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Alexander B. Grannis
Commissioner

FEB - 8 2008

Honorable Alan J. Steinberg
Regional Administrator
U.S. EPA Region 2
290 Broadway
New York, NY 10007-1866

Final Proposed Revision to the
New York State Implementation Plan For Ozone (8-Hour NAAQS):
New York Metro Area

Dear Regional Administrator Steinberg:

The New York State Department of Environmental Conservation (Department) is submitting a final state implementation plan (SIP) revision entitled "New York State Implementation Plan for Ozone (8-Hour NAAQS) – Attainment Demonstration for New York Metro Area". The Department continues to demonstrate attainment of the 8-hour ozone national ambient air quality standard (NAAQS) in 2012. This submittal meets all of the requirements of a serious ozone non-attainment area, including an attainment demonstration and requisite rate of progress demonstration through 2012. It is being submitted pursuant to section 182 of the 1990 Clean Air Act Amendments.

On April 15, 2004 EPA designated as "nonattainment" areas throughout the country that exceeded the health-based standards for 8-hour ozone. The New York – N. New Jersey – Long Island, NY-NJ-CT area, which includes the New York State counties of Suffolk, Nassau, Richmond, New York, Kings, Queens, Bronx, Westchester and Rockland, was designated non-attainment with a moderate classification. The New York – N. New Jersey – Long Island, NY-NJ-CT non-attainment area also includes counties in the states of Connecticut and New Jersey.

On August 9, 2007, the Department proposed an ozone SIP revision that underwent a public review process. A Notice of Public Hearing was published in the Environmental Notice Bulletin, Newsday, New York Post and The Journal News on August 29, 2007. A public hearing was held in New York City on October 2, 2007. The Department accepted written comments until the close of business on October 10, 2007. Comments were received from the United States Environmental Protection Agency and Manufacturers of Emission Controls Association.

Furthermore, the Department has analyzed the preliminary 2007 ozone data and determined that attainment prior to 2012 is unlikely. As a result, under separate cover, the Department is requesting a voluntary reclassification to "serious" in accordance with CAA section 181(b)(3). This is consistent with the 2012 attainment data put forth in the August 9, 2007 proposal and this February 2008 final proposed revision.

The following documents are enclosed:

1. Copies of the Public Notices published in the Environmental Notice Bulletin, Newsday, New York Post and The Journal News on August 29, 2007.
2. Legislative Hearing Transcript
3. Responsiveness Summary
4. February 2008 Final Proposed Revision: New York State Implementation Plan for Ozone – 8-Hour NAAQS – Attainment Demonstration for New York Metro Area

If you have any questions, please contact Mr. Robert D. Bielawa, P.E or Mr. Matthew Reis, P.E. at (518) 402-8396.

Sincerely,

J. Jared Snyder
Assistant Commissioner
Office of Air Resources, Climate Change and Energy

Enclosures

cc: R. Ruvo, EPA
D. Shaw
R. Sliwinski
M. Reis
R. Bielawa
C. McCarthy

NEW YORK
STATE IMPLEMENTATION PLAN
FOR
OZONE
(8-HOUR NAAQS)

ATTAINMENT DEMONSTRATION
FOR
NEW YORK METRO AREA

FINAL PROPOSED REVISION FEBRUARY 2008

New York State Department of Environmental Conservation
ELIOT SPITZER, GOVERNOR ***ALEXANDER GRANNIS, COMMISSIONER***

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STATE OF NEW YORK

ELIOT SPITZER
GOVERNOR

May 14, 2007

Jared Snyder
Assistant Commissioner
New York State Department of
Environmental Conservation
625 Broadway
Albany, NY 12233-1010

Dear Assistant Commissioner Snyder:

This letter will serve to designate you as the State's representative in all matters relating to the preparation and submission of the State Implementation Plan (SIP) and the Title V operating permits program, in compliance with the Federal Clean Air Act.

Sincerely,

ELIOT SPITZER

cc: Commissioner Grannis, Department of Environmental Conservation
Commissioner Swarts, Department of Motor Vehicles
Acting Commissioner Glynn, Department of Transportation

EXECUTIVE CHAMBER STATE CAPITOL ALBANY 12224
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EXECUTIVE SUMMARY

Ground-level ozone, a primary ingredient in smog, is formed when volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) react chemically in the presence of sunlight. Cars, trucks, power plants and industrial facilities are primary sources of these emissions. Ozone pollution is a concern during the summer months when the weather conditions needed to form ground-level ozone – sunshine and hot temperatures – normally occur. Ozone is unhealthy to breathe, especially for people with respiratory diseases and for children, the elderly and adults who are active outdoors. Symptoms include reduced lung function and chest pain, and can lead to respiratory diseases such as bronchitis or asthma.

On April 15, 2005, the United States Environmental Protection Agency (EPA) designated the New York—N. New Jersey—Long Island, NY-NJ-CT metropolitan area (NYMA) as a moderate non-attainment area that exceeds the health-based standards for ozone. The National Ambient Air Quality Standard for ozone is 0.08 parts per million, measured over an 8-hour period. Pursuant to the Clean Air Act Amendments of 1990, states have three years from the date of designation to submit a State Implementation Plan (SIP) demonstrating how the nonattainment area will attain the standard. Moderate nonattainment areas are required to demonstrate attainment within six years of the effective date of designation, or June 15, 2010.

On August 9, 2007, the New York State Department of Environmental Conservation (Department) submitted a proposed revision to the ozone SIP for NYMA demonstrating attainment by June 15, 2013 (2010 – 2012 data). This final proposed revision incorporates minor changes made in response to comments received from EPA and the Manufacturers of Emission Controls Association on that proposal. It is also consistent with the Department's request, submitted under separate cover, to have NYMA reclassified from "moderate" to "serious" nonattainment. Serious nonattainment areas are required to demonstrate attainment within nine years of designation, or June 15, 2013.

This final revision to the NYMA SIP is consistent with August 9, 2007 proposal and contains the 2002 baseline emission inventory, projection inventories for 2008, 2011 and 2012, a predictive photo-chemical modeling attainment demonstration by June 15, 2013, and the control measures and programs that will be implemented by the state in order to demonstrate attainment with the 8-hour ozone standard.

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Acronyms and Abbreviations

ACP	Alternative Compliance Program
AFS	Air Facility System (New York)
AIM	Architectural and Industrial Maintenance
APTZEV	Advanced Technology Partial Zero Emission Vehicle
AQS	Air Quality System
ASTM	American Society for Testing and Materials
BARCT	Best Available Retrofit Control Technology
BDV	Base Design Value
BEIS	Biogenic Emissions Inventory System
BOTW	Beyond On The Way
BTU	British Thermal Unit
CAA	Clean Air Act Amendments of 1990
CAIR	Clean Air Interstate Rule
CAMR	Clean Air Mercury Rule
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation Air Quality
CMSA	Consolidated Metropolitan Statistical Area
CMV	Commercial Marine Vessel
CTG	Control Technique Guideline
CO	Carbon Monoxide
DAR	Division of Air Resources
Department	New York State Department of Environmental Conservation
DVC	Base Case Design Value
DVF	Future Design Value
DVMT	Daily Vehicle Miles Traveled
ECD	Emission Control Device
ECL	Environmental Conservation Law
EDMS	Emission Dispersion Modeling System
EGR	Exhaust Gas Recirculation
EGU	Electric Generating Unit
EIIP	Emissions Inventory Improvement Program
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FE	Fractional Error
FEL	Federal Emission Limit
FHWA	Federal Highway Administration
FR	Federal Register
G/BHP-HR	Grams per Brake Horse Power Hour
GVWR	Gross Vehicle Weight Rating
HAP	Hazardous Air Pollutant
HEDD	High Electric Demand Day
Hg	Mercury

ICI	Industrial/Commercial/Institutional
I/M	Inspection/Maintenance
KM	Kilometer
LAER	Lowest Achievable Emission Rate
LEV	Low Emission Vehicle
LDDV	Light Duty Diesel Vehicle
LDGT1	Light Duty Gasoline Truck 1
LDGT2	Light Duty Gasoline Truck 2
LDGV	Light Duty Gasoline Vehicle
MACT	Maximum Achievable Control Technology
MAGE	Mean Absolute Gross Error
MANE-VU	Mid-Atlantic and Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
MATS	Model Attainment Test System
MB	Mean Bias
MC	Motorcycle
MFB	Mean Fractionalized Bias
ML	Milliliter
MMBTU	Million British Thermal Units
MM5	Mesoscale Meteorological Model, Version 5.0
MNB	Mean Normalized Bias
MNGE	Mean Normalized Gross Error
MOU	Memorandum of Understanding
MSW	Municipal Solid Waste
MWE	Megawatt Electrical
MWH	Megawatt Hour
NAA	Non-Attainment Area
NAAQS	National Ambient Air Quality Standard
NACAA	National Association of Clean Air Agencies
NESCAUM	Northeast States for Coordinated Air Use Management
NESHAP	National Emission Standards for Hazardous Air Pollutants
NH_3	Ammonia
NMB	Normalized Mean Bias
NME	Normalized Mean Error
NMHC	Non Methane Hydrocarbons
NMOC	Non Methane Organic Compound
NMOG	Non Methane Organic Gas
NNSR	Non-Attainment New Source Review
NO	Nitric Oxide
NOAA	National Oceanic and Atmospheric Administration
NO_x	Oxides of Nitrogen
NO_2	Nitrogen Dioxide
NSPS	New Source Performance Standards
NSR	New Source Review
NWS	National Weather Service
NYCRR	New York Codes, Rules and Regulations

NYMA	New York Metropolitan Area
NYSDMV	New York State Department of Motor Vehicles
NYSDOT	New York State Department of Transportation
NYVIP	New York Vehicle Inspection Program
OBD	On Board Diagnostics
OTB	On The Books
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
OTW	On The Way
PAMS	Photochemical Assessment Monitoring System
PCE	Tetrachloroethene
PCV	Positive Crankcase Ventilation
PFC	Portable Fuel Container
PLT	Production Line Testing
PM	Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
PM_{10}	Particulate Matter less than 10 microns
PMC	Coarse Particulate Matter
PPB	Parts Per Billion
PPM	Parts Per Million
PSD	Prevention of Significant Deterioration
PSI	Pounds Per Square Inch
PTE	Potential To Emit
PZEV	Partial Zero Emission Vehicle
QA	Quality Assurance
RACM	Reasonably Available Control Measure
RACT	Reasonably Available Control Technology
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
RIA	Regulatory Impact Analysis
RMSE	Root Mean Square Error
RRF	Relative Reduction Factor
RVP	Reid Vapor Pressure
SEA	Selective Enforcement Audit
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SULEV	Super Ultra Low Emission Vehicle
TAC	Thermostatic Air Cleaner
TCA	Trichloroethane
TCE	Trichlorethene
TEA-21	Transportation Equity Act for the 21^{st} Century
TPD	Tons Per Day
TPY	Tons Per Year
TSD	Technical Support Document
ULEV	Ultra Low Emission Vehicle
VMT	Vehicle Miles Traveled

VOC	Volatile Organic Compound
ZEV	Zero Emission Vehicle

1.0 BACKGROUND AND OVERVIEW OF FEDERAL REQUIREMENTS

1.1 Introduction

Due to the severity of the health and welfare effects associated with ground-level ozone, the Clean Air Act (CAA) required the United States Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) designed to protect public health and the environment. The CAA allows the EPA to establish two types of national air quality standards for primary air pollutants. The primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The secondary standards set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings. Until 1997, the ozone NAAQS was established at 0.12 parts per million (ppm) over a 1-hour period for both the primary and secondary standards. On July 18, 1997, EPA promulgated an ozone standard of 0.08 ppm, measured over an 8-hour period, i.e., the 8-hour standard (62 FR 38856).

1.2 Ozone Formation

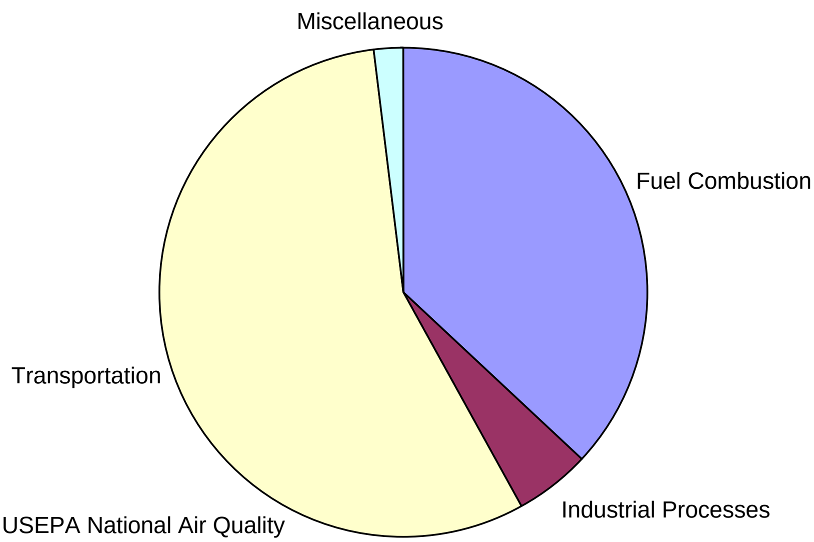
Ozone is produced in complex chemical reactions when its precursors, volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), react in the presence of sunlight. Ozone that is found high in the earth's upper atmosphere (stratosphere) is beneficial because it inhibits the penetration of the sun's harmful ultraviolet rays to the ground. However, ozone can also form near the earth's surface (troposphere). This ozone, commonly referred to as ground-level ozone, is breathed in by or comes into contact with people, animals, crops and other vegetation, and can cause a variety of serious health effects and damage vegetation resulting in reduced crop yield.

Complicating the formation of ground-level ozone is the fact that the chemical reactions that create ozone can take place while the pollutants are being blown through the air, or transported, by the wind. This means that elevated levels of ozone can occur many miles away from the source of their original precursor emissions. Therefore, unlike more traditional pollutants, e.g., sulfur dioxide (SO_2) and lead, which are emitted directly and can be controlled at their source, reducing ozone concentrations poses additional control challenges.

1.2.1 Ozone Precursor - Oxides of Nitrogen (NO_x)

Oxides of nitrogen are a group of gases including nitric oxide (NO) and nitrogen dioxide (NO_2). NO_2 is a reddish-brown, highly reactive gas that is formed in the air through the oxidation of NO. When NO_2 reacts with other chemicals in the atmosphere, it not only results in the formation of ozone, but it also forms particulate matter (PM), haze and acid rain. Sources of NO and NO_2 include motor vehicle exhaust (including both gasoline-fueled vehicles and diesel-fueled vehicles), the burning of coal, oil or natural gas, and industrial processes such as welding, electroplating and dynamite blasting. Figure 1 shows the national breakdown of NO_x emissions by category. In this chart, fuel combustion refers to stationary sources (i.e., power plants). Transportation is considered a mainly localized contributor of NO_X, while stationary source fuel combustion has transport impacts, making it more of a regional issue.

Figure 1: NOx Emissions by Source Category, 2002



Source: USEPA National Air Quality Emissions Trends Report, 2003 Special Studies Edition, September 2003.

Although most NO_x is emitted as NO, it is readily converted to NO_2 in the atmosphere. In the home, gas stoves and heaters produce substantial amounts of nitrogen dioxide. As much of the NO_x in the air is emitted by motor vehicles, concentrations tend to peak during the morning and afternoon rush hours. Also, due in part to poorer local dispersion conditions caused by light winds and other weather conditions that are more prevalent in the colder months of the year, NO_x concentrations tend to be higher in the winter than the summer.

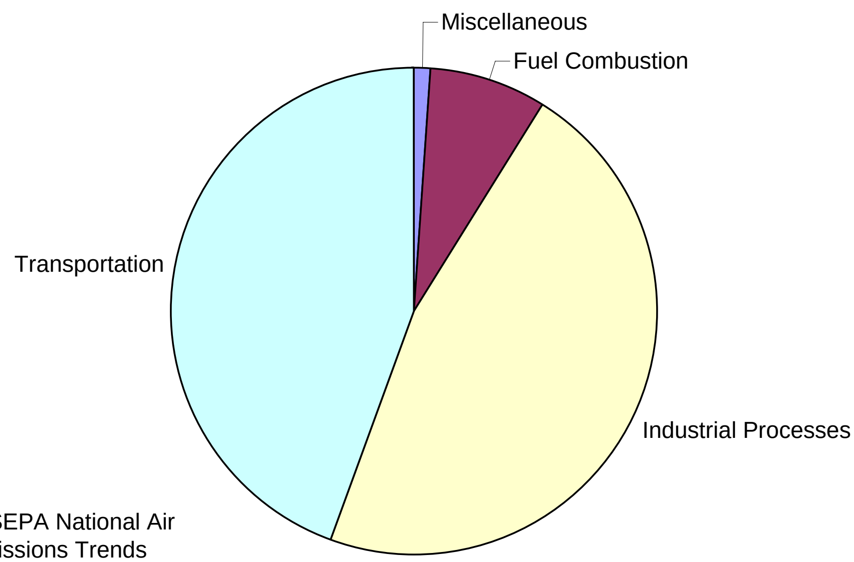
1.2.2 Ozone Precursor - Volatile Organic Compounds (VOCs)

VOCs are chemicals that evaporate (or volatilize) when they are exposed to air. They are called organic because they contain carbon. Some VOC compounds are highly reactive with a short atmospheric lifespan, while others can have a very long lifespan. The short-lived compounds contribute substantially to atmospheric photochemical reactions and thus the formation of ozone.

VOCs are used in the manufacture of, or are present in, many products used daily in both homes and businesses. Some products, like gasoline, actually are VOCs. VOCs are used as fuels (gasoline and heating oil) and are components of many common household items like polishes, paints, cosmetics, perfumes and cleansers. They are also used in industry as degreasers and solvents, and in dry cleaning. VOCs are present in many fabrics and furnishings, construction materials, adhesives and paints. In offices, VOCs can be found in correction fluid, magic markers, paper, rubber bands, invisible tape and other products. The names of many VOCs may be familiar: carbon tetrachloride, trichloroethene (TCE), tetrachloroethene (PCE), trichloroethane (TCA), benzene and toluene. Because of their widespread historical use, and past lack of stringent disposal requirements, they are in our air, soil, and water in varying concentrations. Human-made VOCs are primarily emitted into the air by motor vehicle exhaust, industrial processes and from the evaporation of solvents, oil-based paints and gasoline from gas pumps.

Figure 2 shows the national breakdown of VOC emissions by category. As with the NO_x chart, fuel combustion refers to stationary sources (i.e., power plants).

Figure 2: Anthropogenic VOC Emissions by Source Category, 2002



Source: USEPA National Air Quality Emissions Trends Report, 2003 Special Studies Edition, September 2003.

1.3 Health and Welfare Effects

Ground-level ozone can irritate lung airways and cause skin inflammation much like sunburn. Other symptoms from exposure include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. Even at very low levels, exposure to ground-level ozone can result in decreased lung function, primarily in children active outdoors, as well as increased hospital admissions and emergency room visits for respiratory illnesses among children and adults with pre-existing respiratory diseases (i.e. asthma). In addition to these primary symptoms, medical professionals now believe that repeated exposure to ozone pollution for several months could cause permanent lung damage. People with respiratory problems are most vulnerable to the health effects associated with ozone exposure, but even healthy people that are active outdoors can be affected when ozone levels are high. In fact, on July 11, 2007, EPA proposed to lower the ozone standard even more because of documented health effects of ozone (72 FR 37818).

In addition to its health effects, ozone interferes with a plant's ability to produce and store nutrients, which makes them more susceptible to disease, insects, other pollutants, and harsh weather. This impacts annual crop production throughout the United States, resulting in significant losses, and injury to native vegetation and ecosystems. In addition, ozone damages the leaves of trees and other plants, ruining the appearance of cities, national parks, and recreation areas. Ozone can also damage certain man-made materials, such as textile fibers, dyes, rubber products and paints.

1.4 Clean Air Act Amendments of 1990

During the fall of 1990, and after years of debate, the United States Congress approved changes to the federal CAA. These amendments were the first changes to the CAA since 1977. In addition to adding provisions that addressed concerns associated with acid rain, hazardous air pollutants and stratospheric ozone concerns, Congress significantly changed the way in which states were to address remaining attainment problems for criteria pollutants which include ground level ozone.

As opposed to the past when areas were designated as attainment, non-attainment or unclassifiable, the 1990 Amendments required areas to also be classified according to severity. For those areas with more severe classifications, additional requirements were included in the CAA and additional time was also provided for those areas to demonstrate attainment with the NAAQS for ozone.

NAAQS were developed to protect the public health from the impacts associated with various forms of air pollution. In 1979, EPA promulgated the 0.12 ppm 1-hour ozone standard (40 FR 8202, February 8, 1979).

1.5 8-hour Ozone NAAQS

On July 18, 1997, EPA promulgated an ozone standard of 0.08 ppm, measured over an 8-hour period, i.e., the 8-hour standard (62 FR 38856). In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The CAA and the Transportation Equity Act for the 21 Century (TEA-21) required EPA to designate all areas by July 2000. The NAAQS rule was challenged and in May 1999, the U.S. Court of Appeals for the D.C. Circuit issued a decision remanding, but not vacating, the 8-hour ozone standard. The court noted that EPA is required to designate areas for any new or revised NAAQS in accordance with the CAA and addressed a number of other issues, which are not related to designations. American Trucking Assoc. v. EPA, 175 F.3d 1027, 1047-48, on rehearing 195 F.3d 4 (D.C. Cir. 1999). EPA sought review of the two aspects of that decision in the U.S. Supreme

Court. In February 2001, the Supreme Court upheld EPA's authority to set the NAAQS and remanded the case back to the D.C. Circuit for disposition of issues the Court did not address in its initial decision. Whitman v. American Trucking Assoc., 121 S.Ct. 903, 911-914, 916-919 (2001) (Whitman). In March 2002, the D.C. Circuit rejected all remaining challenges to the 8-hour ozone standard. American Trucking Assoc. v. EPA, 283 F.3d 355 (D.C. Cir. 2002) ATA III). The process for designations following promulgation of a NAAQS is contained in §107(d)(1) of the CAA. For the 8-hour NAAQS, TEA-21 extended by one year the time for EPA to designate areas for the 8-hour NAAQS. Thus, EPA was required to designate areas for the 8-hour NAAQS by July 2000. However, HR3645 (EPA's appropriation bill in 2000) restricted EPA's authority to spend money to designate areas until June 2001 or the date of the Supreme Court ruling on the standard, whichever came first. In 2003, several environmental groups filed suit in district court claiming EPA had not met its statutory obligation to designate areas for the 8-hour NAAQS. EPA entered into a consent decree, which required EPA to issue the designations by April 15, 2004.

Under the requirements of the CAA, states have a responsibility to ensure that all areas within their jurisdiction meet and maintain air quality levels that do not exceed the NAAQS prescribed by the federal government.

1.6 Designation and Requirements

On April 30, 2004, EPA designated the New York – N. New Jersey – Long Island, NY-NJ-CT area, comprised of the New York State counties of Suffolk, Nassau, Kings, Queens, Richmond, New York, Bronx, Westchester and Rockland, as well as counties in the states of Connecticut and New Jersey, as non-attainment (moderate classification) for the federal 8-hour ozone NAAQS, effective June 15, 2004 (69 FR 23858). Consequently, New York State must develop a State Implementation Plan (SIP) to demonstrate how it will come into compliance with the ozone standard.

2.0 PREVIOUS COMMITMENTS

2.1 Introduction

This section summarizes the ongoing mobile source and stationary source control measures that have been enacted in the past to minimize emissions of NO_x and VOCs. Many control measures in this Chapter were developed and implemented after the April 30, 2004 designations. Part D of Title I of the CAA requires that these measures be implemented and display reasonable further progress as the area strives to reach attainment. These past commitments continue indefinitely, unless replaced by an equivalent or stricter emission reduction strategy.

New mobile source and stationary source control measures, included in this SIP as Chapters 8 and 9, respectively, will work in conjunction with these prior commitments to help achieve attainment of the ozone NAAQS.

2.2 Gasoline Measures

2.2.1 Part 225-3: Fuel Consumption and Use - Gasoline

New York State adopted Subpart 225-3 of Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) to limit the volatility, or Reid Vapor Pressure (RVP), of motor fuel statewide as a strategy for controlling VOC emissions from motor vehicles. Specifically, this regulation established a maximum RVP of 9.0 pounds per square inch (psi) for all gasoline sold or supplied to retailers and wholesale purchaser-consumers anywhere in New York State from May 1 through September 15 of each year.

2.2.2 Part 230: Gasoline Dispensing Sites and Transport Vehicles

This rule contains requirements for Stage I and Stage II gasoline dispensing site regulations. Stage I systems are required state-wide, while Stage II systems are mandated only in the New York Metropolitan Area (NYMA) and lower Orange County. Part 230 affects those gasoline-dispensing sites whose annual throughput exceeds 120,000 gallons. (This minimum throughput level is waived for NYMA.)

A Stage I vapor collection system captures gasoline vapors which are displaced from underground gasoline storage tanks when those tanks are filled. These vapors are forced into a vapor-tight gasoline transport vehicle or vapor control system through direct displacement by the gasoline being loaded. A Stage II vapor collection system captures at least 90 percent, by weight, of the gasoline vapors that are displaced or drawn from a vehicle fuel tank during refueling; these vapors are then captured and either retained in the storage tanks or destroyed in an emission control device.

2.2.3 Federal Reformulated Gasoline – Phase I and II

Section 211(k) of the CAA deemed that reformulated gasoline must be sold in certain ozone non-attainment areas. Federal reformulated gasoline allows for a maximum of 1 percent benzene by volume. Phase I of the rule took effect January 1, 1995 with preliminary VOC and air toxics standards. These reformulated gasoline standards were replaced with Phase II standards, effective January 1, 2000, which called for broader emissions controls, requiring 25%-29% VOC emission reductions and 20%-22% air toxics reductions. Retail distribution of reformulated gasoline is required in NYMA and Orange County. Dutchess County and a portion of Essex County have voluntarily opted to use reformulated gasoline.

2.3 NY Motor Vehicle Hardware Measures

2.3.1 Part 217: Motor Vehicle Emissions

To help limit ozone precursor emissions from motor vehicles, New York State has implemented 6 NYCRR Part 217, which contains emissions standards for in-use vehicles and applies to all non-electric and non-diesel automobiles in the state. This rule also requires that all affected vehicles have an on-board diagnostic system which functions correctly and meets certain design standards.

2.3.2 Part 218: Emission Standards for Motor Vehicles and Motor Vehicle Engines

In this rule, New York State requires that new light-duty vehicles sold in New York meet California emissions standards.

2.4 Part 231: New Source Review in Non-Attainment Areas and Ozone Transport Region

New Source Review (NSR) in non-attainment areas has been regulated by 6 NYCRR Part 231 of the New York State air pollution control regulations since 1979. Part 231 was written to conform to federal guidelines and requirements on new sources and modifications at major facilities in non-attainment areas which would cause emission increases exceeding *de minimus* levels set forth in the regulation. The base requirements for applicable sources were that Lowest Achievable Emission Rate (LAER) be applied and that emission offsets be provided.

2.5 VOC RACT

EPA has approved regulations for prior SIP commitments for reducing emissions from non-mobile sources. Descriptions of these regulations are summarized in the following sections.

2.5.1 Part 212: General Process Emission Sources

This rule, which applies to both VOC and NO_x emissions, requires the application of Reasonably Available Control Technology (RACT) for each emission point which emits NO_x for major NO_x facilities or VOCs for major VOC facilities. Its requirements are mostly generic, with specific requirements only for coating operations not subject to Part 228.

2.5.2 Part 226: Solvent Metal Cleaning Processes

Part 226 puts forth guidelines for the cleaning of metal surfaces by VOC-containing substances. Listed in this regulation are specifications limiting the vapor pressure solvents as well as those for control equipment and proper operating practices for a variety of degreasing operations, as well as general requirements for storage and recordkeeping. The Department may accept a lesser degree of control upon submission of satisfactory evidence that the person engaging in solvent metal cleaning is applying RACT and has a plan to develop the technologies necessary to comply with the aforementioned sections.

2.5.3 Part 228: Surface Coating Processes (Including Autobody Shops)

Part 228 limits the VOC content for each gallon of coating and sets minimum efficiency for VOC incinerators used as control equipment for VOC emissions from coating processes. It also provides for the use of source-specific analyses of control requirements where the requirements of the rules cannot be met. Additionally, Part 228 contains requirements for paints and coatings used in autobody refinishing and repairing, including spray equipment and housekeeping.

2.5.4 Part 229: Petroleum and Volatile Organic Liquid Storage and Transfer

This rule limits VOC emissions from applicable gasoline bulk plants, gasoline loading terminals, marine loading vessels, petroleum liquid storage tanks or organic liquid storage tanks. There are lower applicability thresholds for each process for NYMA than those for the Lower Orange County metropolitan area, upstate ozone non-attainment areas, and areas not included above.

2.5.5 Part 233: Pharmaceutical and Cosmetic Manufacturing Processes

This rule limits VOC emissions from synthesized pharmaceutical or cosmetic manufacturing processes at a major source facility located in NYMA. Compliance requires the installation of control devices, along with monitoring, recordkeeping, and leak repair.

2.5.6 Part 234: Graphic Arts

This rule sets control requirements and limits VOC emissions from packaging rotogravure, publication rotogravure, flexographic, offset lithographic or screen printing processes at a major source facility located in NYMA.

2.6 MACT

Under section 112 of the 1990 CAA Amendments, hazardous air pollutants (HAPs) are required to be controlled by technology determined to be the Maximum Achievable Control Technology (MACT). Since many organic HAPs are also VOCs, the use of MACT results in the reduction of VOC and NO_x emissions. New York has been adopting MACT control requirements as they have been developed by EPA and has therefore been realizing the reductions resulting from the MACT program. These federal regulations are incorporated by reference in 6 NYCRR 200.10 (Tables 2,3 and 4).

2.7 Part 235: Consumer Products

The Consumer Products rule regulates the VOC content of consumer and commercial products that are sold to retail customers for personal, household, or automotive use, along with the products marketed by wholesale distributors for use in commercial or institutional settings such as beauty shops, schools and hospitals. The rule also includes labeling, reporting and compliance requirements that apply to manufacturers of these products.

2.8 Part 205: Architectural and Industrial Maintenance (AIM) Coatings

This regulation limits the content of VOCs in AIM coatings by setting minimum VOC limits for AIM coatings. Part 205 also contains labeling and reporting requirements, compliance provisions and test methods.

2.9 Part 208: Landfill Gas Collection and Control Systems for Certain Municipal Solid Waste Landfills

This rule applies to the operation of municipal solid waste (MSW) landfills exceeding stated capacities. For landfills whose non-methane hydrocarbon emissions exceed 50 megagrams per year, the operator must submit a collection and control system design and permit application, along with operating standards for the control systems. The rule additionally contains requirements for monitoring, testing, recordkeeping and reporting.

2.10 Part 227: Stationary Combustion Installations

2.10.1 Subpart 227-2: Reasonably Available Control Technology (RACT) for Oxides of Nitrogen (NO_x)

Subpart 227-2 sets NO_x control limits for major source stationary combustion installations. NO_x RACT requirements applicable to particular applicable combustion sources fall into one of two categories: presumptive RACT limits (which are often set as emission limits but also take other forms) or case-by-case RACT determinations. Presumptive RACT limits are category-wide requirements. However, for some sources, presumptive RACT limits may not be attainable. Case-by-case RACT determinations consider the technological and economic circumstances of the source in these circumstances. Each case-by-case determination which establishes RACT requirements in a source's permit must be submitted to the administrator as a separate SIP revision.

2.10.2 Other NO_x RACT Provisions

Additional RACT provisions include Part 220 which limits particulate and NO_x emissions from portland cement plants, and Part 212, which applies to general process sources. For the purpose of RACT analyses related to the 8-hour ozone standard, RACT consists of technically feasible NO_x control strategies to minimize NO_x formation.

2.10.3 Part 204: NO_x Budget Trading Program

Part 204 sets requirements for how New York meets the emissions budget for NO_x established in EPA's final rule entitled "Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone," otherwise known as the "NO_x SIP Call." This rulemaking set a NO_x emissions budget for New York for the five month summer season. New York is meeting this budget through control programs already in place and by limiting the NO_x emissions of certain major stationary sources through the NO_x budget trading program established under 6 NYCRR 204. Part 204 applies to the following source categories: Electric Generating Units (EGUs) with nameplate capacities equal to or greater than 15 megawatts; non-EGUs with maximum design heat inputs equal to or greater than 250 million British thermal units (mmBTU) per hour; and portland cement kilns with maximum design heat inputs equal to or greater than 250 mmBTU per hour. The Department allocates the budget to sources within the above categories. Sources may hold or transfer allowances, but, at the end of each year's reconciliation period, must have enough allowances in its compliance accounts to cover emissions during the control period.

3.0 AIR QUALITY DATA AND TRENDS

Ozone and ozone precursor monitoring stations in the New York Consolidated Metropolitan Statistical Area (New York CMSA) 8-hr ozone non-attainment area are listed in Table 1 in Appendix A.

3.1 Ozone

Table 2 in Appendix A lists ozone measurements for a total of 24 stations, of which 9 are in New York, 8 in Connecticut and 7 in the New Jersey portions of the non-attainment area for the 2000 to 2006 period. There are some monitors which have blanks indicating that either they were not operational during the entire period or were discontinued during this period. The data listed for each monitor consists of the four highest 1-hr and 8-hr concentrations and the corresponding number of exceedance days that had occurred at that monitor. Table 3 in Appendix A lists the calculated design values for the period of 2000 to 2004 that are averaged to yield the base year design value (DVC) at each monitor.

3.2 NMOC

Following the Photochemical Assessment Monitoring Station (PAMS) network design, there are three sites within the New York CMSA that measure non-methane organic compounds (NMOC) during the ozone season. The locations are identified as upwind, center city and downwind under PAMS network configuration (PAMS 1995). The three sites are:

Station	County	AQS ID	Status
New Brunswick	Middlesex, NJ	340230011	upwind
Botanical Gardens	Bronx, NY	360050083	center city
Sherwood Island	Fairfield, CT	090019003	downwind

Hereafter, we refer the upwind site as RU, center city site as NY, and downwind site as SI. In this analysis, we examined the seasonal averages of the Total NMOC and some selected species at the three PAMS sites for the period 1995 to 2006. The following provides a brief assessment on the measured NMOC levels in New York CMSA, along with the following species (AQS = Air Quality System):

Species	AQS Parameter	Species	AQS
Total NMOC	43102	Benzene	45201
Ethane	43202	Toluene	45202
Propane	43204	Ethylbenzene	45203
Isoprene	43243	O-Xylene	45204

Figure 3-1 displays the seasonal average of total NMOC concentrations at NY, RU, and SI from 1995 through 2006. There is no surprise that the center city site (NY) measures the highest total NMOC concentrations, follow by the upwind site (RU) and downwind site (SI). Unfortunately no data were available for 2006 for the NY site. The center city (NY) shows a downward trend except for a sudden increase in year 2003, while no clear trend emerges for the upwind (RU) and downwind (SI) stations, respectively.

Figures 3-2 to 3-8 display the seasonal average concentrations for ethane, propane, isoprene, benzene, toluene, ethylbenzene, and o-xylene, respectively. A majority of these species represent motor vehicle exhaust, natural gas-based hot water heating, industrial coatings, and natural sources. The center city site (NY), reports higher concentrations than the upwind (RU) or the downwind (SI) sites for ethane, benzene, ethylbenzene and o-xylene, indicating the localized nature of these compounds. Similar to the total NMOC, in general there is a downward trend in these compounds, but with occasional exceptions. Figure 3-3 displays the average concentrations of propane, which appears to show a decrease in the center city (NY) with levels similar to those at upwind (RU) or downwind (SI). For toluene (Figure 3-6), attributable to the industrial coating usage, there seems to be a general decrease in the levels at NY and RU, reaching to those similar to the downwind (SI) site. In the case of isoprene (Figure 3-4), the measurements show year-to-year variability associated with changes in meteorological conditions.

3.3 CO, NO and NO_2

Seasonal averages (June, July, and August) were calculated for CO, NO, and NO_2 for monitors in New York CMSA for the period 1995 to 2006. The averaging was performed using hourly data from 6 to 9 AM that is reflective of the morning rush-hour traffic. For each pollutant the mean concentration and the standard deviation are listed in Table 4 in Appendix A. Examination of the NO and NO_2 data shows that these are associated with high standard deviations suggesting higher variability in these measurements. The CO concentration shows a clearly declining trend for most of the locations in the CMSA. From the limited data, the NO average concentrations also show a slight decline, while NO_2 concentrations are so varied that no clear trend can be ascribed.

3.4 Emissions - Anthropogenic

The 2002 base year emissions inventory has been compiled as part of the regional modeling effort and the details are reported in TSD-1c (2007), and in Pechan (2006). Tables 5a and 5b in Appendix A list the 2002 emissions by major source category and summary, respectively, and in Figure 3-9 are displayed in graphical form. The 2009 projected year emissions inventories for on-the-way (OTW) and beyond-on-the-way (BOTW) have been compiled as part of the regional modeling effort and the details are reported in TSD-1d (2007), TSD-1f (2007), TSD-1j (2007) and MACTEC (2007). The emissions were projected based on growth and control, and in the case of point sources they are provided as 3 distinct sectors, namely as emissions from electric generation units (EGUs), emissions from other point sources (Non-EGU), and emissions from non-fossil fuel units (Non. Foss.). Tables 6a and 6b in Appendix A list the 2009OTW emissions by county and by source sector, while Figures 3-10 and 3-11 display the 2009OTW and 2009BOTW, respectively. In addition to the 2009 scenario, emissions are also estimated for 2012BOTW and these are listed in Table 7a in Appendix A by county and summarized in Table 7b in Appendix A and displayed in Figure 3-12. The emissions identified as 2009BOTW reflect additional emissions reduction measures being undertaken by the Ozone Transport Commission (OTC) states. In this case, emissions changes were limited to the non-EGU and Area sectors only. It should be noted that these emissions data are then processed using SMOKE for use as input to the photochemical model, CMAQ, to simulate ozone over the domain.

3.5 Emissions – Biogenic

Biogenic emissions over the modeling domain were calculated using SMOKE2.1 that incorporated Biogenic Emissions Inventory System (BEIS) v3.1.2. Details of the approach are described in TSD-1b (2007). Briefly, the method utilized surface temperatures generated by the mesoscale meteorological model (TSD-1a 2007) and gridded land use and emissions factors data provided in SMOKE. These estimated emissions were used in all photochemical model (CMAQ) applications. Table 8 in Appendix A lists the annual emissions by county for the New York CMSA.

3.6 Meteorology

The 2002 annual meteorology using MM5 was developed as input data for photochemical model CMAQ. Details of MM5 setup and assessment can be found in TSD-1a (2007).

3.7 Photochemical Model Application

3.7.1 Base Year 2002

The five month period covering May 15 through September 30, 2002 was examined explicitly for ozone. The model assessment on a regional basis can be found in TSD-1e (2007) in Appendix A, which shows that the simulation can be considered satisfactory in reproducing the observed ozone distribution. Eder et al (2003) suggested that overall normalized mean bias (NMB) should be less than 10% and normalized mean error (NME) of 20% as possible indicators of acceptable model performance for ozone.

The statistical measures applied in this analysis are

Observed average, in parts per billion (ppb):

$$\overline{O} = \frac{1}{N}\sum O_i$$

Predicted average, in ppb (only use P_i when O_i is valid):

$$\overline{P} = \frac{1}{N}\sum P_i$$

Correlation coefficient, R^2:

$$R^2 = \frac{\left[\sum (P_i - \overline{P})(O_i - \overline{O})\right]^2}{\sum (P_i - \overline{P})^2 \sum (O_i - \overline{O})^2}$$

Normalized mean error (NME), in %:

$$NME = \frac{\sum |P_i - O_i|}{\sum O_i} \times 100\%$$

Root mean square error (RMSE), in ppb:

$$RMSE = \left[\frac{1}{N}\sum (P_i - O_i)^2\right]^{1/2}$$

Fractional error (FE), in %:

$$FE = \frac{2}{N} \sum \left| \frac{P_i - O_i}{P_i + O_i} \right| \times 100\%$$

Mean absolute gross error (MAGE), in ppb:

$$MAGE = \frac{1}{N} \sum \left| P_i - O_i \right|$$

Mean normalized gross error (MNGE), in %:

$$MNGE = \frac{1}{N} \sum \frac{\left| P_i - O_i \right|}{O_i} \times 100\%$$

Mean bias (MB), in ppb:

$$MB = \frac{1}{N} \sum (P_i - O_i)$$

Mean normalized bias (MNB), in %:

$$MNB = \frac{1}{N} \sum \frac{(P_i - O_i)}{O_i} \times 100\%$$

Mean fractionalized bias (MFB), in %:

$$MFB = \frac{2}{N} \sum \left[\frac{P_i - O_i}{P_i + O_i} \right] \times 100\%$$

Normalized mean bias (NMB), in %:

$$NMB = \frac{\sum (P_i - O_i)}{\sum O_i} \times 100\%$$

In particular for this non-attainment area, the assessment is performed with measurements based on the ozone monitors listed in Table 1 in Appendix A and the results of the statistical measures are listed in Table 9a and 9b in Appendix A for two observed daily maximum 8-hr ozone threshold levels of 40 and 60 ppb, respectively. Results listed suggest that the estimated NME and NMB at most of these monitors is at an acceptable level suggested by Eder et al (2003).

Table 10 in Appendix A lists the comparison between measured and predicted ozone precursor concentrations including selected NMOC species provide an overall view of the application of SMOKE/CMAQ system.

3.7.2 Future Year 2009 and 2012

Photochemical modeling was performed in a manner similar to that of base year. The intent of this modeling is to use the predicted ozone concentrations relative to the base year and estimate the future design value at the monitored locations as well as other areas of the nonattainment area. The approach to be used has been documented in EPA Guidance documents (EPA 2005, 2006) and how it is applied is described in TSD-1g (2007) and in TSD-1h (2007). Table 11a and 11b in Appendix A summarizes the information on the estimated relative reduction factor (RRF) and the projected future design values for 2009BOTW and 2012BOTW scenarios, respectively. Examination of Table 11a in Appendix A indicates that the projected DVF is above the 8-hr ozone NAAQS level of 84 ppb as well as outside the weight of evidence (WOE) range for several monitors in the CMSA. Examination of Table 11b in Appendix A shows that all monitored stations are below the 8-hr ozone NAAQS except for the Stratford, CT location (AQS ID 090013007) which is within the WOE range, thus demonstrating modeled attainment of the area.

3.7.3 Unmonitored Area Analysis

As per EPA guidance (2005, 2006a), the potential occurrence of a projected exceedence at an unmonitored location was investigated. The procedure examined all grid cells for all counties within and immediately surrounding the non-attainment area using the spatial interpolation and gradient adjustment techniques implemented in the EPA-MATS (Model Attainment Test System) software (Timin, 2006).

In this application, MATS was utilized to spatially interpolate base year observed design values. MATS was also utilized to estimate gradient adjustment factors that were based on the CMAQ predictions of the top-30 daily maximum 8-hr ozone concentrations at each grid cell for the 2002 base case. The relative effect of the emission reduction under the 2009BOTW scenario on daily maximum 8-hr concentrations was then estimated by calculating a gridded field of RRF by treating each grid cell as a monitor location. Two approaches were used for calculating the RRF. Use MATS to provide RRF at each grid cell, and the other approach is based on 9-grid cells as described in TSD-1g and TSD-1h. Finally, Future design value (DVF) for each grid cell is estimated by multiplying the spatially interpolated Base Design Values (DVB) from MATS with the gridded gradient adjustment factors (from MATS) and with the gridded RRF fields estimated by the two methods.

The New York CMSA 8-hr ozone non-attaiment is abutted by the Philadelphia, Poughkeepsie, and Greater Connecticut 8-h ozone nonattainment areas, and as such are not considered in this analysis and discussed elsewhere (New York CMSA, 2007).

Table 12a and 12b in Appendix A lists all the counties pertaining to the nonattainment area and some of the surrounding counties identified by their FIPS code and location of the grid cells in the CMAQ modeling domain for the 2009BOTW and 2012BOTW scenarios, respectively. The Tables also provide information as to whether or not the grid cell is associated with an ozone monitor and the percent of the grid area located over water based upon the land classification used in the meteorological modeling with MM5. This analysis shows that for the 2009BOTW scenario, there are several other grid cells that are not associated with a monitor but a percent of the grid cell is over water that are above the 84 ppb threshold both under the hybrid MATS or MATS methodology. In particular, a grid cell that is not associated with water in Bergen County, NJ is at 92ppb or 91ppb depending upon the MATS methodology used. Considering the 2012BOTW scenario (see Table 12b in Appendix A) again the Bergen county grid cell that is not associated with water is projected at 88ppb or 87ppb depending upon the MATS methodology, while other grid cells above the 84 ppb threshold are found to be associated with water. Thus the unmonitored area analysis suggests the potential exists for projected 8-h ozone levels to be above the 8-h ozone NAAQS level under the 2009BOTW scenario, but are essentially absent under the 2012 scenario.

3.8 Weight of Evidence

The model projects that the 8-hr ozone design values for 2009 for the New York CMSA are well above the 8-hr ozone NAAQS, but are below for 2012. The current design values (DV) from 2002 through 2007 are listed in Table 13 in Appendix A. While all monitors show that the 2006 DV levels are lower compared to 2002 DVs, several of the monitors continue to be above the 8-hr ozone NAAQS level. There was a slight upturn in measured ozone levels for 2007. For the monitors in New York State, the only appreciable upward changes were found at the White Plains monitor in Westchester County and the Riverhead monitor in Suffolk County. The changes in DVs from 2006 to 2007 is mostly attributable to the loss of a low 4th highest value (0.078 ppm at White Plains and 0.069 ppm at Riverhead) for 2004. Since the long term trends at these locations show declining ozone, data from these sites will need to be examined carefully in the future.

The EPA recommended method of estimating the base year design value (DVC) for the period of 2000 to 2004 is a weighted average approach that weighs 2002 measurements much more than the other years. Another method is to estimate the base year design value as the average of the five year period of 2000 to 2004. For this approach the 4th highest concentration listed in Table 2 in Appendix A are utilized and average DVC is listed in Table 14 in Appendix A for each of the monitors. The projected design values are estimated using the RRF values from Table 11a in Appendix A and are included in Table 14 in Appendix A. The estimated design values by this method are well below the 8-hr ozone NAAQS, suggesting that this area may be in attainment of the 8-hr ozone NAAQS in 2009. The Department chose not to use this approach to demonstrate attainment since it did not believe, especially given the measured ozone levels for 2007, it had the evidence to indicate that such dramatic drops in measured ozone levels were achievable.

In addition, the trends in the hourly ozone concentrations at some of the monitoring stations (TSD-aa 2007) were examined and the results are listed in Table 15 in Appendix A. The estimated trend is found to be strongly dependent upon the time period that is being considered in the analysis. The estimated trend (percent per year) at a majority of the monitors is downward (with and without meteorological adjustment) for the overall monitoring time period, with some exceptions for the longer time period. However, if consideration is given to the 2000 to 2005 period during which there were targeted reductions in ozone precursor emissions through the state and federal programs, all monitors in the CMSA show a downward trend.

The Department, as a result of the above referenced attainment projection modeling, is requesting under separate cover, that EPA reclassify the NY-NJ-CT ozone nonattainment area as “serious” in accordance with CAA Section 181(a)(3). The completed modeling shows that the nonattainment area will attain the ozone NAAQS by 2012 considering weight-of-evidence. The critical monitoring location (Fairfield (Stratford), CT) has a predicted 2012 design value of 0.086 ppm which is within the weight-of-evidence range as allowed pursuant to EPA’s “Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Qulaity Goals for Ozone, $PM_{2.5}$, and Regional Haze.” The Department anticipates that the nonattainment area will measure attainment by 2012 (equal to or less than 0.084 ppm) as a result of additional emissions reduction measures that are not accounted for in the model-based attainment predictions.

A number of control programs are being adopted or implemented that are not represented in the projection inventories for 2012. These include:

- Part 222, Distributed Generation
- Part 227-2, NOx RACT (High Electric Demand Day Units)
- PlaNYC (New York City emission reduction initiatives)
- Governor Spitzer’s “15 by 15” Initiative

These measures will reduce NOx and VOC emissions by significant amounts. The regulations being adopted by the Department will yield quantifiable, enforceable NOx emissions reductions on the order of 50 tons per day. When compared to those measures included in the modeling and the base and projected NOx inventories, it is apparent that reductions of this magnitude (9 percent of the 2012 projected NOx inventory) have the ability to reduce ozone levels substantially. Given that New Jersey and Connecticut as well as other northeastern states (Delaware, Maryland and Pennsylvania) are committing to similar measures that will also yield substantial reductions in NOx emissions (Memorandum of Understanding Among the States of the Ozone Transport Commission Concerning the Incorporation of High Electrical Demand Day Emission Reduction Strategies into Ozone Attainment State Implementation Planning), it is expected that NOx emissions on days of high electricity demand (which typically track with days of high ozone) will be reduced substantially throughout the Northeast corridor.

3.8.1 Part 222, Distributed Generation

This regulation will set limits on small generators that are not currently controlled. As minor sources, these sources need only to stay below the major source threshold to avoid reasonably available control technology (RACT). Most of these sources (generally diesel-fired stationary internal combustion engines) tend to operate on days of high electricity demand and when called upon to address reliability concerns. This regulation will place NOx and PM limits on existing sources as well as restrict the number of megawatts that can be called to operate under demand response. It will also set strict emission standards for new units. It is expected that NOx emissions on High Electricity Demand Days (HEDD) could be reduced by 10 to 15 tons per day in 2012 through the implementation of this regulation.

3.8.2 Part 227-2, NOx RACT (High Electricity Demand Day Units)

This regulatory revision will set new more stringent NOx limits on electricity generating units. On High Electricity Demand Days (HEDD) base loaded, load following and peaking units all increase operations to meet demand. HEDD are generally those days when the potential for ozone formation is highest (hazy, hot and humid weather). The Department is specifically moving to revise the NOx emission limits for all very large boilers and combustion turbines. These emission limits are expected to result in the reduction of 35 to 40 tons per day of NOx emissions.

3.8.3 PlaNYC

PlaNYC is a compilation of initiatives intended to make the City of New York “the model for cities in the 21st Century.” PlaNYC is a holistic vision that focuses on five key elements of the city’s environment – land air, water, energy and transportation recognizing that choices in one area have unavoidable impacts on the other areas. The air quality goal of PlaNYC is to “achieve the cleanest air quality of any big U. S. city.” We laud the City of New York for this ambitious goal and will partner with the City to help it achieve this goal. While much of PlaNYC has an outlook beyond the attainment date of this plan (2012) and is focused on pollutants that are not causing ozone, many initiatives within PlaNYC will help reduce emissions of NOx and VOCs in time to assist with the 2012 attainment of the ozone NAAQS. It should be noted that the Department is not committing to adopting any of these measures as part of the SIP, but is instead providing these programs as information to further its weight-of-evidence demonstration. If the Department chooses to include these measures in a future SIP revision, it will first evaluate each measure resulting from this initiative individually to determine if it is appropriate to be included in the SIP. The Department will need to consider among other things whether the measure is quantifiable, enforceable, and include emissions reductions that are additional to other adopted SIP measures. The PlaNYC measures include:

Improving the fuel efficiency of private cars by waiving New York City's sales tax on the cleanest, most efficient vehicles and working with the MTA, the Port Authority, and the State DOT to promote hybrid and other clean vehicles. Pilot new technologies and fuels, including hydrogen and plug-in hybrid vehicles.

Reducing emissions from taxis and other for-hire vehicles by reducing idling and increasing fleet efficiency. This will be accomplished by working with the Taxi and Limousine Commission, the industry and other stakeholders.

Retrofit ferries and mandate the use of cleaner fuels. Retrofit the Staten Island Ferry fleet to reduce emissions. Work with private ferries to reduce their emissions.

Replace, retrofit and refuel diesel trucks. Introduce biodiesel into the City’s truck fleet, go beyond compliance with local laws, and further reduce emissions. Accelerate emissions reductions of private fleets through existing Congestion Mitigation and Air Quality (CMAQ) programs. Work with stakeholders and the State to create incentives for the adoption of vehicle emission control and efficiency strategies. Improve compliance of existing anti-idling laws through targeted educational campaign.

Reduce emissions from buildings by improving energy efficiency, decreasing fuel consumption, promoting the use of cleaner burning heating fuels, and facilitating the repowering, replacement and retirement of out-of-date equipment at older power plants.

Implement more efficient construction management practices. Accelerate adoption of technologies to reduce construction related emissions.

Partner with Port Authority to reduce emissions from port marine vehicles, port facilities and airports.

Reduce emissions from boilers in 100 city public schools.

Reforest 2,000 acres of parkland. Increase tree planting on lots. Through MillionTreesNYC plant and care for one million new trees across the City's five boroughs over the next decade.

3.8.4 Governor Spitzer's "15 by 15" Initiative

"15 by 15" is a comprehensive plan for reducing energy costs and curbing pollution in New York. It calls for the reduction of electricity use by 15 percent from forecasted levels by the year 2015 through new energy efficiency programs in industry and government. It also calls for the creation of new appliance efficiency standards and the setting of more rigorous energy building codes. The Department is not committing to the inclusion of any of these measures as part of the SIP at this time, The Department will evaluate each measure resulting from this initiative individually to determine if it is appropriate to be included in the SIP. The Department will need to consider among other things whether the measure is quantifiable, enforceable, and include emissions reductions that are additional to other adopted SIP measures.

3.9 Summary

This study shows that based upon the projected emissions inventory and the photochemical modeling the New York CMSA shows modeled attainment for 8-hr ozone NAAQS in 2012 based upon the EPA guidance method.

3.10 References

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TSD-aa (2007) Trends in Measured 1-hr Ozone Concentrations over the OTR modeling domai

4.0 EMISSION INVENTORIES

4.1 Introduction

This chapter begins with a review of the annual 2002 emission inventory, even though for purposes of an ozone implementation plan the more appropriate measure is an emission rate based on a “typical” ozone season day (OSD). Ozone season emissions are presented in the second section. A third section is devoted to future year projections. Both OSD and future projections use these 2002 annual estimates as the baseline. OSD emissions are adjusted for the various types of emission source sectors, based on their activity level during the summer ozone season. The source sectors enumerated in this chapter are divided into point, EGU, area, non-road mobile, on-road mobile, and biogenic sources.

4.2 Summary of 2002 Baseline Annual Emissions

The fundamental unit for the inventory of each source sector and contaminant is an annual tons per year emissions level reported on a “by-county” basis. The by-county and total statewide inventory for CO, NO_x, and VOCs are detailed in Appendix B. The statewide totals are summarized in Table 4.1. Tons per year are reported to the nearest ton, except where there is less than one (1) ton. Those instances are reported in tenths to distinguish them from categories where there are no (or zero) emissions.

<u>Table 4.1 Statewide Summary</u>

2002 Annual	Tons per Year			Percent of All Sectors		
	CO	**NOx**	**VOC**	**CO**	**NOx**	**VOC**
Point (non-EGU)	53,563	37,985	13,363	1.2%	5.8%	1.0%
EGU	12,189	80,386	1,316	0.3%	12.2%	0.1%
Area	356,287	98,804	507,292	7.7%	15.0%	37.5%
Nonroad	1,206,370	119,808	157,892	26.0%	18.2%	11.7%
Onroad	2,942,730	313,890	179,731	63.5%	47.6%	13.3%
Biogenic	63,436	8,313	492,483	1.4%	1.3%	36.4%
All Sectors	4,634,575	659,186	1,352,076	100.0%	100.0%	100.0%

For the nine-county NYMA, the summary is tabulated below as Table 4.2.

Table 4.2 New York Metropolitan Area

2002 Annual	Tons per Year				Percent of All Sectors		
	CO	**NOx**	**VOC**		**CO**	**NOx**	**VOC**
Point (non-EGU)	3,542	9,211	2,379		0.2%	3.3%	0.7%
EGU	6,741	33,454	819		0.4%	12.0%	0.2%
Area	23,834	54,968	158,039		1.3%	19.7%	47.6%
Nonroad	667,739	55,984	60,635		36.9%	20.1%	18.3%
Onroad	1,106,919	124,640	81,499		61.1%	44.7%	24.6%
Biogenic	3,098	633	28,372		0.2%	0.2%	8.6%
All Sectors	1,811,874	278,890	331,743		100.0%	100.0%	100.0%

For both the Statewide and NYMA annual inventories, the percent share of each sector for each of the contaminants is shown in the left-hand portion of the tables above. The by-county and by-sector details (presented as Appendix B) are also available in spreadsheets (MS Excel).

4.2.1 Point Inventory Methodology

New York State has an integrated emissions, permitting, compliance, and fee billing computer system identified as New York's Air Facility System (AFS). The emissions module of AFS is a database which contains detailed facility and emissions information for all of the major (Title V) sources within New York State. This database is used to generate annual emission statement forms which are sent out to the State's major facilities each year. Emission statements survey the type and amount of fuel consumed (combustion sources), throughput rates (non-combustion processes), average hours of operation, percent operation by season, control descriptions/efficiencies, and estimates of actual emissions for each regulated contaminant. The 2002 emissions from point sources were obtained directly from Title V major sources via the required emission statement surveys. These data from the major sources were further subdivided into EGU and (other) point source sectors.

All of this data was submitted to MARAMA / MANE-VU for additional quality assurance (QA) and for their use in preparing the projection inventories. MARAMA, the Mid-Atlantic Regional Air Management Association, Inc. is a voluntary, non-profit association of ten state and local air pollution control agencies. MARAMA is cooperating with the Northeast States for Coordinated Air Use Management (NESCAUM) and the Ozone Transport Commission (OTC) to provide staff support to the Mid-Atlantic and Northeast

Visibility Union (MANE-VU). The inventory summary work described in this chapter was prepared by MANE-VU as a coordinated effort among the states to develop a consistent inventory throughout the region with the most efficient process. The MANE-VU methodology and results can be found in the document "Development of Emission Projections for 2009, 2012, and 2018 for NonEGU Point, Area, and Nonroad Sources in the MANE-VU Region," February 2007.

4.2.2 Area Inventory Methodology

Area sources are defined and calculated in accordance with the descriptions and methodologies in the EPA Emissions Inventory Improvement Program (EIIP) Volume III - Area Source series, and the Air Toxic Emission Protocol for the Great Lakes States. Area sources collectively represent individual stationary sources that have not been inventoried as specific point sources. These individual sources treated collectively as area sources are typically too small, numerous, or difficult to inventory using the methods for the other classes of sources. Area sources represent a collection of emission points for a specific geographic area, most commonly at the county level; however, any geographic area can be used to present area sources. Facilities and emission points are grouped together with other like sources into area source categories. These area source categories are combined in such a way that emissions can be estimated for an entire category using one methodology. This methodology normally requires a step to exclude the emissions from sources that have already been accounted for as point sources. The area source categories must be defined in such a way to avoid overlap or duplication with point, mobile or biogenic emissions sources.

New York has applied the methodologies as identified in EIIP and/or the Air Toxic Emission Protocol for the Great Lakes States, including appropriate 2002 actual activity data to develop the 2002 periodic area source inventory. The area sources are broken down according to Area Source Codes (ASC). Details of area source methodologies are provided as Appendix D.

All of the area source data was submitted to MANE-VU for additional QA and for its use in preparing the projection inventories. The MANE-VU methodology and results can be found in the document "Development of Emission Projections for 2009, 2012, and 2018 for Non-EGU Point, Area, and Nonroad Sources in the MANE-VU Region," February 2007.

4.2.3 On-Road Inventory Methodology

The on-road component of the 2002 base year inventory includes an estimate of emissions from all motorized vehicles operated on public roadways. All on-road mobile emissions were estimated using EPA's MOBILE6 emission model and individual inputs for each of the 62 counties in the state. These inputs include varying temperature, traffic, and/or air quality programs. “Base-year” inventory inputs were derived from 2002 data, where applicable, and reflect the programs and controls that were in effect in 2002. In order to yield more accurate annual inventories the modeling was done using specific inputs for each month. Brief descriptions of these input types are provided below.

A new 2002 Daily Vehicle Miles Traveled (DVMT) inventory was constructed by the New York State Department of Transportation (NYSDOT) to provide DVMT estimates by county, geographic component (urban, small urban, and rural) and functional class. This resulting VMT by county and by functional class is then multiplied by a seasonal adjustment factor to account for seasonal differences. This seasonal adjustment factor is also supplied by the NYSDOT. For ozone season day, the seasonal adjustment factor is a 10 year average of “summer” seasonal adjustment factors supplied by NYSDOT.

The vehicle mix for each of the 11 NYSDOT regions in New York State is used to produce VMT by vehicle type. There are 28 fuel and weight categories employed by MOBILE6. The main objective is to create a separate, distinct (where justified) vehicle mix for each of the twelve roadway types in the Federal Highway Administration (FHWA) classification scheme.

The vehicle age distributions used in MOBILE6 are obtained from the New York State Department of Motor Vehicles (NYSDMV) registration data for the current year at the beginning of each July. Each record is sorted into the 28 vehicle types by county. The 2002 registration distribution was used for 2002 inventories. Diesel fractions are obtained at the same time as the registration distributions.

EPA default Mileage Accumulation Rates for all vehicle types were taken from EPA’s Fleet Characterization Data for Mobile6.1.

NYSDOT created vehicle use profiles similar to those used as inputs to California’s EMFAC model. One of these inputs is the percent of vehicle trips in each hour; these values also equate to the number of starts per hour.

Hourly temperatures were obtained from the National Oceanic and Atmospheric Administration for New York and vicinity. Each area of the State was then matched to a NWS station. The Department uses hourly values to more accurately model hourly emissions. Monthly average hourly temperatures were created from recorded hourly temperature data for all of 2002 for each of the weather stations used for ozone temperatures.

The relative humidity data for modeling of ozone exceedance days were calculated from hourly airport observations that the Department obtained from the National Climatic Data Center. Dewpoint observations for the same dates and locations that were used in temperature calculations were also used to determine hourly relative humidity values. The Department uses actual recorded hourly values to more accurately model hourly emissions. In modeling annual emissions an average daily absolute humidity value was calculated for each month of the year.

The Planning Division of NYSDOT developed speed estimates for air quality modeling in 1994. Speeds were developed for 15 areas, some as small as a single county, throughout the state along with each of the 12 possible functional classes and four time periods. When modeling these speeds in MOBILE6, the AVERAGE SPEED command was not used because it can only model a single speed for the entire day. The SPEED VMT command allows the modeling of different hourly speeds and was therefore chosen as the input format for New York State speeds.

The Stage II Refueling program began for the NYMA area in 1989. However, refueling emissions are not included as part of the mobile source inventory; rather, they are calculated separately and included in the area source component of the inventory.

The Mobile6 Anti-Tampering Program command is used to specify the programs in effect in New York State. The Anti-Tampering Program is applicable statewide to all gasoline-powered vehicles during the annual safety/emissions inspections. An additional gas cap pressure check was added in 1999 The Mobile 6 I/M Program command is used to specify the Inspection/Maintenance (I/M) programs in effect in New York State.

The LEV 2 phase-in schedules were created using a spreadsheet to solve for the NMOG standard for each model year using the various motor vehicle certification standards, or “bins.” The LEV 2 program is based on each vehicle meeting an NMOG standard for each model year. This standard can be met using any combination of LEV 2 bins the manufacturer desires.

4.2.4 Non-Road Inventory Methodology

The non-road component of the 2002 base year inventory includes an estimate of emissions from motorized vehicles and equipment that are not typically operated on public roadways. Emissions estimates for non-road mobile sources were estimated using four separate methodologies. EPA's Non-Road Model is used for a number of non-road emission categories while airport, commercial marine vessel and locomotive emissions are calculated separately outside of the model. In addition, all 62 counties are modeled separately and the state is separated into two areas to account for the federally mandated RFG program in place in the 10-county NYMA.

Emissions from 2-stroke gasoline, 4-stroke gasoline, liquefied petroleum gas, compressed natural gas and diesel fueled non-road vehicles as well as emissions from recreational marine vessels were estimated using the U.S. EPA Non-Road Model Version 2005. The software was finalized for use in SIP development on June 12, 2006. Using the Non-Road Model, emissions from New York were estimated for each individual county for each month of the year. To account for temperature and fuels differences across the state, county-specific temperature and fuels blend data for each month of the year were input into the model.

For 2-stroke gasoline, 4-stroke gasoline, liquefied petroleum gas, compressed natural gas and diesel fueled nonroad vehicles as well as emissions from recreational marine vessels; the U.S. EPA Nonroad Model was run on a monthly county-by-county basis. To develop emissions for a typical ozone season day, the emissions for June - August were added together and then divided by 92.

The temperature data for 2002 was acquired from the National Oceanic and Atmospheric Administration which included historical weather data from 33 airport locations across the State of New York as well as surrounding locations. This information was used to develop average high and low temperatures for each month of the year on a county by county basis.

Fuels blend data for 2002 was acquired from the New York State Department of Agriculture and Markets. This data is based on thousands of samples collected across the state from fueling stations and retention areas. These samples are analyzed for many profiles including oxygen content, RVP, and sulfur content. This analysis provides average monthly fuels profiles on a county-by-county basis for use in the model.

Aircraft emissions for New York State are estimated using the Federal Aviation Administration's (FAA) Emission Dispersion Modeling System (EDMS) Version 4.4. Airport specific landing and take-off data by aircraft type acquired from FAA are used as inputs to the model. EDMS uses this information to estimate emissions from both aircraft and ground service equipment.

Commercial Marine Vessel (CMV) emissions are based upon the CMV emissions report prepared by the Starcrest Consulting Group in conjunction with their work on the New York Harbor Deepening Project. The emissions from Bronx, Kings, Nassau[1], New York, Queens, Richmond, Rockland, Suffolk and Westchester counties are based on actual 2002 operational data from an intensive survey performed by Starcrest. The CMV inventory for the rest of the state is based on Radian Corporation's report entitled "1990 Base Year Ozone Precursor Emissions Inventory for New York State: Volume 4: Non-Road Mobile Sources," March 1993 (revised July 1993).

The Starcrest inventory includes a detailed survey of all CMV types, activity and fuel consumption and took several months to complete. This project was undertaken as part of the NYC Harbor Deepening Project to update the baseline inventory and to optimize the offsets that would be utilized by the Army Corps of Engineers. This updated inventory was performed by Starcrest Consulting under contract to the Port Authority. While the Department would like to use the Starcrest methodology to update the CMV inventory for the rest of the state it would require an intensive effort to survey all of the counties bordering Lake Erie, Niagara River, Lake Ontario, the St. Lawrence Seaway, Lake Champlain, Hudson River, Mohawk River, Erie Canal and both the Long Island Sound and Atlantic Ocean since Suffolk County was not included in the Starcrest inventory. Other bodies of water that may have CMV traffic are the Finger Lakes, Oneida Lake, Lake George and possibly some other rivers.

The Department is aware that there is more recent EPA guidance regarding CMV inventory development but the methodology is very different than the work completed by Starcrest. The Department also believes that this guidance is far less detailed and would not result in an improvement to the methodology established in the development of the 1990 inventory.

[1] The update to the Nassau and Suffolk CMV inventory only pertains to that portion included in the New York Harbor study completed by Starcrest. Only portions of these counties affected by the New York City Harbor Deepening Project are included. The remaining portions of Nassau and Suffolk counties are based upon emissions from the 1990 Radian Report grown to reflect 2002 vessel activity.

The locomotive emissions inventory is based upon a report developed under contract to the New York State Energy Research and Development Authority (NYSERDA). The report is entitled "NYSERDA CLEAN DIESEL TECHNOLOGY: NON-ROAD FIELD DEMONSTRATION PROGRAM; Development of the 2002 Locomotive Survey & Inventory for New York State." The locomotive inventory is based upon a survey conducted of the national, regional, and local freight railroads, as well as passenger and commuter rail lines operating in New York State. Information collected in the survey was used in development of the emissions inventory.

For aircraft, commercial marine and locomotives the 2002 annual base year inventories were first grown to annual projection year inventories by the method described above. For all three categories, there is no documentation that supports using any seasonal adjustment factors to develop daily emissions. Therefore, ozone season day emissions were calculated by dividing the annual emissions by 365.

4.2.5 Biogenic Inventory Methodology

Biogenic emissions were calculated using Biogenic Emissions Inventory System (BEIS) v3.1.2. Daily values were totaled for each county to yield annual numbers.

4.3 Summary of 2002 Ozone Season Day (OSD) Emissions

For this portion of the inventory, the fundamental unit for the inventory of each source sector is tons per OSD. Similar to the annual inventory, the OSD inventory is reported on a "by-county" basis for the various source sectors. The by-county and total statewide inventory for CO, NO_x, and VOCs are detailed in Appendix C. The statewide numbers are summarized in Table 4.3. They are reported to the nearest hundredth ton. In some cases, where there is less than one-hundredth (0.01) ton, emissions are reported in thousandths to distinguish them from categories where there are no (or zero) emissions.

Table 4.3 Statewide Ozone Season Day Summary

2002 OSD	Tons per Day			Percent of All Sectors		
	CO	**NOx**	**VOC**	**CO**	**NOx**	**VOC**
Point (non-EGU)	227.27	140.85	59.46	1.8%	7.8%	1.0%
EGU	36.73	237.29	3.97	0.3%	13.1%	0.1%
Area	148.31	153.39	889.13	1.2%	8.5%	15.3%
Nonroad	5,386.05	400.78	749.45	42.2%	22.1%	12.9%
Onroad	6,518.33	844.22	546.65	51.1%	46.6%	9.4%
Biogenic	431.59	35.68	3,548.04	3.4%	2.0%	61.2%
All Sectors	12,748.29	1,812.20	5,796.69	100.0%	100.0%	100.0%

For the NYMA, the summary is tabulated as Table 4.4.

Table 4.4 New York Metropolitan Area Ozone Season Day Summary

2002 OSD	Tons per Day				Percent of All Sectors		
	CO	**NOx**	**VOC**		**CO**	**NOx**	**VOC**
Point (non-EGU)	15.78	50.91	11.21		0.3%	6.7%	0.9%
EGU	23.07	117.61	2.70		0.4%	15.6%	0.2%
Area	28.70	78.33	461.31		0.5%	10.4%	38.4%
Nonroad	2,824.03	178.49	283.51		53.3%	23.6%	23.6%
Onroad	2,384.72	327.31	236.83		45.0%	43.3%	19.7%
Biogenic	21.08	2.72	204.40		0.4%	0.4%	17.0%
All Sectors	5,297.38	755.38	1,199.96		100.0%	100.0%	100.0%

The percent share of each sector for each of the contaminants on a statewide basis is shown in the rightmost columns in the tables above.

4.3.1 Methodological Details Used to Compute Ozone Season Day from the Annual Estimates

OSD emission inventories are derived from annual inventories and are estimated by adjustments to reflect the relative difference of emission patterns during the ozone season when compared to cooler months. Depending upon source sector activity levels, some source categories are more or less likely to have emissions during an OSD. For example, an OSD is less likely to have emissions related to space heating and more likely to have emissions related to air conditioning or painting. Many categories have relatively constant emissions throughout the year (e.g., consumer products – deodorant, house cleaning products, etc.) OSD estimates attempt to characterize those seasonal differences to more accurately reflect emissions during the summer season.

The ORMS (on-road mobile source) sector uses a seasonal adjustment factor to adjust DOT's annual average daily vehicle miles traveled (AADVMT). This seasonal adjustment factor is an average of the June, July, and August monthly factors used by NYSDOT.

Hourly temperatures were obtained from the National Oceanic and Atmospheric Administration for New York and vicinity. Each area of the State was then matched to a NWS station. The Department uses hourly values to more accurately model hourly emissions.

The relative humidity data for modeling of ozone exceedance days were calculated from hourly airport observations that NYSDEC obtained from the National Climatic Data Center. Dewpoint observations for the same dates and locations that were used in temperature calculations were also used to determine hourly relative humidity values. NYSDEC uses actual recorded hourly values to more accurately model hourly emissions.

These inputs are then used in MOBILE6.2 to produce an emission factor for each vehicle and road type combination for all 62 counties. The resultant emission factor in grams/mile is multiplied by daily VMT, including seasonal adjustment, to determine daily ozone season emissions.

For NRMS (non-road mobile sources) the following methodologies were used:

1. For 2-stroke gasoline, 4-stroke gasoline, liquefied petroleum gas, compressed natural gas and diesel fueled non-road vehicles as well as emissions from recreational marine vessels ; the U.S. EPA Non-Road Model was run on a monthly county-by-county basis. To develop emissions for a typical OSD, the emissions for June through August were added together and then divided by 92.

2. For aircraft, commercial marine vessels and locomotives the 2002 annual base year inventories were first grown to annual projection year inventories by the method described above. For all three categories, there is no documentation that supports using any seasonal adjustment factors to develop daily emissions. Therefore, OSD emissions were calculated by dividing the annual emissions by 365.

Area source (non-point) sector OSD emissions are calculated based upon the area source category. For example, for consumer products, the annual emissions are simply divided by 365 because consumer products are generally used uniformly throughout the year. For dry cleaning, the emissions are assumed to be consistent throughout the year, but are assumed to be five day per week emissions, so annual emissions for this category are divided by 260 (5*52) to estimate OSD emissions. For AIM coatings, activity is higher during the summer, so based upon EPA guidance, an adjustment factor of 1.3 is applied during the summer – annual emissions are multiplied by 1.3 and divided by 365 to estimate OSD emissions.

Point source sector OSD emissions are calculated from the operational information provided in the emission statement forms. This information includes the process throughput and a breakdown of operation by season, including the number of days the process was in operation during that season.

For biogenics, technical staff used statewide annual by-day BEIS output to calculate what they have come to call “biogenic OSD expansion factors”. These are subsequently applied to the “annual by-county” estimates to generate OSD tonnages. The expansion factors use BEIS model statewide daily values from June, July, and August to compute a representative ton per OSD. Details of this series of computations are available upon request.

4.4 Summary of Future Year Emissions

For the NYMA, the future years of interest are 2008, 2011 and 2012. The inventories for those years are presented in Tables 4.5, 4.6 and 4.7.

Table 4.5 New York Metropolitan Area 2008 Ozone Season Day Summary

2008 OSD	Tons per Day			Percent of All Sectors		
	CO	**NOx**	**VOC**	**CO**	**NOx**	**VOC**
Point (no EGU)	17.74	64.99	13.21	0.4%	10.4%	1.3%
EGU	27.07	108.94	2.50	0.6%	17.4%	0.3%
Area	31.06	76.73	406.31	0.7%	12.2%	41.0%
Nonroad	3,121.62	161.51	214.87	68.6%	25.8%	21.7%
Onroad	1,332.64	211.77	148.85	29.3%	33.8%	15.0%
Biogenic	21.08	2.72	204.40	0.5%	0.4%	20.6%
All Sectors	4,551.20	626.66	990.14	100.0%	100.0%	100.0%

Table 4.6 New York Metropolitan Area 2011 Ozone Season Day Summary

2011 OSD	Tons per Day			Percent of All Sectors		
	CO	**NOx**	**VOC**	**CO**	**NOx**	**VOC**
Point (no EGU)	18.28	64.05	13.68	0.4%	11.3%	1.5%
EGU	27.07	108.94	2.50	0.6%	19.2%	0.3%
Area	31.76	77.05	398.88	0.7%	13.6%	42.8%
Nonroad	3,250.20	149.85	191.70	72.3%	26.5%	20.6%
Onroad	1,149.41	163.84	120.93	25.6%	28.9%	13.0%
Biogenic	21.08	2.72	204.40	0.5%	0.5%	21.9%
All Sectors	4,497.79	566.45	932.09	100.0%	100.0%	100.0%

Table 4.7 New York Metropolitan Area 2012 Ozone Season Day Summary

2012 OSD	Tons per Day			Percent of All Sectors		
	CO	**NOx**	**VOC**	**CO**	**NOx**	**VOC**
Point (no EGU)	18.46	62.80	13.84	0.4%	11.5%	1.5%
EGU	27.07	108.94	2.50	0.6%	20.0%	0.3%
Area	31.91	77.34	399.75	0.7%	14.2%	43.5%
Nonroad	3,292.11	145.67	187.23	73.6%	26.7%	20.4%
Onroad	1,083.31	147.43	111.08	24.2%	27.1%	12.1%
Biogenic	21.08	2.72	204.40	0.5%	0.5%	22.2%
All Sectors	4,473.94	544.90	918.80	100.0%	100.0%	100.0%

4.4.1 Projection Methodologies for Point, EGU, and Area Sources

The 2002 non-EGU point and area source emissions inventories were projected using the growth factors in tables provided by MANE-VU. The emissions used for projections were interpolated for the years 2005, 2008, and 2011. The MANE-VU methodology and results can be found in the document "Development of Emission Projections for 2009, 2012, and 2018 for Non-EGU Point, Area, and Non-Road Sources in the MANE-VU Region," February 2007.

For EGU point sources, EPA has recommended the use of the IPM model to project EGU emissions. MANE-VU followed this recommendation, so the MANE-VU projections for point sources used IPM to estimate EGU emissions. When the IPM modeled emissions were compared to the actual 2005 emissions for New York, or when IPM modeled emissions were compared to the permit applications that the Department has received for new EGUs, it became obvious that, for New York, the IPM projected emissions were not realistic (for example, in NYCMA, IPM projected more than a 70 percent reduction in NO_x emissions from EGUs by 2009 with the generation – and associated emissions – moving further upstate). This re-siting of facilities by IPM and hence the movement of emissions does not accurately reflect the reality of the constraints of the electrical grid in New York State, nor does it reflect the realities of siting new power plants in New York. In order to present a more realistic projection of EGU emissions for New York, it is assumed that the 2005 actual EGU emissions will represent the EGU emissions for the future years. 2005 is the most recent data available. The trend in recent years for EGUs has been decreasing emissions statewide (25 percent NO_x reduction between 2002 and 2005). Although it is forecasted that generation will increase in New York in future years, emissions are not expected to increase due to the Clean Air Interstate Rule (CAIR) which establishes NO_x and SO_2 emission caps. The only exception to assuming that the 2005 actual EGU emissions represent future year EGU emissions is where there is a consent agreement that limits future year emissions for a facility. In that case, the future year emissions for that specific facility have been reduced to meet the limits contained in the agreement.

Sample calculations for point and area source growth and control are provided in Appendix J.

4.4.2 On-Road Projection Methodology

New York State is modeled by using individual inputs for each of the 62 counties. Each county receives varying temperature, traffic, and/or air quality programs. The mobile source projection inventory was developed by using Mobile6 emission factors and vehicle miles traveled (VMT) projections for each future inventory year prepared by the New York State Department of Transportation (NYSDOT). This projection uses linear regression of Highway Performance Monitoring System (HPMS) historical data for forecasting VMT. These projections employed HPMS data from 1981 to 2002.

Mobile 6.2 is then run to produce emission factors for each vehicle and road type combination for all 62 counties. The resultant emission factor in grams/mile is multiplied by daily VMT, including seasonal adjustment, to determine daily emissions.

It should be noted that the on-road projections factor in the Department's proposal to discontinue the NYMA tailpipe testing requirement on December 31, 2010. This discontinuation will be documented in a separate I/M SIP revision being developed by the Department and will address the anti-backsliding provisions of section 110(l) of the CAA.

4.4.3 Non-Road Projection Methodology

The U.S. EPA Nonroad Model Version 2005, was used to develop future year nonroad emissions projections for 2-stroke gasoline, 4-stroke gasoline, liquefied petroleum gas, compressed natural gas and diesel fueled nonroad vehicles as well as emissions from recreational marine vessels. When completing future year projections, the model incorporates emissions effects that result from both anticipated changes in equipment activity as well as deterioration of equipment. The model also accounts for expected turnover of old equipment. In addition, the following EPA nonroad emission control programs are built into the model:

1. New Phase 2 Standards for Small Spark-Ignition Non-handheld Engines (March 1999) which covers NOx and HC reductions from mowers, edgers, lawn tractors, and other non-hand held gasoline equipment.

2. Final Phase 2 Standards for Small Spark-Ignition Handheld Engines (March 2000) which covers NOx and HC reductions from trimmers, leaf blowers, chain saws, and other handheld gasoline equipment.

3. Emission Standards for New Nonroad Engines (September 2002) which covers NOx, HC and CO from the following new engines and vehicles:

   a. Large Industrial Spark-Ignition Engines (forklifts, electric generators, airport baggage, etc.)
   b. Recreational Vehicles (snowmobiles, dirt-bikes, ATVs)
   c. Recreational Diesel Marine Engines (for use in yachts and cruisers)

4. Clean Air Nonroad Diesel Rule (May 2004) which covers NOx, PM and SOx emissions from diesel engines used in most construction, agricultural, industrial and airport equipment

In addition, this rule includes and requires a 99 percent reduction in diesel sulfur by 2010.

Future year nonroad emissions projections for the aircraft, commercial marine and locomotives categories were calculated using the growth factors developed for the MANE-VU Emissions Projections Technical Support Document. These projections were developed using combined growth and control factors developed from emission projections for U.S. EPA's Clean Air Interstate Rule (CAIR). The control programs in place that were used to develop the growth factors were:

1. Adopted Aircraft Engine Emissions Standards (April 1997) which reduces NOx and CO from new aircraft engines

2. Final Emissions Standards for Locomotives (December 1997) which reduces NOx, HC, CO and PM from new and remanufactured diesel powered locomotive engines. This rule requires a reduction in diesel sulfur which will result in a reduction in SOx.

3. Emission Standards for New Commerical Marine Diesel Engines (November 1999) which reduces NOx and PM from

diesel marine engines over 37 kW. This rule requires a reduction in diesel sulfur which will result in a reduction in SOx.

The following regulations were not built into the growth factors.

November 2005 - New Emission Standards for New Commercial Aircraft Engines
March 2007 - EPA Proposal for More Stringent Emissions Standards for Locomotives and Marine Compression-Ignition Engines

4.4.4 Biogenic Future Year Emissions

Biogenic emissions levels were maintained at the 2002 levels for all future years.

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5.0 PERMIT PROGRAM

One of the most effective means of applying the requirements of SIPs in reducing air emissions is through an air pollution permitting program for stationary sources. New York's air permitting program identifies and controls sources of air pollution, ranging in size from large industrial facilities and power plants to small commercial operations, such as dry cleaners.

Before 1970, few emission limitations were placed on the pollutants that could be discharged to the air. When the first federal air quality standards were issued, New York's air was more polluted than the standards allowed in several areas. Today, however, air quality in most areas of New York meet standards that are much more rigorous than those of 1970. As new information on the health and environmental effects of air pollution has become available, new state and federal standards have been established and emission limits have been tightened to protect public health and the environment. By requiring the use of effective pollution control technology and enforcing compliance with these requirements through permitting, the Department's air permitting program has been a vital means of reducing air emissions to meet ever more stringent air quality standards.

Title V of the Clean Air Act (CAA) requires states to implement a permitting program for major stationary sources. Section 19-0311 of Article 19 of the Environmental Conservation Law directs the Department to establish a permitting program to implement Title V of the CAA. In addition, the Department has implemented a permitting program for minor sources of air pollution. The Department's permitting regulations are set forth at 6 NYCRR Part 201, "Permits and Certificates". The two most common types of permits for air contamination sources are described in 6 NYCRR Part 201 include State Facility permits (Subpart 201-5) and Title V permits (Subpart 201-6).

State Facility permits are issued to facilities whose emissions are below the major source threshold (as defined in Part 201), but meet the criteria for permitting under Subpart 201-5. These are generally facilities which meet any of the following characteristics:

- stationary sources which require and have accepted an emission cap pursuant to Subpart 201-7 to limit their potential to emit to avoid the requirement to obtain a Title V permit or other applicable requirement

- stationary sources which have been granted a variance pursuant to an air regulation implemented by the Department

- stationary sources which are new facilities subject to a New Source Performance Standard

- stationary sources which emit hazardous air pollutants and have a potential to emit that is below major stationary source thresholds.

Title V facilities are required for major facilities under the CAA and the ECL and implementing regulations at 40 CFR Part 70 and 6 NYCRR Subpart 201-6. These include facilities which:

- have a potential to emit which is major as defined in Part 201

- are subject to a NSPS and/or are not a deferred source category

- are subject to a standard or other requirement regulating a hazardous air pollutant

- are subject to federal acid rain program requirements.

Title V permits have greatly assisted the Department’s efforts to ensure that major sources are operating in compliance with applicable air pollution control laws and regulations. Notably, the Title V permit, in one document, contains all applicable requirements for a major stationary source, the approved test methods by which a source will determine whether it is in compliance with those requirements and conditions requiring prompt reporting of all violations and emission limit exceedances. The Title V permit also includes conditions for recordkeeping, monitoring and reporting, including the requirement for facilities to prepare semi annual and annual reports of their emissions and an annual certification that they have operated in compliance with all applicable requirements. All of this information is accessible to the public. Thus, the Title V permit provides both the Department and members of the public with a clear picture of what a facility does, what requirements are applicable to a facility, what measures the facility must implement to control its emissions of air pollutants, and how the facility will determine whether it is operating in compliance with those applicable requirements. The terms of the Title V permit are also federally enforceable which means that citizens can bring suit to address violations of the permit.

To obtain a permit, a facility owner or operator must apply to the Department using a form designated for this purpose. Applicants must supply information on the facility's emissions, the processes operating at the facility, the raw materials being used, the height and location of stacks or vents, the requirements that apply to the facility, and the controls being applied. The Department develops air pollution permits based on the information in the applications and the Department’s own assessment of the rules that apply.

The information generated by the permit process is also used by the Department in its air quality planning to ensure the effective implementation of control measures needed to curb air pollution. Air permits play a direct role in the implementation of emission reduction requirements at stationary sources. For example, RACT requirements intended to reduce VOC and NOx emissions, as well as NOx budget and other requirements applicable to large sources, are set forth in regulations which serve as the source of conditions in permits issued by the Department. Permit terms and condition in turn ensure that the facility is in fact complying with applicable regulatory requirements. The result is that the Department can document that it is achieving the emission reduction targets contemplated by the SIP which are necessary to improve air quality in New York State.

All other non-major facilities that meet the criteria of Subpart 201-4 can obtain a minor facility registration, rather than a permit. These facilities typically have actual emissions which are less than one-half of the major source threshold.

Facilities with registrations are still required to meet any applicable requirements that are subject to in accordance with the Department's regulations. The Department, in addition, can enforce these regulatory obligations through its authority under New York State Environmental Conservation Law and the CAA.

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6.0 SECTION 110 MEASURES

Pursuant to CAA sections 110(a)(1) and (2), states are required to address basic SIP requirements related to the attainment of new or revised NAAQS, including emission inventories, monitoring and modeling to assure attainment, maintenance and enforcement of the standards. Section 110(a)(1) contains the general requirements for submitting a SIP to address a new or revised primary NAAQS. Section 110(a)(2) contains specific elements to be included in the SIPs.

Pursuant to EPA guidance issued on October 2, 2007, SIPs must include the following elements of CAA section 110(a)(2):

- Enforceable Emission Limitations and Other Control Measures (110(a)(2)(A))
- Ambient Air Quality Monitoring, Compilation, Analysis and Reporting (110(a)(2)(B)
- Enforcement and Stationary Source Permitting (110(a)(2)(C)
- Interstate Transport (110(a)(2)(D))
- Assurance of Adequate Resources (110(a)(2)(E))
- Stationary Source Monitoring System and Reporting (110(a)(2)(F))
- Emergency Powers and Contingency Plans (110(a)(2)(G))
- Authority for SIP Revisions for Revised NAAQS (110(a)(2)(H))
- Authority for SIP Revisions for New Nonattainment Areas (110(a)(2)(I))
- Consultation, Public Notification and Prevention of Significant Deterioration (PSD)/Visibility (110(a)(2)(J))
- Air Quality Monitoring and Reporting (110(a)(2)(K))
- Permitting Fees (110(a)(2)(L))
- Consultation/Participation with Affected Local Entities (110(a)(2)(M))

The Department's December 13, 2007 submittal addressed each of the required elements of CAA section 110(a)(2), and affirmed that New York State's SIPs meet the requirements of CAA sections 110(a)(1) and (2). It is included as Appendix I.

In a separate related action, on January 24, 2008 (73 FR 4109), EPA approved "Revision to the New York State Implementation Plan Clean Air Interstate Rule (CAIR) and Transport (110(a)(2)(D))" that the Department submitted to EPA on March 29, 2007. EPA determined that the SIP revision fully implements the CAIR requirements for New York and satisfies New York's obligation under section 110(a)(2)(D)(i) of the CAA to prohibit air emissions that would interfere with provisions to prevent significant deterioration of air quality.

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7.0 CONTINGENCY MEASURES

Under the CAA, 8-hour ozone areas subject only to subpart 1, as well as those classified under subpart 2 as moderate, serious, severe and extreme must include in their SIPs contingency measures consistent with Sections 172(c)(9) and 182(c)(9), as applicable. Contingency measures are additional controls to be implemented in the event the area fails to meet an RFP milestone or fails to attain by its attainment date. Such measures shall take effect in any such case without further action by the state or the Administrator.

EPA requires that contingency measures identified by the state must be sufficient to secure an additional 3 percent reduction in ozone precursor emissions in the year following the year in which the failure has been identified. For a non-attainment area that fails to meet RFP percent reduction requirements, and where it has been demonstrated that NO_x controls are needed to attain the primary NAAQS for ozone, measures that produce a combination of NO_x and VOC reductions may serve as 15 percent contingency measures. EPA requires at least 0.3 percent out of every reduction of 3 percent be attributable to a reduction in VOC measures.

The New York State portion of the New York – N. New Jersey – Long Island, NY-NJ-CT non-attainment area meets RFP percent reduction requirements as demonstrated in Chapter 10.

In order to demonstrate compliance with the contingency measures provision applicable to the attainment demonstration, the Department has opted to include measures that have been or will be adopted for its contingency measures for the New York State portion of the New York – N. New Jersey – Long Island, NY-NJ-CT non-attainment area.

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