or natural disaster). However, there has been increased use of these units as part of financial incentive programs to reduce grid electricity use during times of high demand (generally referred to as Demand Response (DR) programs). According to the Federal Energy Regulatory Commission (FERC), DR is the reduction of energy consumption by customers in response to the increased price of electricity or in response to financial incentives to reduce electric demand.[123]

In addition to the emissions not being properly accounted for in state and Federal inventories, the temporal profiles used in the emissions model for many area source categories tend to distribute emissions evenly over the year. This could also lead to an underestimate of emissions due to DG/DR units operating on a peak electric demand day.

The OTC HEDD Workgroup performed a review of state rules and regulations that pertain to the participation of emergency generators in demand response programs.[124] They determined that in most states an engine that participates in a voluntary demand response program or other supply arrangement with a utility or system operator is considered a non-emergency engine. On April 15, 2016, the USEPA provided its "Guidance on Vacatur of RICE NESHAP and NSPS Provisions for Emergency Engines". This guidance clarified and modified the USEPA's requirements concerning the participation of generation resources in non-emergency programs. The guidance specifies that the previous allowance for emergency engines to operate when an Energy Emergency Alert (EEA) Level 2 has been declared, or when there are specific voltage or frequency deviations, is vacated as of May 2, 2016. The USEPA further clarifies that any such operation for these purposes would be considered non-emergency operation after this date. While it is not known whether USEPA's requirements were the cause, there was a noticeable decrease in the amount of generating resources that cleared the PJM auction for DR participation between 2015 and 2016 in the OTC workgroup analysis.

An emission analysis was also conducted for these units by the OTC workgroup. The estimated emissions show a potentially significant amount of emissions from these units in the New York City Metropolitan/Long Island area on peak ozone days in the range of 2 to 3 tons per day.

6.8 Control Measures Not Included in the Photochemical Modeling

A weight of evidence (WOE) analysis is a supplemental analysis to support SIP modeling attainment demonstration results. Guidance for what may be included in a WOE analysis can be found in the USEPA 2014 Modeling Guidance. In some cases, a single modeling demonstration may not be appropriate as the determining factor in demonstrating whether an area will attain the NAAQS by the attainment date or when an area will attain the NAAQS. Depending on the results of the SIP modeling attainment demonstration, a state may choose to perform a WOE analysis to support the SIP modeling. A WOE analysis may include, but is not

[123] NESCAUM. Air Quality, Electricity, and Back-up Stationary Diesel Engines in the Northeast; Northeast States for Coordinated Air Use Management, Boston, MA, 2014.
[124] OTC Stationary and Area Source Committee, HEDD Workgroup White Paper: Examining the Air Quality Effects of Small EGUs, Behind the Meter Generators, and Peaking Units during High Electric Demand Days, 11/10/16.

limited to, emissions reductions and control measures that were not included in the modeling and actual monitored design values.

New Jersey has adopted or implemented additional measures that have not been included in the air quality modeling, which are discussed below. These measures provide additional VOC and NO_x emission reductions that contribute towards the goal of attainment of the ozone NAAQS. They also provide additional evidence that the air quality modeling may not be representing true future conditions.

6.8.1 Quantified Control Measures

<u>CSAPR</u>

As discussed in more detail above in Section 6.3.2, on September 7, 2016, the USEPA finalized its update to CSAPR for the 2008 75 ppb ozone NAAQS.[125] Implementation of the 2016 CSAPR update began in May of 2017, and is anticipated to reduce ozone season (May - September) NO_x emissions from power plants in 22 states in the eastern U.S. However, because CSAPR does not address daily NO_x emissions, there is uncertainty as to whether peak ozone day NO_x emissions will be reduced significantly. These benefits were not included in the regional air quality modeling for this SIP.

USEPA's 2016 CSAPR Update allocates 2,062 tons of NO_x emissions from applicable power plants for the 2017 ozone season for New Jersey and 5,135 for New York. The ERTAC power plant emissions projection tool used in the SIP modeling inventory estimates 2,881 tons of NO_x emissions from applicable power plants for the 2017 ozone season for New Jersey and 6,783 for New York. This a 819 ton NO_x emission reduction for New Jersey and 1,648 for New York, respectively.

The USEPA 2016 CSAPR rule update was based on air quality modeling performed by USEPA and documented in the USEPA 2016 CSAPR TSD. The TSD describes the modeling performed to predict ozone concentrations in 2017 at individual monitoring sites and estimates the state-by-state contributions to ozone concentrations at each monitor.

USEPA's "Ozone Transport Policy Analysis Final Rule TSD,"[126] dated August 2016 includes the analysis to quantify upwind state emissions that significantly contribute to nonattainment in downwind states, and quantifies the improvement in ozone concentrations associated with NO_x Emissions Budgets ($/ton) at the impacted monitors. Per USEPA's Policy Analysis, the ozone benefits estimated at the Westport, CT monitor in 2017 due to the <u>*partial*</u> remedy associated with the 2016 CSAPR update are 0.3 ppb. Applying this estimated ozone reduction to the 2016 monitored design value at that monitor, the potential 2017 design value would be 82 ppb at the Westport, CT monitor.

<u>Control Techniques Guidelines: Fiberglass Boat Manufacturing Materials; Industrial Cleaning Solvents; Misc. Metal and Plastic Parts Coatings; Paper, Film, and Foil Coatings</u>

The four CTGs that will be adopted by New Jersey were discussed in Chapter 3 Control Measures. It is estimated that these rules will reduce VOC emissions more than approximately 0.41 tons per day in New Jersey starting in 2018. Additional reductions will be obtained from best management practices that have not been quantified.

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[125] 81 Fed. Reg. 74504 (October 26, 2016).

[126] Technical Support Document (TSD) for the Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS Docket ID No. USEPA-HQ-OAR-2015-0500, "Ozone Transport Policy Analysis Final Rule TSD," U.S. Environmental Protection Agency Office of Air and Radiation (August 2016).

Gasoline Transfer Operations Proposed 2017 Amendments

The Department proposed amendments to New Jersey's Gasoline Transfer Operations rules on July 3, 2017. These amendments included revisions to Stage I, Stage II and refueling operations. A summary of New Jerseys Stage II program and more details on the rule and SIP revisions were included in Chapter 3. The Department anticipates that the proposed upgrade requirements for Stage I, tank breathing and refueling systems will result in a positive environmental benefit. The Department estimates that the requirements for a CARB-certified Phase I Enhanced Vapor Recovery (EVR) system, including the CARB-certified pressure/vacuum valve and a dual-point vapor balance system for new gasoline dispensing facilities, will result in an emission reduction of approximately 5 tons per day (tpd) of VOCs. It is estimated that the requirements for dripless enhanced conventional (ECO) nozzles and low permeation hoses will result in an emission reduction of approximately 3.5 tpd of VOCs.

Stationary Gas Turbines and Engines

The stationary turbine and engine rules that will be adopted in New Jersey were discussed in Chapter 3 Control Measures. It is estimated that this rule will reduce NO_x emissions approximately 1.8 tons per day in New Jersey starting in 2018.

State Voluntary Mobile Measures

North Jersey Transportation Planning Authority Measures NJTPA Nonroad Mobile Measures in Northern NJ-NY-CT Nonattainment Area:

The North Jersey Transportation Planning Authority (NJTPA) projects were discussed in Chapter 3 Control Measures. Total NO_x reductions from these NJTPA projects are estimated to be approximately 0.5 tons/day.

Nonroad Mobile Measures in Southern NJ-PA-DE-MD Nonattainment Area: Forklift Replacements

The South Jersey Port Corporation (SJPC) forklift project was discussed in Chapter 3 Control Measures. It is estimated that the replaced equipment will yield lifetime emission benefits of: 11 tons of PM (96 percent reduction), 63 tons of NO_x (95 percent reduction), 9.5 tons of hydrocarbons (95 percent reductions), and 29 tons of carbon monoxide (97 percent reductions) starting in 2017 in the New Jersey portion of the Southern NJ-PA-DE-MD Nonattainment Area. These benefits were calculated with the USEPA Diesel Emissions Quantifier.

6.8.2 Non-Quantified Control Measures

Transportation Control Measures (TCMs)

Transportation Control Measures (TCMs) were discussed in Chapter 3 Control Measures. TCMs are transportation strategies, specific to mobile sources, which reduce emissions by reducing the number and/or length of vehicle trips and/or improve traffic flow. After the passage of the CAA Amendments of 1990, New Jersey made a full-scale commitment to TCMs. To this day New Jersey's transportation capital program continues to stress transit projects, system preservation, and systems management over the provision of new highway capacity. The

NJDOT has continued to commit to the support and implementation of air quality-friendly transportation projects and programs.

Transportation Management Associations (TMAs) are non-profit organizations that work with businesses, commuters, county and local governments, and state agencies to implement programs that reduce traffic congestion and improve air quality. There are eight TMAs currently operating in the state of New Jersey. Seven TMAs operate in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area. They are: EZRide (Meadowlink), TransOptions, Ridewise of Raritan Valley, Keep Middlesex Moving, HART Commuter Information Services, Greater Mercer TMA and Hudson TMA. TMAs carefully apply selected approaches to facilitating the movement of people and goods within an area. NJTPA coordinates the activities of the TMAs within the NJTPA region. In New Jersey many TCMs are organized and operated by the TMAs with additional assistance from NJTPA on more encompassing projects (such as ride match services.) Details on these TCM programs are available on the web sites for each of the TMAs.

Electric Vehicles

Electric vehicles were discussed in Chapter 3 Control Measures. New Jersey is supportive of the roll-out of Electric Vehicle (EV) support infrastructure (primarily vehicle charging stations) and seeks to encourage greater adoption of EVs statewide. Although the penetration of EVs is not yet significant enough for measures to increase their use to be considered RACM, EV related measures do hold promise in the future as the number of electric vehicle options increase, the vehicle capabilities improve and pricing becomes more competitive with conventional vehicles. A significant state measure that encourages the purchase of EVs is the New Jersey Sales and Use Tax Act (N.J.S.A. 54:32B-8.55) that provides a sales and use tax exemption for zero emission vehicles (ZEVs), which are vehicles certified pursuant to the California Air Resources Board zero emission standards for the model year.

In addition, on June 15, 2016 New Jersey announced a new grant program that can help employers offset the cost for electric vehicle charging stations across the state. The first phase of the program offers $725,000 in reimbursement grants to employers to offset some of the costs to purchase and install the stations, while also encouraging employees to ultimately purchase and drive electric vehicles to work. Reimbursement grants are offered on a first-come, first-serve basis of up to $250 for each Level 1 charging station installed, and up to $5,000 for each Level 2 charging station installed. Level 2 stations provide more mileage range for electric vehicles than Level 1 stations. Eligible employers include public, private, for-profit, nonprofit, educational and governmental entities. Owners of parking facilities used by commuters or employees of other companies are also eligible.

EGUs: Mercury and Air Toxics Standards

As discussed in Chapter 3, on December 16, 2011, the USEPA promulgated the Mercury and Air Toxics Standards (MATS) to reduce emissions of toxic pollutants from power plants. The MATS are national CAA standards to reduce mercury and other toxic emissions from new and existing coal- and oil-fired electric utility steam generating units (EGUs). The standards will reduce emissions of metals, including mercury (Hg), arsenic (As), chromium (Cr) and nickel (Ni), acid gases, including hydrogen chloride (HCl) and hydrogen fluoride (HF). Emission controls to reduce air toxics will also reduce emissions of PM2.5 and SO_2. The MATS include revisions to the Federal NSPS for new fossil-fuel-fired electric generating units, including revised numerical emission limits for PM, SO_2, and NO_x.

Existing sources had 4 years, if needed, to comply with MATS. The USEPA estimated that there are approximately 1,400 units affected by this action, which includes approximately 1,100 existing coal-fired units and 300 oil fired units at about 600 power plants. USEPA listed 73 facilities in New Jersey, Pennsylvania, Delaware, New York and Connecticut that could potentially be affected by the MATS.

IM: Heavy Duty On-board Diagnostics (OBD)

The heavy duty on-board diagnostics (OBD) inspection and maintenance program requirements were discussed in Chapter 3 Control Measures. This program will be implemented in 2018 and is considered a more predictive testing method that will be used on the vehicles equipped with OBD.

Regional Haze "Asks"

The Federal Clean Air Act sets a national goal to restore visibility to its natural conditions in many of the national parks and wilderness areas in the United States of America. New Jersey is home to one of these areas, the Brigantine Wilderness Area in the Edwin B. Forsythe National Wildlife Refuge. Additional measures to control air pollution, including ozone precursors, in New Jersey and other states within its shared ozone nonattainment area, as well as upwind contributing states, have occurred as part of states' Regional Haze State Implementation Plans (SIPs) for the first implementation planning period of 2008-2018. States in the MANE-VU region developed a list of "asks" for states that contribute to visibility impairment to consider undertaking as air pollution control measures in their Regional Haze SIPs. For some states, the Regional Haze SIPs included source-specific Best Available Retrofit Technology (BART) controls on specific eligible sources. It also included an ultra-low sulfur fuel measure for distillate and residual fuel oils that will also lower NO_x emissions from fuel burning sources.

6.9 Attainment Demonstration and Transport Summary and Conclusions

The Northern NJ-NY-CT Nonattainment Area is attaining the 84 ppb 8-hour ozone NAAQS based on ambient air quality monitoring data. The data presented in this SIP satisfies the requirements of the final SIP Call for the 84 ppb 8-hour ozone NAAQS.[127] New Jersey does not anticipate attainment of the 75 ppb 8-hour ozone NAAQS in the Northern NJ-NY-CT Nonattainment Area by the July 20, 2018 attainment date based on an evaluation of modeling and monitoring data.

Six of the seven monitors currently measuring noncompliance with the 75 ppb standard based on 2016 design values are in Connecticut and one is in New York. Additional emission reductions of ozone precursors are anticipated from control measures not in the modeling such as the 2016 CSAPR Update and other New Jersey measures. However, these reductions are not enough to bring the controlling Connecticut monitors into attainment by the attainment date.

All the monitors in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area are in compliance with 75 ppb standard. New Jersey has met its obligation for implementing control measures to address its contribution to ozone nonattainment within the nonattainment area. New Jersey has adopted state specific control measures that have significantly reduced ozone precursor emissions, most specifically those on peak ozone season days. These measures have reduced the local component of ozone formation in New Jersey, and it is showing in the New Jersey monitors.

Many of New Jersey's rules are more stringent than those in neighboring states. The compliant ozone design values at New Jersey monitors reflect all of the control measures implemented by

[127] 81 Fed. Reg. 26697 (May 4, 2016)

New Jersey, including rules for power plants, which have provided significant reductions from 2011 to present day. Other states have not implemented similar control measures and need to catch up to New Jersey to bring the controlling monitors in Connecticut into attainment.

Attainment of the ozone standard at the controlling nonattainment monitors in Connecticut will require additional actions by other states including New York, which is directly upwind of the monitors, as well as the USEPA to address the interstate transport of pollutants to these monitors, especially NO_x on high ozone days. These actions include: a full remedy by USEPA to address interstate ozone transport beyond the current 2016 CSAPR Update regulations; implementation of mobile source control measures by USEPA to reduce NO_x emissions from heavy-duty trucks; an update by USEPA to the Federal Aftermarket Catalytic Converter (AMCC) Policy (dated August 5, 1986)[128] and, other states adopt rules as stringent as those in New Jersey that address: HEDD power generation including behind-the-meter DG/DR electric generators, municipal waste combustors, as well as mobile source measures such as adoption of the California LEV Program and vehicle idling.

Attainment Demonstration Summary

Northern NJ-NY-CT Nonattainment Area 84 ppb 8-Hour Ozone NAAQS

The Northern NJ-NY-CT Nonattainment Area is attaining the 84 ppb 8-hour ozone NAAQS based on air quality monitoring data. The modeling attainment test also predicts all monitors in the Northern NJ-NY-CT Nonattainment Area will attain the 1997 84 ppb ozone NAAQS by the July 20, 2018 attainment date.

The highest predicted design value for 2017 is 83 ppb at Westport (Sherwood Island Connector) in Fairfield County, Connecticut. The current 2016 ozone design value at this monitor based on measured ambient air quality is 83 ppb. In a letter dated July 31, 2017, USEPA concurred with Connecticut's exceptional event demonstration. All other monitors in the nonattainment area were also predicted by the model to attain the 84 ppb ozone NAAQS by the July 20, 2018 attainment date. Current 2016 and preliminary 2017 ambient air quality monitoring data also show compliance with the standard. In addition, all monitor's in New Jersey have remained in compliance with the 1997 84 ppb NAAQS since 2013.

Northern NJ-NY-CT Nonattainment Area 75 ppb 8-Hour Ozone NAAQS

The modeling attainment test did not predict attainment of the 2008 75 ppb 8-hour ozone NAAQS. New Jersey does not anticipate attainment in the Northern NJ-NY-CT Nonattainment Area without a full transport solution from the USEPA and other states controlling to New Jersey levels.

The 8-hour ozone Northern NJ-NY-CT Nonattainment Area's monitor with the highest 2014-2016 monitored design value of 83 ppb is the Westport (Sherwood Island Connector), Connecticut monitor. Though that design value means the Northern NJ-NY-CT is not in compliance with the 2008 75 ppb ozone standard for the 2014-2016 period, all monitors in the New Jersey portion of the nonattainment area were below 75 ppb during that same period and have been below the 75 ppb standard since 2014.

Monitoring data does show a slight decreasing trend in the highest controlling Connecticut monitors from 2012 design values and 4th highest values, although the trend appears to be

[128] 51 Fed. Reg. 28114 (August 6, 1986). "Notice of Proposed Enforcement Policy Regarding the" Sale and Use of Aftermarket Catalytic Converters."

leveling off in later years. The 2011 design value is heavily influenced by the low 2009 ozone season.

Additional emission reductions of ozone precursors are anticipated from control measures not in the modeling such as from CSAPR Update and other NJ measures. However, these reductions are not enough to bring the Connecticut monitors into attainment by the attainment date.

New Jersey's NO_x and VOC (ozone precursor) emissions have decreased significantly. New Jersey's annual NO_x and VOC emissions have each decreased approximately 77 percent from 1990 to 2017 and 57 percent from 2002. Annual NO_x and VOC emissions have decreased approximately 31 percent and 17 percent, respectively, from 2011 to 2017. A significant decreasing trend has also been shown in 8-hour ozone air quality monitoring design values in New Jersey of approximately 39 percent from 1988 to 2016, 33 percent from 2002 and 15 percent from 2011.

New Jersey has met RACM and RACT requirements and has gone beyond RACM and RACT by adopting control measures more stringent than Federal rules, CTGs and neighboring state rules, especially those of most importance that address NO_x on high ozone days, setting the standard for what modern RACT should be. Of particular note are the following:

Power Plants

New Jersey has enforceable performance standards for NO_x and VOC emissions from power plants (or EGUs) that are among the most stringent and effective air pollution control regulations in the country. New Jersey has taken the lead by adopting measures to address emissions from EGUs that operate on HEDDs when ozone concentrations tend to be elevated. These sources are critically important contributors to episodes of elevated ozone in the Northern NJ-NY-CT Nonattainment Area.

All major facility permits for new EGU sources issued by the Department limit NO_x emissions based on hourly or daily averaging times, which are monitored by continuous emissions monitors (CEMs) and stack testing. These shorter averaging times lower NO_x emissions on a daily basis during the summertime (when they are needed to control outdoor ozone levels), rather than allowing facilities to emit high levels of NO_x during a summer day while still meeting an annual or ozone season cap. New Jersey's EGU rules include similar short-term emission limits for existing sources of NO_x, including all existing coal, oil and gas-fired EGU's.

New Jersey's EGU rules more effectively control ozone levels than the 2016 CSAPR Update because New Jersey's facilities must meet daily NO_x performance standards for all units, while facilities in other states may, under the Federal rules, purchase allowances to cover their excess emissions on high energy demand days. New Jersey's daily enforceable emission limitations better address ozone nonattainment than emission trading programs that allow the averaging of NO_x emissions over the entire summer. Five-month compliance periods are insufficient to ensure attainment of the ozone NAAQS because emissions can be high on days when ozone levels are high. Five-month averaging does not sufficiently lower emissions on the hottest summer days when peak electric demand and peak ozone levels usually occur. Unlike other states that significantly impact New Jersey's air quality, New Jersey power plants cannot turn off their NO_x pollution controls and use excess NO_x allowances to meet emission limits.

USEPA's ozone season trading program in the 2016 CSAPR Update is inadequate to address NO_x emissions from HEDD units that are preferentially used on high temperature, high ozone days. New Jersey has reduced NO_x emissions from power plants an estimated 64 tons per day on HEDD since implementation of the rule, with Phase I in 2009 and Phase II in 2015.

Distributed Generation/Demand Response (DG/DR)

New Jersey's rules for stationary reciprocating internal combustion engines (RICE) do not allow the use of uncontrolled engines for the purpose of distributed electric generation or demand response in non-emergency situations. However, in some states these engines are uncontrolled and used to assist the electric grid during high electric demand periods. The emissions from these units are not properly accounted for in states inventories, or in the USEPA National Emissions Inventory (NEI) and they are not properly temporalized in the modeling. Like HEDD EGUs, many of these engines are operating on hot summer days which usually coincide with the high ozone days. Emissions from these units in the New York City Metropolitan/Long Island area on peak ozone days may be significantly contributing to ozone formation.

Area Source VOC Rules

New Jersey has implemented several area source VOC control measures which are more stringent than Federal standards, many based on stringent California standards. These include rules for consumer products including hairspray, insecticides, household cleaners, air fresheners, automotive brake cleaners, carpet and upholstery cleaners and household adhesives, paints, stains and varnishes, automotive refinishing, industrial and commercial adhesives, asphalt paving and solvent degreasing.

State of the art (SOTA)

SOTA air pollution control must be implemented for significant equipment at minor facilities for new VOC and NO_x sources of air pollution.

Petroleum Storage

New Jersey has implemented one of the most stringent petroleum storage rules in the country, which established requirements to reduce VOC emissions from bulk petroleum storage facilities.

Municipal Waste Combustors

New Jersey has implemented measures to control NO_x emissions from Municipal Waste Combustors. New Jersey has taken significant actions to address these important sources while the USEPA, State of New York, and other nearby states, including upwind states that significantly contribute to ozone nonattainment, have not.

New Jersey Mobile Source Controls

New Jersey has also done its part to address emissions from mobile sources to the extent that state action on mobile source control measures is not pre-empted by the Clean Air Act. New Jersey has adopted a Low Emission Vehicle Program (NJLEV) addressing motor vehicle emissions based on the standards used by the State of California to ensure that the lowest emitting vehicles available in the nation are sold in New Jersey including zero emission Standards. Other states have not made the same commitment. New Jersey also has some of the most stringent rules in the country for vehicle idling and heavy-duty vehicle inspection and maintenance using on-board diagnostics (OBD) technology. USEPA must also do its part to address the largest source sector contributing to NO_x emissions within the nonattainment area, as well as, the region. USEPA should adopt new engine standards to reduce NO_x emissions from heavy-duty onroad diesel vehicles and update the Federal Aftermarket Catalytic Converter (AMCC) Policy.

New Jersey has met its RFP demonstration requirements. New Jersey's Northern nonattainment area has achieved a total reduction in VOC and NO_x summer tons per day emissions of 45 percent between 2011 and 2017. This is three times the RFP CAA requirement of a 15 percent reduction over the six-year period.

Transport

The Westport Connecticut monitor is the controlling monitor (or the last monitor predicted to reach attainment as emissions are generally reduced) for the area based on: the most recent monitoring data, the air quality modeling and the USEPA CSAPR modeling. The USEPA CSAPR modeling estimates the ozone contribution to the Westport monitor from the states within the Northern NJ-NY-CT Nonattainment Area to be approximately 30 ppb, with over half of that ozone concentration from New York. Pennsylvania's significant ozone contribution is estimated to be about equal to that of New Jersey yet Pennsylvania is not located within the nonattainment area. The combined significant ozone contribution from upwind states outside of the OTR is greater than the contribution attributed to Connecticut sources alone and nearly as much as New Jersey's estimated contribution.

The USEPA's final 2016 CSAPR Update rule requires ozone season NO_x reductions in 22 states, including the nine states that the USEPA found to significantly contribute to high ozone levels in Connecticut. Although the final rule will assist with lowering ozone levels across the Northeast, the USEPA acknowledges that it falls short of providing the full remedy required by the "good neighbor" provision of CAA section 110(a)(2)(D)(i)(I). A full transport remedy for the 75 ppb ozone standard will require additional emission reductions from the EGU sector that are not addressed by the current 2016 CSAPR Update. USEPA has not implemented a full remedy to address upwind contributions to downwind nonattainment areas for the 2008 75 ppb ozone NAAQS nor has it required the upwind states to supplement the 2016 CSAPR update requirements with additional control measures to satisfy CAA transport requirements.

The CAA requires states to address their significant contribution to ozone nonattainment within 3 years of the promulgation of the standard, ahead of the attainment demonstration SIP submittal deadline. However, USEPA's solution to transport, CSAPR, was adopted on September 7, 2016, and therefore too late and insufficient to address the transport contribution from upwind states to New Jersey's multi-state nonattainment area by the attainment deadline of July 2018 (2017 ozone season) for the 2008 75 ppb ozone NAAQS.
Addressing transported emissions, both to and from the State, is critical for New Jersey's multi-state nonattainment areas to attain and maintain the NAAQS. The Northern NJ-NY-CT Nonattainment Area will be unable to reach attainment until USEPA adopt a full remedy to transport.

Attainment Plan Conclusions

Further actions are needed by the USEPA and other states to attain the 75ppb 8-hour ozone NAAQS in the Northern NJ-NY-CT Nonattainment Area. New Jersey has done its share by implementing control measures beyond standard RACM and RACT, many more stringent than neighboring states, especially those targeting power generation on high ozone days.

Interstate transport of pollutants from states upwind of the controlling Connecticut monitors must be addressed in order attain compliance with the 75 ppb 8-hour ozone NAAQS. This would provide a necessary and appropriate Federal regulatory complement to the 2016 CSAPR update, which is insufficient to address daily NO_x emissions from power generation during the ozone season, and especially on days when high ozone is anticipated. Following are recommendations to achieve compliance:

- USEPA CSAPR

  USEPA should adopt a full remedy, addressing those largest contributing States identified by USEPA's analysis of contributing States outside the non-attainment area (e.g. Pennsylvania, Maryland, Ohio, Virginia, West Virginia and Indiana), to transport that includes, but is not limited to:

  - Daily NO_x performance standards for EGUs, including distributed generation units, similar to those implemented in New Jersey, in states that significantly impact the Northern NJ-NY-CT Nonattainment Area for ozone.

  - A requirement that all installed NO_x controls on EGU's be fully operated, as required in New Jersey.

- USEPA Mobile

  The USEPA must do its part to address the largest source sector contributing to NO_x emissions within the nonattainment area, as well as the region. For example, the USEPA should evaluate if new engine standards to reduce NO_x emissions from heavy-duty on-road diesel vehicles are feasible and prioritize an update to the Federal Aftermarket Catalytic Converter (AMCC) Policy dated August 5, 1986 to reflect the most recent technological advances.

- Address Power Generation Emissions in New York

  - The New York metropolitan area is directly upwind of the controlling Connecticut monitors, with a bay in between. New York should adopt and implement controls measures that meet RACT standards similar to those in New Jersey for High Electric Demand Day power generation, oil, gas and coal fired EGUs and DG/DR power generation. New Jersey has adopted measures to address emissions from EGU sources that operate on high electric demand days when ozone concentrations tend to be elevated. It is important for upwind states to also implement measures to reduce emissions from electric generation on high electric demand days, including electric generating units in CAMD, smaller electric generating units and behind the meter demand response units. New York could build off of the Ozone Transport Commission (OTC) High Electric Demand Day (HEDD) model rule and workgroup effort to reduce emissions from HEDD power generation in the New York City area. Bringing these units into compliance with modern RACT standards will assist New York in meeting its good neighbor requirements and assist in achieving attainment of the 75 ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area.

  - New York recently adopted a regulation, 6 NYCRR Part 222, that establishes performance standards for distributed generation sources. On March 1, 2017, the implementation and enforcement of this rule was challenged and subsequently stayed. The implementation of this rule in New York and similar rules in upwind states will contribute to the attainment of the 75ppb ozone standard in the Northern NJ-NY-CT Nonattainment Area.

- New Jersey RACT Rules in Other States

  Nonattainment area and upwind states should adopt and implement controls measures that meet RACT standards similar to those in New Jersey for sources such as HEDD power generation, DG/DR power generation and municipal waste combustors. In addition to electric generation rules discussed above, New York should take action to adopt rules for municipal waste combustors, similar to those implemented in Connecticut and New Jersey.

- New Jersey Mobile Source Rules in Other States

  Nonattainment area and upwind states should adopt mobile source measures similar to those in New Jersey such as the California Low Emission Vehicle Program and heavy-duty vehicle OBD inspection and maintenance.

New Jersey is complying with the USEPA's requirements regarding interstate transport as it relates to the 8-hour ozone NAAQS and has done its part to ensure that it is not interfering with the ability of its neighboring states to attain and maintain the ozone NAAQS. Many of New Jersey's existing air pollution control requirements are more stringent than those in neighboring upwind states. All monitors in the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area are below the 75 ppb standard and have been since 2014. Therefore, New Jersey has met its obligations for attainment of the 75 ppb ozone NAAQS.

Chapter 7 CONFORMITY

The Clean Air Act[129] requires that Federal actions conform to a state's State Implementation Plan (SIP). Specifically, the act requires the action/activity will not:

- Cause or contribute to any new violation of any standard in any area;
- Increase the frequency or severity of any existing violation of any standard in any area; or,
- Delay timely attainment of any standard or any required interim emission reductions or any other milestones in any area.

To implement this requirement the Clean Air Act directed the United States Environmental Protection Agency (USEPA) to issue rules that governed how conformity determinations would be conducted for two categories of actions/activities; a) those dealing with transportation plans, programs and projects (Transportation Conformity), and b) all other actions, e.g., projects requiring Federal permits. This latter category is referred to as General Conformity.

7.1 Transportation Conformity

The Federal Transportation Conformity Rule (40 CFR Sect. 93.100-160) provides the process by which the air quality impact of transportation plans, transportation improvement programs, and projects are analyzed. The agency preparing plans (20 or more years), transportation improvement programs (at least four years), or approving a transportation project must analyze the emissions expected from such a proposal in accordance with the Transportation Conformity Rule.[130]

For the purposes of transportation conformity, the emission budget is essentially a cap on the total emissions allocated to onroad vehicles. The projected emissions from a transportation plan, transportation improvement program, or project, estimated in accordance with the Transportation Conformity Rule, may not exceed the motor vehicle emissions budget or cap contained in the appropriate SIP. Emissions in years for which no motor vehicle emissions budgets are specifically established must be less than or equal to the motor vehicle emissions budget established for the most recent prior year.

According to the USEPA's Implementation Rule,[131] 8-hour ozone transportation conformity budgets must be established for the RFP emission reduction milestone year of 2017. For the Northern NJ-NY-CT Nonattainment Area, 2017 is also the 8-hour ozone attainment year. This section finalizes 8-hour ozone Transportation Conformity emission budgets for 2017 for the North Jersey Transportation Planning Authority (NJTPA) which is the Metropolitan Planning Organization (MPO) for the nonattainment counties in New Jersey. As shown in Figure 7-1, New Jersey's 21 counties fall into one of three Metropolitan Planning Organizations.

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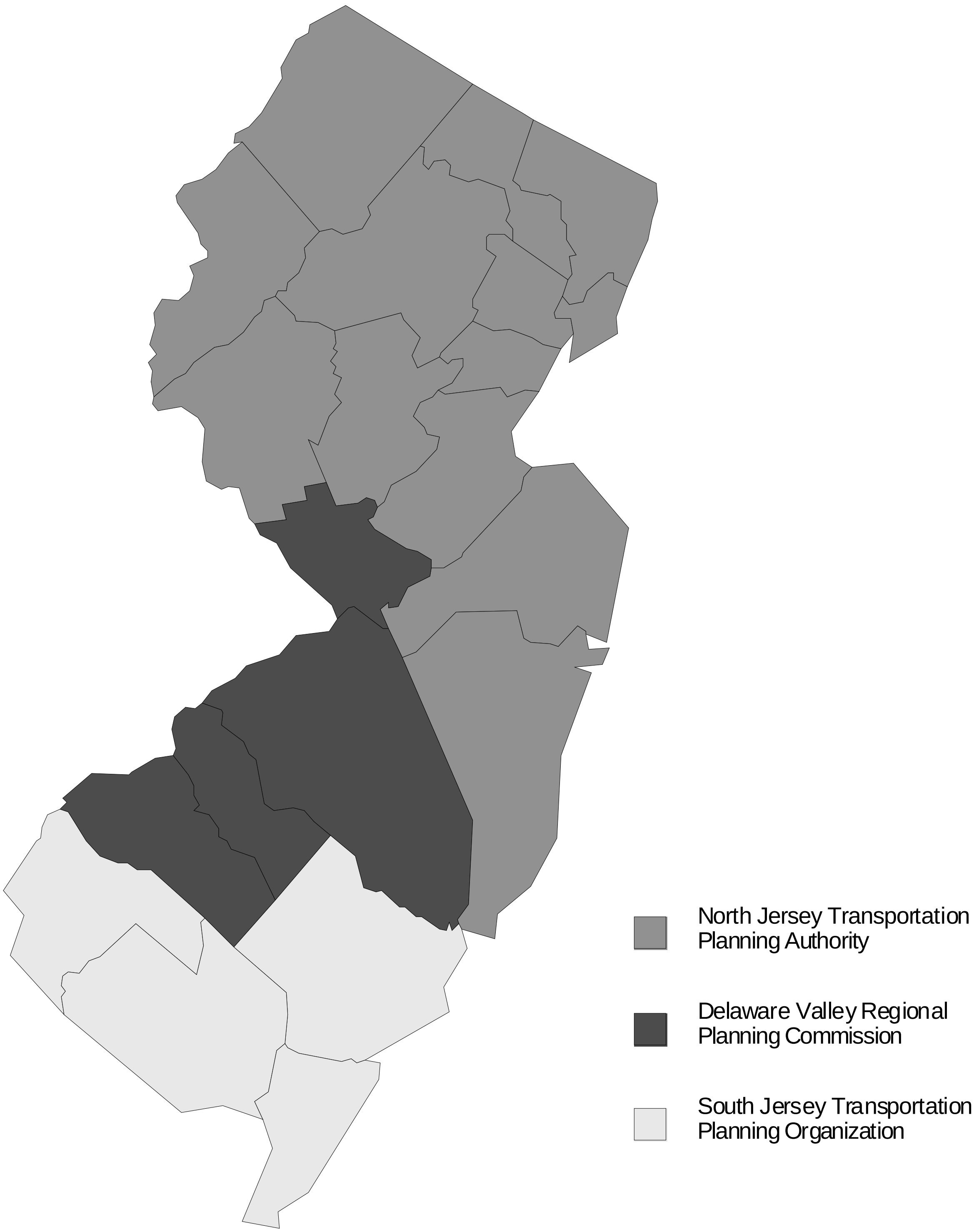
[129] 42 U.S.C. §7506

[130] For New Jersey, such plans are prepared by three Metropolitan Planning Organizations (North Jersey Transportation Planning Authority, South Jersey Transportation Planning Organization and Delaware Valley Regional Planning Commission).

[131] Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule, 80 FR 12264, March 6, 2015.

<u>**Figure 7-1: Metropolitan Planning Organizations in New Jersey**</u>



Each Metropolitan Planning Organization is responsible for the transportation plans and transportation improvement programs for its designated area, and they each work in consultation with the United States Department of Transportation (USDOT), USEPA, New Jersey Department of Transportation (NJDOT), and New Jersey Department of Environmental Protection (NJDEP) to meet established transportation emission budgets for their area. The transportation conformity budgets are established for each Metropolitan Planning Organization area by nonattainment area. For example, the NJTPA MPO includes the 13 northernmost counties in New Jersey; however, the Northern NJ-NY-CT Nonattainment Area includes only 12 of these counties (Ocean County is part of the Southern NJ-PA-DE-MD Nonattainment Area). Budgets for a nonattainment area were calculated by adding the onroad emissions from individual counties.

New Jersey has two 8-hour ozone nonattainment areas, i.e., the Northern NJ-NY-CT Nonattainment Area and the Southern NJ-PA-DE-MD Nonattainment Area. Only the Northern NJ-NY-CT Nonattainment Area is the subject of this SIP revision. This area is classified as “moderate” based on the severity of its ozone problem. Areas classified as moderate must demonstrate attainment by July 20, 2018 or the 2017 ozone season.

The control measures assumed in the development of the Transportation Conformity budgets are those used to estimate highway onroad emissions as described in Chapter 4. The approach used to calculate the budgets is the same as that used to calculate the emission inventories as described in detail in Appendix 4-7. The onroad source emission projections are presented in Table 7-1. These emission projections are being established as the 8-hour ozone Transportation Conformity budgets.

Table 7-1: 8-Hour Ozone Transportation Conformity Budgets

Transportation Planning Area	VOC Emissions (tons per summer work weekday)	NO_x Emissions (tons per summer work weekday)
	2017	2017
North Jersey Transportation Planning Authority - 12 Counties (Excluding Ocean County)	103.22	48.69

7.2 General Conformity

The authority to address General Conformity is set forth in Section 176(c) of the Clean Air Act and the requirements to demonstrate conformity are found in the USEPA’s implementing regulation (40 CFR Part 93, Subpart B – Determining Conformity of General Federal Actions to State or Federal Implementation Plans). The purpose of General Conformity is to ensure that actions undertaken by Federal agencies will conform to the State Implementation Plan (SIP) to attain and maintain the National Ambient Air Quality Standards (NAAQS).

General Conformity applies to criteria pollutants in nonattainment and maintenance areas. Actions that receive Federal funding, require a Federal permit, license, approval or support but do not fall under Transportation Conformity are subject to General Conformity. The Federal General Conformity regulation (40 CFR 93.161) provides Federal installations with the ability to develop a facility-wide budget to demonstrate conformity. New Jersey has established General Conformity budgets for McGuire Air Force Base (AFB) and Lakehurst Naval Air Station (NAS) for volatile organic compounds (VOC) and oxides of nitrogen (NO_x) and continue to remain in effect.

Chapter 8 OTHER SIP COMPONENTS

8.1 Infrastructure CAA Section 110

When the USEPA establishes a new or makes a revision to a NAAQS, the CAA Section 110(a)(2)(D) (or 42 U.S.C. § 7410(a)(2)(D)), requires the states to submit to the USEPA a SIP revision or certification indicating that the State has the authority to develop, implement, and enforce an air quality management program that provides for attainment and maintenance of the NAAQS. This SIP revision is referred to as an "Infrastructure" SIP.

Table 8-1 provides a summary of the SIP elements and the citations for New Jersey's authority in the State's statutes, including the Air Pollution Control Act.

Table 8-1: Infrastructure Elements Required under the CAA Section 110(a)(2)

CAA Element	Summary of Element	New Jersey Authority
110(a)(2)(A)	Enforceable Emission Limitations and Other Control Measures	N.J.S.A. 26:2C-8, 9, 18 and 19 N.J.A.C. 7:27
110(a)(2)(B)	Air Quality Monitoring, Compilation, Data Analysis, and Reporting	N.J.S.A. 26:2C-9.a.
110(a)(2)(C)	Enforcement and Stationary Source Permitting	N.J.S.A. 13:1D-9 N.J.S.A. 26:2C-8 and 19 N.J.S.A. 26:2C-9.b (specifically 9.b(4), 9.b(5) and 9.b(8)) and 9.1 N.J.A.C. 7:27 and 7:27A N.J.A.C. 7:27-8 and 22
110(a)(2)(D)	Interstate Transport of Air Pollution and International Pollution Abatement	N.J.A.C. 7:27 N.J.A.C. 7:27-22.11(k) and 22.24 N.J.S.A. 26:2C-8 and specifically 8.11 N.J.S.A. 26:2C-9 and 9.b(6)
110(a)(2)(E)	Resources, Conflict of Interest, and Emergency Backstop	N.J.S.A. 26:2C-3.2 and 8 N.J.S.A. 13:1D-9 N.J.S.A. 52:13D-14 and 16 N.J.S.A. 26:2C-22 N.J.S.A. 26:3A2-21 et seq. N.J.A.C. 7:1H-1 et seq.
110(a)(2)(F)	Stationary Source Emissions Monitoring and Reporting	N.J.S.A. 26:2C-9.b(3) and (4) and 9.2 N.J.A.C. 7:27-8, 11.3(e), 21, and 22.18
110(a)(2)(G)	Emergency Powers and Contingency Plans	N.J.S.A. 26:2C-26 et seq. N.J.A.C. 7:27-12
110(a)(2)(H)	State Implementation Plan Revision for Revised Air Quality Standards or New Attainment Methods	N.J.S.A. 13:1D-9
110(a)(2)(I)	State Implementation Plan for Non-attainment Areas	N.J.S.A. 13:1D-9
110(a)(2)(J)	Consultation, Public Notification, and Prevention of Significant Deterioration	N.J.S.A. 26:2C-8, 9, and 19 N.J.S.A. 52:14B-1 et seq. N.J.A.C. 7:27-8.10 and 22.11
110(a)(2)(K)	Air Quality Modeling and Reporting	N.J.S.A. 26:2C-9.2(b) N.J.A.C. 7:27-8.5 and 22.8
110(a)(2)(L)	Major Stationary Source Permitting Fees	N.J.A.C. 7:27-22.31 N.J.S.A. 26:2C-9.b(7), 9.5 and 9.6
110(a)(2)(M)	Consultation with Local Entities	N.J.S.A. 26:2C-8 N.J.S.A. 52:14B-1 et seq.

On October 17, 2014, the NJDEP submitted a Multi-Pollutant Infrastructure SIP revision to USEPA, which addressed the requirements of CAA Section 110(a)(2)(D) for the 2008 75 ppb 8-

hour ozone NAAQS. A summary of the status of each infrastructure element listed above is contained within this SIP. A summary of USEPA actions to date on this SIP is discussed below.

Transport

On March 30, 2016, New Jersey withdrew the interstate transport element of the Multi-Pollutant Infrastructure SIP revision as it pertained to the 2008 75 ppb 8-hour ozone NAAQS in order to be included in the FIP for the 2016 CSAPR Update. On June 15, 2016 [132], USEPA published a finding of failure to submit for New Jersey for the interstate transport requirements of CAA Section 110(a)(2)(D)(i)(I) for the 2008 75 ppb 8-hour ozone NAAQS, which was necessary for USEPA to promulgate a FIP to address interstate transport for the 2008 75 ppb 8-hour ozone NAAQS. Transport is discussed in more detail in Chapter 6 Section 6.2.

Prevention of Significant Deterioration (PSD) Permitting

On September 19, 2016 [133], USEPA disapproved New Jersey's Infrastructure SIP submittal related to element (D)(i)(II) prong 3 (PSD program only) for the 2008 Lead, 2008 Ozone, 2010 NO_2, 2010 SO_2, and 2012 PM2.5, 2006 PM10 and 2011 CO NAAQS. USEPA noted in its disapproval that New Jersey is complying with the Federal PSD requirements by accepting delegation of the Federal rules and has been successfully implementing this program for many years. However, USEPA does not recognize a delegated PSD program as satisfying the Infrastructure SIP requirements.

New Jersey's PSD permitting program applies when a major source that is located in an area designated as attainment or unclassifiable for any criteria pollutant, is constructed, or undergoes a major modification. New Jersey has elected to comply with the Federal PSD requirements by accepting delegation of the Federal rules and has been successfully implementing this program for many years. New Jersey accepted delegation of the administration of the Federal PSD program from the USEPA on February 22, 1983 and the provisions of 40 CFR 52.21(b) through (w), related to Prevention of Significant Deterioration, were incorporated into New Jersey's SIP at 40 CFR 52.1603(b). New Jersey's delegation was most recently revised on July 11, 2011. However, USEPA does not recognize a delegated PSD program as satisfying the Infrastructure SIP requirements. Therefore, USEPA disapproved New Jersey's submittal pertaining to the requirements of CAA section 110(a)(2)(D)(i)(II) requirement for PSD (or prong 3) for the 2008 Lead, 2008 Ozone, 2010 NO_2, 2010 SO_2, and 2012 PM2.5, 2006 p.m.10 and 2011 CO NAAQS. However, the disapprovals will not trigger any sanctions or additional Federal Implementation Plan obligation since a PSD Federal Implementation Plan is already in place.

New Jersey's regulations at N.J.A.C 7:27-8.5, 18, and 22.8 meet the Federal requirements for preventing a violation of the NAAQS in areas already attaining the NAAQS.

Visibility

On September 19, 2016 [134], USEPA approved the portion of the October 17, 2014 SIP submittal from New Jersey pertaining to the requirements of CAA section 110(a)(2)(D)(i)(II) requirement for visibility (or prong 4) for the 2008 Lead, 2008 Ozone, 2010 NO_2, 2010 SO_2, and 2012 PM2.5, 2006 PM10 and 2011 CO NAAQS.

[132] 81 Fed. Reg. 38963 (June 15, 2016).
[133] 81 Fed. Reg. 64070 (September 19, 2016).
[134] 81 Fed. Reg. 64070 (September 19, 2016).

NNSR

On February 3, 2017 [135], USEPA published a finding of failure to submit for New Jersey's NNSR element. USEPA determined that New Jersey's SIP did not include the NNSR element addressing the Northern NJ-NY-CT and Southern NJ-PA-DE-MD Nonattainment Areas for the 75 ppb ozone NAAQS required under subpart 2 of part D of Title 1 of the CAA and the 2008 Ozone SIP Requirement Rule. NNSR is addressed in this SIP in Chapter 8 Section 8.2.

8.2 New Source Review/Permitting

8.2.1 Introduction and Background

The CAA section 110(a)(2)(C) requires that States include a permitting program in their SIP to ensure that the construction or modification of a stationary source of air pollution does not interfere with the attainment or maintenance of a NAAQS or violate the control strategy in a nonattainment area. The Federal New Source Review (NSR) program is a pre-construction permitting program designed to meet these requirements. The Federal NSR program has three components: nonattainment NSR (NNSR); prevention of significant deterioration (PSD); and minor NSR.

The NNSR program applies when a new major stationary source is constructed in a nonattainment area, or if the proposed or actual emissions from a modified existing source exceed the applicable thresholds at 40 CFR 51.165 and 40 CFR Part 51, Emission Offset Interpretative Ruling (Appendix S). NNSR can also apply to a major source or major modification that is proposed in an attainment or unclassifiable area, if it would significantly affect a nonattainment area or cause a violation of the NAAQS in an attainment area. To obtain a permit that complies with the Federal requirements, an applicant must show that the lowest achievable emission rate (LAER) control technology will be installed; certify that all major sources owned or operated by the applicant in the state are in compliance with all applicable State rules and Federal regulations; conduct an alternative siting analysis, which demonstrates that the benefits of the proposed construction or modification outweigh its environmental and social costs; and secure creditable emission reductions to offset increased emissions. New Jersey's NNSR program is described in section 8.2.3 below.

The PSD program applies to new and modified major sources in an attainment or unclassifiable area. A new or modified source that is subject to the PSD requirements must obtain a pre-construction permit and demonstrate compliance with the PSD program requirements at 40 CFR Part 52.21. The PSD program is administered by USEPA, a state that USEPA has delegated permit review authority, or a state that has incorporated the Federal PSD program regulation into its SIP. New Jersey has delegated permit review authority pursuant to the April 19, 1983 delegation agreement between USEPA and New Jersey (48 FR 16738) as revised on July 15, 2011. Therefore, the Department includes the Federal PSD program requirements in its air pollution control permits, and reviews permit applications to ensure that the permits reflect compliance with the PSD program requirements. The PSD requirements are reflected in N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22.

The minor NSR program applies to the construction or modification of minor sources, whether the area in which the source is located is designated in attainment or nonattainment. The Federal minor NSR program rules at 40 CFR Part 51, Subpart I, do not establish specific standards or requirements for the regulated entities; these are left to the states to formulate. A state can customize the requirements of the minor NSR program if its program meets minimum

[135] 81 Fed. Reg. 64070 (September 19, 2016).

requirements. New Jersey's minor NSR program at N.J.A.C. 7:27-8 is part of the SIP's control strategy to achieve and maintain the NAAQS for ozone and other criteria pollutants.

8.1.3 New Jersey's NNSR Program

New Jersey is required to have a permitting program that conforms with section 172(c)(5) and section 173 of the CAA related to requirements for ozone nonattainment areas. Most New Jersey counties were designated as nonattainment for the 1-hour ozone NAAQS and classified as severe. New Jersey implemented an NNSR permitting program statewide for addressing the ozone precursors (VOC and NO_x) in accordance with the requirements of its 1-hour ozone classification. New Jersey continues to be designated nonattainment statewide for the 75ppb and 70 ppb ozone 8-hour ozone NAAQS, therefore, the existing statewide ozone NNSR program remains in effect and applies to the 8-hour ozone NAAQS for major stationary sources in accordance with requirements for anti-backsliding at CAA section 172(e).

New Jersey codified these Federal NNSR requirements for ozone and other criteria pollutants (other than PM2.5) at N.J.A.C. 7:27-18, the Emission Offset rules, which are part of its SIP. New Jersey's proposal to address the Federal requirements for PM2.5 emissions in the Emission Offset rules was proposed in the March 20, 2017 New Jersey Register. The provisions of N.J.A.C. 7:27-18 are at least as stringent as the Federal requirements at 40 CFR 51.165 for ozone and its precursors discussed further below.

8.1.4 NNSR Program Compliance Certification

<u>USEPA Checklist</u>

This section addresses the submittal requirements for New Jersey's NNSR program for implementing the 2008 75 ppb ozone NAAQS. In the final rule published in the February 13, 2017 Federal register (82 FR 9158), USEPA determined that New Jersey's SIP did not include the NNSR element addressing the New York-Northern New Jersey-Long Island (Northern NJ-NY-CT) and Philadelphia-Wilmington-Atlantic City nonattainment areas (Southern NJ-PA-DE-MD) for the 75 ppb ozone NAAQS required under subpart 2 of part D of Title 1 of the CAA and the 2008 Ozone SIP Requirement Rule.[136] New Jersey's Infrastructure SIP[137], dated September 2014, did not include the NNSR component because USEPA's September 2013 guidance[138] stated that the NNSR elements were not to be addressed in infrastructure SIP submissions and were to be addressed through a separate process.

In this SIP revision, New Jersey addresses the SIP deficiency identified by USEPA. New Jersey demonstrates and documents that the existing NNSR rules are at least as stringent as the Federal provisions for the 75 ppb ozone standard.

In November 2016, USEPA issued a checklist for determining if the 2008 ozone NAAQS NNSR SIP submittals adequately address the Federal NNSR requirements specified at 40 CFR 51.165. The checklist requires New Jersey to address the following provisions:

[136] 80 Fed. Reg. 12264 (March 6, 2015)
[137] NJDEP State Implementation Plan (SIP) Revision Section 110(a)(1) and 110(a)(2), for the Lead, Sulfur Dioxide, Nitrogen Dioxide, Ozone, PM2.5 and PM10, and Carbon Monoxide National Ambient Air Quality Standards and Regional Haze, dated September 2014.
[138] USEPA Guidance on Infrastructure SIP Elements under Clean Air Act Sections 110(a)(1) and 110(a)(2), September 13, 1013.

A. 1997 Ozone NAAQS Phase 2 Implementation Final Rule November 29, 2005: USEPA asked to address the following eight Federal provisions of 40 CFR 51.165:

1. (a)(1)(iv)(A)(1)(i)-(iv) and (2): Major source thresholds for ozone – VOC and NO_x.
2. (a)(1)(iv)(A)(3): Change constitutes a major source by itself.
3. (a)(1)(v)(E): Significant net emissions increase of NO_x is significant for ozone.
4. (a)(1)(v)(F): Any emissions change of VOC in Extreme area triggers NNSR.
5. (a)(1)(x)(A)-(C) and (E): Significant emissions rates for VOC and NO_x as ozone precursors.
6. (a)(3)(ii)(C)(1)-(2): Provisions for emissions reduction credits.
7. (a)(8): Requirements for VOC apply to NO_x as ozone precursors.
8. (a)(9)(i)-(iii): Offset ratios for VOC and NO_x for ozone nonattainment areas.

B. 2008 Ozone NAAQS SIP Requirements Final Rule March 6, 2015:

1. Federal anti-backsliding provision of 40 CFR 51.165.

The New Jersey NNSR program complies with all of the Federal provisions list above. A compliance demonstration of the New Jersey NNSR rules with the Federal provisions is provided in Table 8-2 below.

Former SIP Deficiencies

The Department submitted an equivalency determination on December 29, 2005 (http://www.nescaum.org/documents/new-source-review-equivalency-demonstration-letters/), documenting that New Jersey's current NNSR program is more stringent than the Federal program, including lower applicability levels than the Federal rules. In Attachment-3 of the December 29, 2005 submittal, the Department addressed all former SIP deficiencies.

New Jersey NNSR Program Compliance Certification

New Jersey is certifying that its existing NNSR rules codified at N.J.A.C. 7:27-18, which regulate the New Jersey portions of the Northern NJ-NY-CT and Southern NJ-PA-DE-MD Nonattainment Areas for the 2008 75 ppb 8-hour ozone NAAQS are at least as stringent as the Federal requirements at 40 CFR 51.165 for ozone and its precursors as amended by the final rule entitled "Implementation of the 2008 National Ambient Air Quality Standard for Ozone: State Implementation Plan Requirements (80 FR 12264, March 6, 2015). A compliance demonstration of New Jersey NNSR rules with the Federal provisions is provided in Table 8-2.

Table 8-2:
New Jersey Nonattainment New Source Review (NNSR) Rules
Compliance Demonstration with Federal Provisions

	75 ppb Ozone NNSR SIP Requirements	Federal Provisions	New Jersey Provisions*
1	Major source thresholds for ozone – VOC and NO_x	40 CFR 51.165(a)(1)(iv)(A)(1)(i)-(iv) and (2)	N.J.A.C. 7:27-18.2(a)1 and 2
2	Change constitutes a major source by itself	40 CFR 51.165(a)(1)(iv)(A)(*3*)	N.J.A.C. 7:27-18.2(a)2
3	Significant net emissions increase of NO_x is significant for ozone	40 CFR 51.165(a)(1)(v)(E)	N.J.A.C. 7:27-18.7(a)1 and 2; and the definition of “Respective criteria pollutant” at N.J.A.C. 7:27-18.1
4	Any emissions change of VOC in Extreme area triggers NNSR	40 CFR 51.165(a)(1)(v)(F)	Not Applicable. New Jersey does not have, nor has ever had, “extreme” areas
5	Significant emissions rates for VOC and NO_x as ozone precursors	40 CFR 51.165(a)(1)(x)(A)-(C) and (E)	N.J.A.C. 7:27-18.7, Table 3
6	Provisions for emissions reduction credits	40 CFR 51.165(a)(3)(ii)(C)(*1*)-(*2*)	N.J.A.C. 7:27-18.5(a) and (b) N.J. A.C. 7:27-18.1 N.J.A.C. 7:27-18.8(f)
7	Requirements for VOC apply to NO_x as ozone precursors	40 CFR 51.165(a)(*8*)	N.J.A.C. 7:27-18.2(a)1 and 2; N.J.A.C. 7:27-18.7, Table 3, and the definition of “Respective criteria pollutant” at N.J.A.C. 7:27-18.1
8	Offset ratios for VOC and NO_x for ozone nonattainment areas	40 CFR 51.165(a)(*9*)(i)-(iii)	N.J.A.C. 7:27-18.5(c), Table 2
9	Anti-backsliding provision(s), where applicable	40 CFR 51.165(a)(*12*)	Statewide NNSR thresholds and offset ratios were adopted in1992 based on New Jersey’s most stringent classification of severe nonattainment for the 1-hour ozone NAAQS. These thresholds and offset ratios have not been amended to be less stringent since adoption. The entire State continues to be in nonattainment for the 84 ppb and 75 ppb 8-hour ozone NAAQS, therefore, the existing ozone NNSR program remains in effect with no amendments that affect stringency.

* A copy of N.J.A.C. 7:27-18 is available at http://www.state.nj.us/dep/aqm/Sub18.pdf

Chapter 9 CONTINGENCY MEASURES

9.1 Introduction

The CAA Sections 172(c)(9) and 182(c)(9) and the USEPA Ozone Implementation Rule for the 2005 75 ppb 8-hour ozone standard[139] require that the SIPs for all 8-hour ozone nonattainment areas include contingency measures. Contingency measures are additional controls needed to further reduce emissions in the event an area fails to meet a reasonable further progress (RFP) milestone or fails to attain by its attainment date. These contingency measures must be fully adopted rules or measures that are ready for implementation quickly without further action by the State or the USEPA upon failure to meet a RFP milestone or reach attainment.

The USEPA has provided guidance over time that defines the requirements for identifying RFP and attainment demonstration contingency measures. Specifically:

- Contingency measures are required for each milestone year. As discussed in Chapter 4, the future projection year for the attainment demonstration is 2017. Therefore, the 75 ppb 8-hour ozone attainment milestone is defined as 2017. For nonattainment areas with an attainment date of July 20, 2018, the only applicable RFP milestone is also 2017 (reductions obtained between 2011 and 2017, six years after the base year), which is the same milestone as the attainment demonstration milestone in this SIP.

- Contingency measures, combined, must provide for a three percent reduction in the 2011 base year VOC emissions inventory for both RFP and attainment.[140]

- Post-1996 RFP and attainment demonstration contingency measures may reduce emissions of either VOC or NO_x. However, in meeting the three percent reduction requirement, a minimum of 0.3 percent VOC must be included.[141]

9.2 Contingency Measures for RFP and Attainment

New Jersey must identify contingency measures to be implemented in the event that the State does not attain the 2005 75 ppb 8-hour ozone standard by July 20, 2018, as determined by the 2017 ozone season design values. Both the RFP and attainment contingency requirement for the New Jersey portion of the Northern NJ-NY-CT Nonattainment Area will be met with a combination of VOC and NO_x emission reductions from Federal and state onroad and nonroad mobile control measures due to fleet and equipment turnover from 2017 to 2018, which was not included in the attainment demonstration modeling.

The turnover of the onroad fleet of cars and trucks as well as the turnover of nonroad equipment will result in additional VOC and NO_x emission benefits beyond the 2017 modeled projection year because the new vehicles/equipment have significantly lower emission standards than the older sources they are replacing. The new vehicle/equipment emission standards are lower primarily because of a number of Federal rules such as: the Tier 2 and Tier 3 standards for automobiles and light trucks, the 2007 Heavy Duty Diesel standards for large diesel highway trucks, the 2004 Tier 4 emission standards for nonroad diesel engines, and the 2008 emission standards for new nonroad spark-ignition engines, equipment and vessels. The new vehicle emission standards are also lower due to the New Jersey Low Emission Vehicle Program that includes the zero emission vehicle standards. The 2017 to 2018 emission benefits for onroad

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[139] 80 Fed. Reg. 12285 (March 6, 2015).
[140] 57 Fed. Reg. 13498 (April 16, 1992).
[141] USEPA Memorandum from Michael H. Shapiro to Region Air Directors, “Guidance on Issues Related to 15% Rate-of-Progress Plans,” August 23, 1993.

and nonroad fleet/equipment turnover were estimated as one-sixth the difference between the actual 2011 emissions and the projected 2017 emissions. This calculation results in an estimated VOC benefit of 7.9 tons per day and NO_x benefit of 16.6 tons per day. Calculation details are provided in Appendix 9-1.

Table 9-1 summarizes the contingency measure calculations including the three percent necessary based on the 2011 inventory, the minimum amount of contingency that must be VOC based on 0.3 percent of the base, the amount of onroad and nonroad emission reductions available for contingency and the emission reductions allocated for 2017 contingency for the New Jersey portion of the Northern NJ-NY-CT.

Table 9-1:
Contingency Measure Demonstration for RFP and Attainment for the New Jersey Portion of the Northern NJ-NY-CT Ozone Nonattainment Area

2011 Base Year Inventory		Three Percent Contingency Requirement (three percent of base)	Three Percent Contingency Requirement with NO_x Substitution (VOC 0.3 percent of base)	Reductions from Onroad and Nonroad Fleet Turnover for 2018	Reductions Allocated for 2017 RFP and Attainment Contingency
summer tpd		summer tpd	summer tpd	summer tpd	summer tpd
VOC	360	10.8	1.1	7.9	**7.9**
NO_x	379	NA	9.7	16.6	**2.9**
Total		10.8	10.8	24.5	**10.8**

9.3 Contingency Measure Implementation Schedule

States have no more than one year after notification by the USEPA of an RFP or attainment failure to achieve the contingency plan reductions.[142] New Jersey's designated contingency measures are already adopted and implemented measures with future effective new benefits. Therefore, no additional schedule is necessary for new control measures.
By following the USEPA's guidance that encourages early implementation of contingency measures and relying on measures already implemented, New Jersey is ensuring that any contingency measures will not need to be backfilled, and is safeguarding itself against failure to meet the RFP and attainment milestones.

9.4 Contingency Measure Conclusions

New Jersey demonstrates that it has met its contingency requirements for both RFP and attainment.

[142] 57 Fed. Reg. 13498 (April 16, 1992).