The State of New Jersey
Department of Environmental Protection

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

Proposal

Meeting the Requirements of the Regional NO_x Cap Program and Transportation Conformity Budgets Related to the Attainment of the Ozone and Carbon Monoxide National Ambient Air Quality Standards

September 28, 1999

Preface

New Jersey is taking comment on this proposed State Implementation Plan to demonstrate attainment with the National Ozone Ambient Air Quality Standard, in accordance with the Clean Air Act. In order to improve air quality in New Jersey and reduce the New Jersey contribution to ozone in other states, this document:

1) establishes a cap on emissions from all source sectors of oxides of Nitrogen (NO_x), an ozone precursor, and

2) establishes a NO_x and volatile organic compounds (VOCs) emissions budget for the Highway Vehicle sector related to attainment of the 1-hour ozone health standard and a carbon monoxide (CO) health standard emissions budget for attainment of the carbon monoxide health standard.

Acknowledgments

The New Jersey Department of Environmental Protection (NJDEP) acknowledges the efforts and assistance of the many agencies and individuals whose contributions were instrumental in the preparation of this State Implementation Plan Revision.

In particular, the NJDEP wishes to acknowledge the individuals within the United States Environmental Protection Agency (USEPA) Region II, the staffs within the Connecticut Department of Environmental Protection, the New York State Department of Environmental Conservation, the Pennsylvania Department of Environmental Protection, the Delaware Department of Natural Resources and Environmental Control, the Maryland Department of the Environment, and the USEPA Office of Air Quality Planning and Standards, Acid Rain, for their assistance and guidance.

Table of Contents

Preface i

Acknowledgments i

List of Tables iii

List of Figures iv

List of Appendices v

Acronyms and Abbreviations vi

Executive Summary vii

I. Introduction 1

II. Background and Need for a New Jersey NO_x Cap 1

III. Development of the New Jersey NO_x Budget by the USEPA 7

IV. Update of NO_x Budget and Plans to Meet 2007 Emissions Cap 12
- A. Area Sources 12
- B. Non-road Sources 14
- C. Highway Sources 16
- D. Major Stationary Sources 17
  - 1. Electricity-generating Units (EGUs) 17
  - 2. Major Stationary Sources: Non-electricity-generating Units (non-EGUs) 19
- E. Comparison of USEPA's Projected Quantities by Sector with New Jersey's Projected SIP Budget Quantities 24
- F. Compliance, Monitoring, Record-keeping, and Reporting 25

V. Transportation Conformity Budgets 26

VI. Conclusions 29

List of Tables

Table ES-1: Comparison of USEPA Projected 2007 NO_x Emissions with New Jersey Projected NO_x Emissions, by Sector (Tons) viii
Table ES-2: Transportation Conformity Budgets Ozone viii
Table 1: Budget Derivation 7
Table 2: 2007 Base Case Controls 8
Table 3: Non-road NO_x Emissions, Projected to 2007, by Sector, thousands of tons, five-month ozone season 15
Table 4: Non-electricity-generating Units Not included in NJ's Proposed Budget Cap: Source Classification Codes (SCCs) with Significant NO_x Emissions, Rates per N.J.A.C. 7:27-19, and Ratio of Estimated Controlled Rate to Estimated Uncontrolled Rate 22
Table 5: Non-electricity-generating Units Not included in NJ's Proposed NO_x Budget Cap, Source Classification Codes (SCCs) with Significant NO_x Emissions: Estimated Uncontrolled Ozone Season 1995 Emissions, Estimated Expected Emissions with NJ RACT Implementation, Estimated Expected Emissions with NJ RACT Implementation, and Projected 2007 Emissions (tons) 23
Table 6: Comparison of Projected 2007 NO_x Total Emissions, by Sector (Tons) 25
Table 7: Transportation Conformity Budgets Ozone and Carbon Monoxide 28

List of Figures

Figure 1: New Jersey NO_x Budget 4
Figure 2: Projected 2007 Area NO_x Emissions, Apportioned by Sector 14

List of Appendices

Appendix I: NO_x SIP Call Checklist and New Jersey Responses
Appendix II: Proposed Amendments to N.J.A.C. 7:27-31 Only available in hard copy
Appendix III: N.J.A.C. 7:27-31 Only available in hard copy
Appendix IV: File Structures for the USEPA emission spreadsheets for the five emission sectors, egu, non-egu, area, non-road, and mobile.
Appendix V: Public Participation Information
Appendix VI: Description of procedures, and structures, documentation, and web site address for spreadsheet files and database files used to develop Tables 4 and 5 and Figure 2
Appendix VII: Transportation Conformity Budget Background Data and Information
Appendix VII Attachment A: Mobile5a_h Input file Samples
Only available electronically
Appendix VII Attachment B: Mobile5a_h Output files
Only available electronically
Appendix VII Attachment C: Listing of files Available in Electronic Format

Acronyms and Abbreviations

Btu	British Thermal Unit
CAA	Clean Air Act
CE	Control Efficiency
CO	Carbon Monoxide
CTG	Control Techniques Guidelines
Department	New Jersey Department of Environmental Protection
LAER	Lowest Achievable Emission Rate
mm	Million
MPOs	Metropolitan Planning Organizations
MW	Megawatts (one million watts)
NAAQS	National Ambient Air Quality Standard
N.J.A.C.	New Jersey Administrative Code
NLEV	National Low Emission Vehicle
NO_X	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
OTAG	Ozone Transport Assessment Group
OTR	Ozone Transport Region
PPB	Parts Per Billion
PPM	Parts Per Million
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
Regional NO_X Cap	The USEPA Regional NO_X Emission Reduction Program
TIP	Transportation Improvement Program
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

Executive Summary

Ozone is not emitted directly but is created in the atmosphere by chemical reactions involving various reactive compounds. Significant anthropogenic emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) lead to higher ozone concentrations in regions in the vicinity of, and downwind of, such emissions. VOC's are also emitted by certain biogenic sources. Recent studies have shown that long-range transport of ozone and NO_x contribute to high levels of ozone in northeastern states, including New Jersey.

Exposure to elevated levels of ozone has significant negative impacts on human health and the environment. Therefore, New Jersey has been actively involved in efforts to reduce concentrations of ozone by controlling emissions of its precursors, VOCs and NO_x, for more than two decades. Past efforts focused on VOCs, and were successful in reducing peak ozone concentrations. But clearly, more reductions in emissions of precursors are needed.

Recent efforts have focused on reducing NO_x emissions As part of this effort, New Jersey's Oxides of Nitrogen Reasonably Available Control Technology (NO_x RACT) Program has already achieved significant reductions from major point sources in the State. Other states with ozone non-attainment areas have made similar efforts. The requirements of the USEPA to further limit emissions of NO_x from New Jersey sources to a total of not more than 100,133 tons per a 5 month ozone season, in 2007, are consistent with New Jersey's own goals. The State has in place an additional measure, the NO_x Budget Program, that should ensure that this goal will be met. Reporting systems are in place to monitor progress towards the goal with data that will be publicly available.

The New Jersey approach to meeting its NO_x cap level is two-fold. First, the State relies upon USEPA emission projections for the year 2007 for the area, non-road, and highway sectors. Second, the State relies upon its NO_x Budget Program to provide the emission reductions that the USEPA projected in the point source sector. The results of this approach are shown in Table ES-1.

This SIP revision also provides transportation conformity budgets for VOC and NO_x related to the 1-hour ozone health standard attainment demonstration, and for carbon monoxide, related to attainment of the carbon monoxide health standard. The resulting budgets are presented in Table ES-2.

Table ES-1: Comparison of USEPA Projected 2007 NO_x Emissions with New Jersey Projected NO_x Emissions, by Sector (Tons)

Sector	USEPA Budget	NJ Projected Emissions*
Area sources	12,431	12,431
Non-road sources	23,565	23,565
Highway sources	35,890	35,890
Point sources	28,247	28,079
Totals	**100,133**	**99,965**

* Measures to be implemented in New Jersey are considered equivalent to those assumed by USEPA in its budget for area, non-road, and highway sources. For point sources subject to New Jersey's NO_x Budget, emissions will be limited to 8,200 tons for the five-month ozone season. For point sources not included in New Jersey's NO_x Budget, emissions are estimated based on USEPA data and the degree of control expected with New Jersey's NO_x RACT rule. See text for further discussion.

Table ES-2: Transportation Conformity Budgets
Ozone

Attainment[1] Year Budgets		
MPO	**VOC tons/summer day**	**NO_x tons/summer day**
DVRPC	33.41	64.09
SJTPO	10.69	27.41
NJTPA	82.38	196.95

[1]2005 for DVRPC, SJTPO; 2007 for NJTPA.

Carbon Monoxide

Five county area	690.43 tons/day

I. Introduction

Ozone is not emitted directly but is created in the atmosphere by chemical reactions involving various reactive compounds. Significant anthropogenic emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) lead to higher ground-level ozone concentrations in regions in the vicinity of, and downwind of, such emissions. VOC's are also emitted by certain biogenic sources. Recent studies have shown that long-range transport of ozone and NO_x contribute to high levels of ground-level ozone in northeastern states, including New Jersey.

Pursuant to the Federal Clean Air Act and USEPA requirements[1] to mitigate the interstate transport of both ozone and oxides of nitrogen (NO_x), New Jersey requires reductions of emissions of NO_x. It is expected that such reductions will reduce the generation of ozone and thereby have significant public health benefits. This proposed SIP revision demonstrates how New Jersey will meet the NO_x emissions cap for 2007 as determined by USEPA. The USEPA has established such NO_x emissions caps in 23 jurisdictions to mitigate the interstate transport of ozone and ozone precursors such as NO_x.

Additionally, regarding SIP demonstrations of attainment with standards, the Clean Air Act, 42 U.S.C. §7401 et seq., requires, at 42 U.S.C. §7506, that the emissions resulting from transportation plans, programs and projects conform to the highway source emissions projections (referred to as "emissions budgets") contained in each state's SIP. The rule implementing 42 U.S.C. §7506 is referred to as the transportation conformity rule. In practice, the rule is implemented by the metropolitan planning organizations (MPOs), which must make a conformity determination before approval of certain transportation plans, programs, or projects. This SIP revision contains the emission budgets related to attainment with the 1-hour ozone and 8-hour carbon monoxide ambient air quality standards for each of the three New Jersey MPOs.

II. Background and Need for a New Jersey NO_x Cap

For almost 30 years, beginning with amendments to the federal Clean Air Act in 1970, the United States Congress has focused major efforts on reducing concentrations of ground-level ozone. Ground-level ozone, formed near the earth's surface where the potential for exposure to humans and the environment is high, has long been recognized has an air pollutant with a significant negative impact on public health. Both clinical and epidemiological research have found that ozone causes a wide range of health effects.

[1] 40 C.F.R. 51.121, Findings and requirements for submission of State Implementation plan revisions relating to emissions of oxides of nitrogen

Specifically, ozone causes the following health effects[2]:

- Decreased lung function, primarily in children active outdoors;
- Increased respiratory symptoms, such as coughing and chest pain upon inhalation, particularly in highly sensitive individuals;
- Increased hospital admissions and emergency room visits for respiratory causes among children and adults with pre-existing respiratory diseases, such as asthma;
- Inflammation of the lung;
- Possible long-term damage to the lungs; and
- Promotion of allergic reactions.

In addition to its health effects, ozone interferes with a plant's ability to produce and store nutrients[3]. This causes the plants to become more susceptible to disease, insects, other pollutants and harsh weather. This impacts annual crop production throughout the United States, resulting in significant losses, and injures native vegetation and ecosystems. Ozone can also damage certain man-made materials[4], such as textile fibers, dyes, and paints.

The regional nature of ozone formation and transport has been recognized for some time.[5] On September 27, 1994, the Ozone Transport Commission (OTC) agreed to develop a regional program to achieve significant reductions in NO_x emissions from large combustion sources. New Jersey signed the Memorandum of Understanding (MOU) which articulated the agreement to develop this program.

The MOU calls for the establishment of NO_x cap and trade program, and the establishment of an emissions cap or "budget" that all affected sources must not exceed during each control period, beginning in 1999. The MOU further calls for a multi-phase approach to the budget calculation. The first phase essentially involved NO_x RACT which was required by the Clean Air Act in ozone non-attainment areas. The second phase is to be a budget cap commencing in 1999. A third phase is a cap to be in place by the year 2003. The affected sources are fossil fuel-fired indirect heat exchangers having a fuel use capacity of at least 250 million Btu per hour and fossil fuel-fired units serving electric generators having a rated capacity of at least 15 megawatts (MW). The control period is May 1 through September 30.

---

[2] 62 Fed. Reg. 60317 (Nov. 7, 1997).

[3] A USEPA Fact sheet on the New 8-Hour Ozone and Fine (2.5 microns) Particulate Matter Health Standards, July 1997

[4] ibid

[5] National Research Council; Rethinking the Ozone Problem in Urban and Regional Air Pollution, National Academy Press, 1991

The 1999 cap is calculated by reducing the emission rate for each baseline source in a state by the lesser of the RACT level for that source or the higher of the emission rate resulting from a 65% reduction from baseline or 0.2 pounds of NO_x per million Btu's. This emission rate is then applied to the 1990 activity level, i.e. fuel usage, to compute the emissions. The emissions from all the baseline sources are summed to calculate the budget cap. In 2003 the cap will be computed similarly, except that a 75% reduction or a 0.15 pounds of NO_x per million Btu rate is used.

New Jersey adopted NO_x emission reduction requirements for large boilers that are more stringent that the OTC NO_x MOU Phase III requirements because, through the OTAG process, the State recognized that reductions beyond the OTC requirements were needed. New Jersey's rule proposal for the more stringent requirements on large boilers appeared in the September 15, 1997 New Jersey Register. A hearing was held on October 17, 1997. The rule was adopted in June 1998. The rule included a NO_x Cap on the larger New Jersey sources and provided for emissions trading among sources. Revisions to the rule have been proposed to assure consistency of certain procedural aspects with the USEPA's cap and trade requirements.[6] Absent unanticipated events or comments, adoption is targeted for September 30, 1999.

The emission reductions from this rule, for affected sources, will provide significantly more reductions than the OTC NO_x MOU Phase III requirements as illustrated in Figure 1.

In Figure 1, the 1999 bar illustrates the emission allowances to be allocated to sources under the NO_x Budget Program for the years 1999 through 2002. This cap amount reflects a level of control identical to what is established in the OTC NO_x Budget MOU. The 2003 bar illustrates the emission allowances to be allocated by those under the NO_x Budget Program for the year 2003 and beyond. The 2003 cap is calculated by applying the less stringent of a 0.15 pound per mmBtu or 90% emission rate reduction to the three most recent years of operational emission data rather than the OTC default for the inner zone of the less stringent of a 0.15 pound per mmBtu or 75% emission rate reduction. This cap amount reflects a level of control more stringent than the OTC NO_x Budget MOU control level because there are some older sources in New Jersey that had relatively high emission rates.

Recently the USEPA determined[7,8,9] that NO_x emissions from sources and emitting activities in 23 jurisdictions significantly contribute to the non-attainment of the 1-hour and 8-hour health based ozone national ambient air quality standards (NAAQS), or will contribute to the non-attainment of the 1-hour and 8-hour NAAQS in one or more downwind states in the eastern portions of the United States.

---

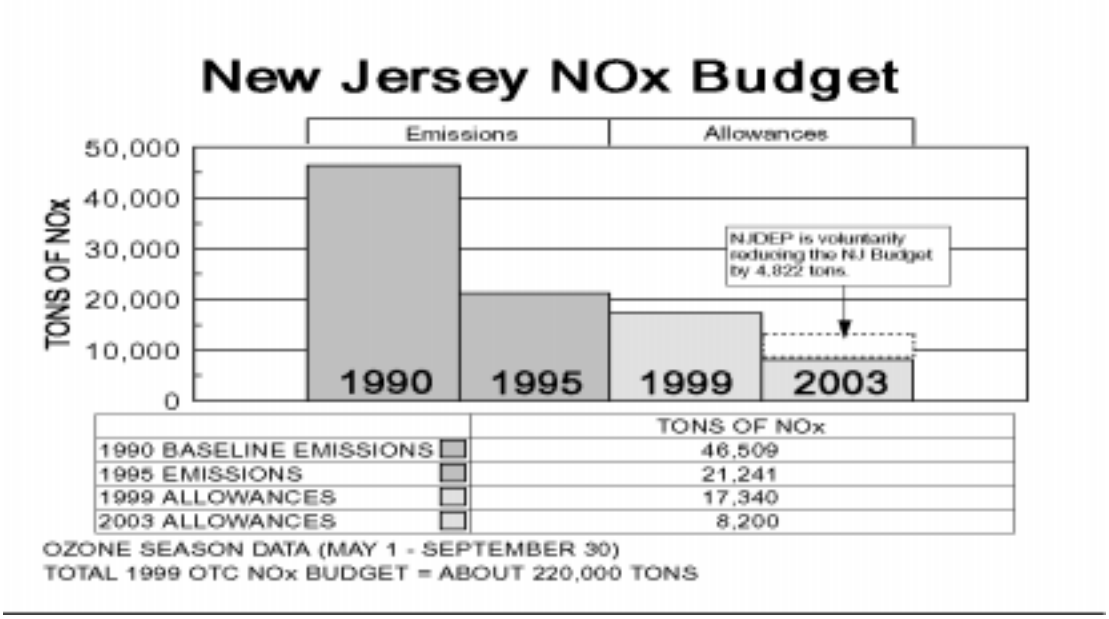
[6] 31 N.J.R. 2001(a) (Aug. 2, 1999)

[7] 62 Fed. Reg. 60317 (Nov. 7, 1997)

[8] 63 Fed. Reg. 25902 (May 11, 1998)

[9] 63 Fed. Reg. 57356 (Oct. 27, 1998)

Figure 1: New Jersey NO_x Budget



In particular, New Jersey was cited as containing sources that contribute significantly to non-attainment with the 1-hour and 8-hour standards in Connecticut, Maine, Massachusetts, New Hampshire, New York, Pennsylvania and Rhode Island.[10] These conclusions were developed with the use of data generated by the Ozone Transport Assessment Group (OTAG)[11], the USEPA's own air quality modeling analyses, and data obtained from public comments and other sources. The OTAG also recommended cost-effective control measures that could provide significant NO_x emission reductions, including controls on large stationary point sources.[12,13]

Based on the OTAG efforts and on its own analysis, on October 27, 1998, the United States Environmental Protection Agency (USEPA) required that certain states, including New Jersey, adopt and submit SIP revisions to reduce the NO_x emissions that are contributing significantly to non-attainment in downwind states or interfere with maintenance of attainment in downwind states.[14] These reductions are to be achieved by meeting NO_x emissions caps that are imposed on each jurisdiction. The selection of the measures needed

[10] 63 Fed. Reg. 57356, 57394, 57395 (Oct. 27, 1998)

[11] OTAG report, referred to in 63 Fed. Reg. 57356, 57358 (Oct. 27, 1998)

[12] OTAG final report: http://www.USEPA.gov/ttn/rto/otag/finalrpt

[13] Letter to USEPA referenced in NJ's 126 petition, dated April 14, 1999

[14] 63 Fed. Reg. 57356, 57358 (Oct. 27, 1998)

to meet the cap is the decision of each individual jurisdiction. Independent of the USEPA's call for SIP revisions, Section 110(a)(2)(D) of the Clean Air Act requires New Jersey to include in its State Implementation Plan provisions prohibiting any source or other type of emissions activity from emitting air pollutants which will "contribute significantly to non-attainment in, or interfere with maintenance by, any other state with respect to any such national primary or secondary air quality standard." [15]

Additionally, Section 126 of the Clean Air Act provides that any state may petition the USEPA Administrator for a finding that any major source or group of stationary sources in another state emits or would emit any air pollutant in violation of the prohibition of Section 110(a)(2)(D) regarding significant contributions to non-attainment or maintenance with an air quality standard in that state.[16] Five states (Connecticut, Maine, New Hampshire, New York, and Vermont) filed Section 126 petitions naming sources in New Jersey as contributing significantly to their non-attainment with both the 1-hour and 8-hour standards. With respect to the 1-hour ozone standard, the USEPA has made an affirmative technical determination that New Jersey contains stationary sources that contribute significantly to non-attainment in areas within Connecticut and New York.[17] Regarding the 8-hour standard, the USEPA has made an affirmative technical determination that New Jersey contributes significantly to non-attainment in Maine and New Hampshire.[18]

Section 126 calls for relief where the USEPA found that New Jersey sources are emitting in violation of the "significant contribution" provisions of Section 110(a)(2)(D)(i) of the Clean Air Act (CAA).[19] However, USEPA had sought to harmonize the similar "significant contribution" test requirements of Section 126 and Section 110(a)(2)(D). Considering that Section 110(a)(2)(D) is more inclusive, i.e., it involves a finding regarding all sources in a state, whereas Section 126 involves a finding with respect to stationary sources, the USEPA stated its intention to defer the final granting of a petition by a state with respect to other states, as long as those other states are, and remain on, an expeditious schedule to submit their NO_x Budget SIPs and implement the requisite controls.[20] It was intended that the submittal of this NO_x Cap SIP will meet New Jersey's requirements regarding Section 126, based on the USEPA's approach.

---

[15] 42 U.S.C. Section 7419 (a)(2)(D).

[16] 42 U.S.C. Section 7426

[17] 40 CFR 52, Part II, 64 Fed. Reg. 28252, 28294, 28295 (May 25, 1999)

[18] 40 CFR J2, Part II, 64 Fed. Reg. 28294 & 28295 (May 25, 1999)

[19] 63 Fed. Reg. 56302 (October 27, 1998)

[20] 40 CFR 52, Part II, 64 Fed. Reg. 28252, 28275 (May 25, 1999)

The course of future actions to control ozone by states and the nation was made more complicated by a May 14, 1999 ruling by the U.S. Court of Appeals for the District of Columbia (DC Circuit Court). In essence, this ruling remanded the 8-hour ozone NAAQS back to USEPA for greater clarification of the criteria used to set the standards under Clean Air Act Sections 108 and 109.[21] The DC Circuit Court did not vacate the 8-hour ozone NAAQS, but stated that it was essentially unenforceable due to the explicit structure of ozone nonattainment classifications and deadlines Congress established in the CAA. In addition, on May 25, 1999, the DC Circuit Court stayed the September 30, 1999 date that the USEPA had established for submission of the Regional NO_x Cap SIPs. In response to these decisions, the USEPA decided that it is no longer appropriate to link its findings under Section 126 to a compliance schedule for the NO_x SIP call, and to limit its findings of significant contribution to the 1-hour ozone standard.[22] Instead the USEPA has proposed to use a Federal NO_x Budget Trading program as the Section 126 control remedy[23]. New Jersey DEP has maintained its support of the 8-hour standard, and will continue to seek the emission reductions necessary to achieve this health based standard. Given the regional scope of the ozone problem, broad-based implementation of the more protective 8-hour standard is the only way New Jersey will be assured of clean and healthy air.[24] In addition, the OTC states have proposed to move toward meeting the September 30, 1999 NO_x Cap SIP submittal date, despite the DC Circuit Court's stay of that date.

New Jersey is proposing, through this SIP revision, to establish a statewide NO_x emission cap covering all man-made source sectors, i.e., stationary, mobile and area combined, in order to meet several requirements and objectives. This NO_x Cap will (1) improve ozone air quality in New Jersey, (2) meet the SIP requirements placed on New Jersey by the USEPA's recent "NO_x SIP Call" rulemaking,[25] (3) provide a major step by New Jersey toward meeting its obligations under Section 110(a)(2)(D) of the Clean Air Act, independent of the USEPA NO_x "SIP Call", and (4) permit the USEPA to defer the granting of the relief sought by five other states against New Jersey in their Section 126 petitions naming New Jersey, by proceeding on an expeditious schedule to provide for the substantive equivalent of that relief sought.

---

[21] NESCAUM, 1999, Legal summary of DC Circuit ruling on revised air quality standards, Northeast States for Coordinated Air Use Management (NESCAUM), Boston, MA, May 14, 1999

[22] 64 Fed. Reg. 33956 (June 24, 1999)

[23] 63 Fed. Reg. 56292 (Oct. 21, 1998)

[24] NJDEP, 1999, Press statement released by NJDEP Commissioner Shinn, NJDEP, Trenton, NJ, May 14, 1999

[25] 63 Fed. Reg. 57356, 57538 (Oct. 27, 1998)

III. Development of the New Jersey NO_x Budget by the USEPA

Pursuant to the USEPA NO_x Budget Rule, New Jersey's statewide NO_x emission cap is 100,133 tons for the 5-month ozone season from May 1 to September 30. The budget, developed by USEPA, was described in a final notice[26] and formally revised with a technical amendment.[27] The year 2007 is specified as the year by which New Jersey's statewide NO_x emissions cannot exceed this total. The total budget of 100,133 tons was established by the USEPA from projected emission contributions, after applicable emission control measures, from five sectors as shown in Table 1. New Jersey is obligated to meet the overall budget number, not the number for each emission sector.

Table 1: Budget Derivation

Sector	2007 5-month Ozone Season NO_x Emission Estimate (tons)
Area sources	12,431
Non-road sources	23,565
Highway sources	35,890
Electricity generating unit (EGU)point sources	10,384
Non-EGU point sources	17,863
Total budget	100,133

In calculating the overall budget, the USEPA first defined the "future base year 2007" NO_x emissions. These are the emissions projected to occur with implementation of specific control measures cited in the 1990 Clean Air Act and other control measures that USEPA expects will be implemented. These measures are listed in the "Measures" column of Table 2. Then the USEPA applied what is considered to be highly cost effective controls to establish 2007 NO_x "Budget" emissions levels.

For New Jersey, the 2007 emissions budget limits for the area, non-road, and highway sectors are essentially the same as the "future base year 2007" NO_x emissions. However, for the electricity generating unit (EGU) point source sector, the future base year 2007 emissions were reduced from 18,352 to arrive at the budget number of 10,384 tons, representing a 43% reduction. For the non-EGU point source sector, the future base year 2007 total emission went from 18,345 tons to the budget number of 17,863 tons; a 3% reduction. The control assumptions included a NO_x emission limit of 0.15 lbs/mmBtu on

---

[26] 63 Fed. Reg. 57356 (Sept. 24, 1998)

[27] USEPA, 1999, Development of Emission Budget Inventories for Regional Transport NO_x SIP Call, USEPA Office of Air Quality Planning and Standards, May, 1999. This document also exists as emis_tsd.pdf, which can be downloaded from ftp.USEPA.gov/pub/scram001/modelingcenter/NOx_SIPcall/budget/May/ (referred to hereafter as "USEPA, 1997, Inventories.")

EGU units greater than 25 MW capacity, and certain specific assumed emissions reductions for boilers and turbines greater than 250 mmBtu/hr, and cement manufacturing plants and internal combustion engines with greater than 1 ton NO_x emissions on a typical ozone season day. These assumptions are described in detail elsewhere.[28]

The USEPA's SIP call regulations permit each state to determine which measures to adopt to meet the emissions budget. Consistent with OTAG's recommendations to achieve NO_x emissions decreases mainly from large stationary sources in a trading program, the USEPA has encouraged states to consider electric utility and large boiler controls under a cap and trade program.[29]

New Jersey's strategy for meeting its NO_x emissions cap is twofold. First, the state anticipates full implementation of the control measures for all the sectors that result in the projected 2007 base year emissions levels as projected by USEPA. Second, the state will implement a cap and trading rule[30] to achieve the needed reductions in the EGU and non-EGU sectors to go from the "future base year 2007" to the "budget" emission level. The implementing mechanisms for the 2007 base year control measures, not including the cap and trading rule, are presented in the right hand column of Table 2, below.

Table 2: 2007 Base Case Controls

Category	**Measure** [31]	**Implementing Mechanism in New Jersey**
EGU	Title IV Controls [phase 1 & 2]	Federal Rules
	250 Ton PSD (NSPS)	Federal rules; PSD applies to new sources in attainment areas. Federal NSPS were accepted by NJ under authority delegated by USEPA.
Table 2: 2007 Base Case Controls (continued)		

[28] USEPA, 1999, Inventories

[29] 63 Fed. Reg. 57356, 57359 (Oct. 27, 1998)

[30] 31 N.J.R. 2100 (Aug. 2, 1999).

[31] USEPA, 1999, Inventories augmented with additional items from USEPA, September 24, 1998 Development of Emission Budget Inventories for Regional Transport NO_x SIP Call

	NO_x RACT & New Source Review (NSR) in non-attainment areas (NAAs) that did not receive RACT waivers.	NJ RACT Rules, N.J.A.C. 7:27-19, adopted on 12/20/93 [25 NJR 5957 (a)] and 4/17/95 [27 NJR 1581 (a)]; NJ New Source Review LAER Rule, N.J.A.C. 7:27-18, adopted on 10/3/96 [28 NJR 4784 (b)]. SIP revision to USEPA in 1/97. Requires state-of-the-art controls on all sources and permits for small sources; NJ New Source Review Emission Offset Rules, N.J.A.C. 7:27-18, adopted on 3/15/98 [25 NJR 1231 (b)] and 11/4/96 [28 NJR 4784 (b)].
Non-EGU Point	NO_x RACT on major sources in NAA's not receiving RACT waivers.	NJ RACT Rules, N.J.A.C. 7:27-19, adopted on 12/20/93 [25 NJR 5957 (a)] and 4/17/95 [27 NJR 1581 (a)]
	250 Ton PSD and NSPS	Federal Rules
	CTG & Non-CTG VOC* RACT at major sources in NAAs & OTR	NJ VOC RACT Rules; 7:27-16 adopted on 6/20/94.
	New Source LAER	Control and Prohibition of Air Pollution from New or Altered Sources. N.J.A.C. 7:27-18, adopted on 10/3/96 [28 NJR 4784 (b)]. SIP revision to USEPA in 1/97. Requires state-of-the-art controls on all sources and permits for small sources.
	NO_x MACT standards to municipal waste combustors (MWCs)	USEPA rules

Table 2: 2007 Base Case Controls (continued)

Stationary Area	Two Phases of VOC Consumer and Commercial Products & One Phase of Architectural Coatings controls	USEPA Consumer and AIMS rules (finalized Sept. 11, 1998); New Jersey Consumer Products Rule, N.J.A.C. 7:27-24, adopted on 10/3/95 [27 NJR 4291 (a)].
	VOC* Stage 1 & 2 Petroleum Distribution Controls in NAAs	NJ VOC RACT rules, N.J.A.C. 7:27-16, adopted on 6/20/94 (26NJR 2600 (a)).
	VOC* Autobody, Degreasing & Dry Cleaning controls in NAAs	NJ VOC RACT rules NJAC 7:27-16, adopted on 6/20/94 (26 N.J.R. 2600(a)). Also USEPA Autobody Refinishing rule adopted on 9/11/98.
Non-road Mobile	Fed Phase II Small Eng. Stds	USEPA rules 40 CFR 9 and 90; July 3, 1995
	Fed Marine Eng. Stds.	USEPA rules
	Fed Nonroad Heavy-Duty (>=50 hp) Engine Stds - Phase 1	USEPA rules
	Fed RFG II (statutory and opt-in areas)	USEPA rules
	9.0 RVP maximum elsewhere in OTAG domain	Not relevant to NJ.
	Fed Locomotive Stds (not including rebuilds)	USEPA rules
	Fed Nonroad Diesel Engine Stds - Phases 2 & 3	USEPA rules
	On-board vapor recovery	USEPA rules
Table 2: 2007 Base Case Controls (continued)		

Highway vehicles	National LEV	Governor opt into the NLEV Program on 1/29/98. Included in 2/96 NJ SIP revision. Rule, N.J.A.C. 7:27-26, which became operative on 1/21/96.
	Fed RFG II (statutory and opt-in areas)	Rule promulgated by USEPA and implemented on 2/14/94 (59 FR 7716). NJ has opted entire state into program.
	Phase II RVP limits elsewhere in OTAG domain	Not relevant to NJ.
	High Enhanced, Low Enhanced, or Basic I/M in areas specified by State	For NJ, enhanced I/M applies statewide. Rules, N.J.A.C. 7:27-15 and 7:27-4, adopted on 8/28/95. DMV rules, N.J.A.C. 13:20-43, 44 and 45, adopted in 1995.
	Clean Fuel Fleets (mandated NAAs)	Rules, N.J.A.C. 7:27-15 and 7:27-4, adopted on 8/28/95. DMV rules, N.J.A.C. 13:20-43, 44 and 45, adopted in 1995.
	HDV 2 gm std	USEPA Rules

** NOTE: Table 2 includes controls on volatile organic compounds (VOCs). Although control of these pollutants is not strictly within the purview of this NO_x-specific SIP, VOCs are involved in the creation of ground-level ozone and thus their control is relevant within the broad context of a SIP for ozone.*

A further measure in place in New Jersey is the Open Market Trading Program.[32] This program is intended to facilitate NO_x and VOC emission reductions by permitting trading of emission reduction credits. Such trading has the potential of facilitating compliance through a reduction of the cost of compliance.

The major New Jersey control measure that is relied upon to reduce NO_x emissions from the "future base year 2007" level to the "budget" level is the New Jersey NO_x Budget Program and amendments thereto[33]. This control measure assigns NO_x emissions

[32] N.J.A.C. 7:27-30, Open Market Emissions Trading (OMET) Rule

[33] 31 N.J.R. 2100 (Aug. 2, 1999)

allocations to specific sources presently included in both the EGU and non-EGU point source sectors. Although this measure was adopted in 1998, it is referred to herein as a "new" measure to use terminology consistent with USEPA guidance to distinguish between "future base year 2007" and "budget" emission levels.

For these EGU and non-EGU sources covered by the New Jersey NO_x Budget Program, this SIP Revision includes a projection of the quantity of NO_x emissions that is expected in the year 2007 both with and without the additional new New Jersey control, and an assessment of the degree of reduction expected with the emissions control required by New Jersey.

With the new New Jersey control measures the projected emissions from the EGU and non-EGU sources in the New Jersey NO_x Budget Program are less than the cap allowance. Given that the New Jersey projections for the other three sectors are the same as their allowance, the overall budget cap is met. This strategy for each of the five sectors is described more fully in Section IV., below.

IV. Update of NO_x Budget and Plans to Meet 2007 Emissions Cap

New Jersey's strategy for meeting its NO_x emissions cap is twofold. First, the state anticipates full implementation of the control measures for all the sectors that result in the projected 2007 base year emissions levels for the 5-month ozone season as projected by the USEPA. Second, the state will implement a cap and trading rule[34] to achieve the needed reductions in the EGU and non-EGU sectors to go from the "future base year 2007" to the "budget" emission level. This action is being taken under the authority of N.J.S.A. 26:2C-1 et seq. and N.J.S.A. 13:1D-9. The approach for each sector is discussed in detail below.

A. Area Sources

The Area Source sector includes smaller commercial and industrial operations, and residential sources. According to supporting information provided by the USEPA,[35] the inventory is based on data sets from the OTAG 1990 base year inventory. The base year inventories were prepared with 1990 ozone SIP emission inventory data augmented by USEPA's National Emissions Trends (NET) data[36] if the former data was unavailable. 1995 emission quantities were estimated based on 1990 quantities using United States Bureau of Economic Analysis (BEA) historical growth estimates of industrial earnings at the state 2-digit Standard Industrial Code (SIC) level.

---

[34] ibid

[35] USEPA, 1999, Inventories

[36] USEPA, 1997, National Air Pollutant Emission Trends, 1900-1996, USEPA-454/R-97-011, USEPA, Research Triangle Park, NC, December, 1997

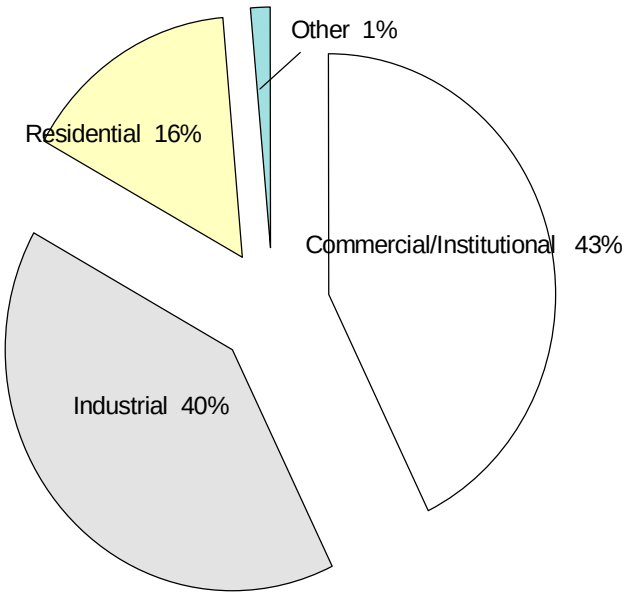
The estimated 1995 emissions were then projected to 2007 using BEA projections of gross state product (GSP) at the 2-digit SIC code level supplemented by state and local data where available.[37] Because the source categories do not generally report SIC codes, USEPA used an SIC-Source Classification Code (SCC) cross-reference file to apply these growth factors. The growth factors used to represent rates of growth of specific SCC categories in New Jersey from 1995 to 2007, as listed in USEPA's database nj_ar.xls[38] vary from 0.42 to over 6, with a mean of 1.66. In the area sources sector, the largest overall categories are commercial/institutional and industrial, each of which contributes approximately 40% of the total emissions from area sources. For the entire area source sector, approximately 50% of the NO_x emissions are accounted for by natural gas combustion. The total from the entire area source sector is projected to be 12,431 tons for the five-month ozone season in the year 2007. See Figure 2 for an apportionment of the estimated 2007 emissions by sector categories as indicated in nj_ar.xls. See Appendix VI for details of these data.

The USEPA's methodology is assumed herein to be appropriate and to have been carried out accurately. Therefore, the overall budget quantity for this sector, 12,431 tons, is assumed to be accurate and to represent New Jersey's emissions for this sector in 2007. No additional controls or other actions other than the degree of control assumed by the USEPA are planned for this sector pursuant to New Jersey's SIP call budget.

Figure 2: Projected 2007 Area NO_x Emissions, Apportioned by Sector

[37] USEPA, 1999, Inventories

[38] USEPA, 1999, extracted from file "NJ.zip" , dated 5/13/99, downloaded from **ftp.USEPA.gov/pub/scram001/modeling**center/NO_x_SIPcall/budget/May/



B. Non-road Sources

As described by the USEPA,[39] the non-road mobile source category is based on data sets that originated with the OTAG 1990 base year survey. The OTAG 1990 non-road emission inventories were based primarily on estimates of 1990 non-road emissions from the 1995 NET data. The emissions were increased from the 1990 levels to estimated 1995 levels using BEA 1990-1995 historical growth estimates of industrial earnings at the state 2-digit SIC level.

New Jersey provided 1990-2007 growth rates during the OTAG process. These rates were used in combination with the BEA estimates to develop the revised 1995-2007 growth factors used by USEPA in its projected estimates of New Jersey non-road source emissions.[40] Because the source categories do not generally report SIC codes, the USEPA used an SIC-SCC cross-reference file in conjunction with the above projections to develop growth factors to represent rates of growth of specific SCC categories in New Jersey from

[39] USEPA, 1999, Inventories

[40] Sklar, M., 1999, personal communication from Michael Sklar, USEPA, August 4, 1999

1995 to 2007. The growth factors used for specific SCC categories in New Jersey, as listed in USEPA's database nj_nr.xls[41] vary from 0.68 to 1.5, with a non-weighted average of about 1.14. In addition, several SCC categories are assumed to have additional, "process unit" growth rates in the range of 1.8 to 2.0. The 1995 to 2007 growth rate projections, in the absence of additional controls beyond any assumed to exist in the 1990 numbers as projected to 1995, would result in emissions from this sector in 2007 of 35,384 tons.

However, a significant degree of control of emissions from this sector is assumed to take place during the years from 1995 to 2007. The control is the result of several Federal standards, which New Jersey expects to be fully implemented, including:

Federal Small Engine Standards, Phase II,
Federal Marine Engine Standards (for diesel engines greater than 50 horsepower),
Federal Locomotive Standards, and
Federal Nonroad Diesel Engine Standards.

Two of these four control strategies, the small engine standards and the marine engine standards, will accomplish VOC reductions but are not expected to reduce NO_x emissions. Substantial NO_x emissions reductions are projected to result from the locomotive standards and from the nonroad diesel standards, which reduce the projected NO_x 2007 emissions from 35,384 tons to 23,565 tons. As with the area source category, the USEPA's methodology is assumed to be appropriate and to have been carried out accurately. Therefore, the USEPA's overall estimated emission quantity for this sector is used to represent New Jersey's emissions for this sector in 2007. No further controls or other actions other than those assumed by USEPA are planned for this sector pursuant to New Jersey's SIP call budget. Table 3 shows non-road NO_x emissions, by category, projected to 2007 with and without controls.

Table 3: Non-road NO_x Emissions, Projected to 2007, by Sector, thousands of tons, five-month ozone season

Sector	2007 Projection w/o controls	2007 Projection with federal controls
Aircraft	2.1	2.1
Marine vessels	5.6	5.6
Off-highway vehicle, diesel	23.5	12.5
Off-highway vehicle, gasoline, 4-stroke	2.0	2.0

[41] USEPA, 1999, extracted from file "NJ.zip" , dated 5/13/99,
downloaded from **ftp.USEPA.gov/pub/scram001/modeling**center/NO_x_SIPcall/budget/May/

Off-highway vehicle, gasoline, 2-stroke	0.3	0.3
Railroad locomotives	1.9	1.1
Total	**35.4**	**23.6**

C. Highway Sources

As described in detail elsewhere,[42] emissions from this sector were estimated by the USEPA starting with a 1995 vehicle emissions inventory that had been developed from data sets originating with annual 1995 vehicle miles traveled (VMT) data. These data came from the Highway Performance Monitoring System of the Federal Highway Administration (FHA), which includes specific data for state, vehicle type, and roadway type. The New Jersey Department of Transportation reports these data to the FHA annually. The data were then distributed from the statewide level to the county level using population data from the U.S. census. These VMT data were then apportioned to the vehicle type categories used by the USEPA with data provided by USEPA's Office of Mobile Sources, and projected to 2007 using methodology described in detail in the document referenced above.

Emissions for 2007 were then calculated by multiplying the county-specific 2007 monthly VMT by MOBILE 5b emissions factors for 2007. In projecting these emissions, the following controls were assumed:

county-specific I/M programs,
reformulated gasoline,
the new heavy duty diesel engine standard, and
the National Low Emission Vehicle program, with implementation schedule modeled on a county-specific basis.

Pursuant to federal and state laws, these controls are being implemented in New Jersey. Table 2 provides details on these and other NO_x control measures in effect in New Jersey.

With these measures, total New Jersey highway sector NO_x emissions are projected to be 35,890 tons in 2007. As with the area and non-road sectors, the USEPA's methodology is assumed to be appropriate and to have been carried out accurately. Therefore, the overall budget quantity for this sector is assumed to be accurate and to represent New Jersey's emissions for this sector in 2007. No further controls or other actions other than those assumed by USEPA are planned for New Jersey for this sector.

D. Major Stationary Sources

[42] USEPA, 1999, Inventories

There are two categories of major stationary sources, those that generate electricity (electricity-generating units, or EGUs), and those that do not (non-electricity-generating units, or non-EGUs.). Sources within each of these two categories that are above size or capacity thresholds are subject to NO_x emissions controls pursuant to two major programs operative in New Jersey, the NO_x Reasonably Available Control Technology program (NO_x RACT)[43] and the NO_x Budget Program.[44] As described in this SIP revision, additional NO_x emissions controls scheduled to occur pursuant to the NO_x Budget Program are expected to significantly reduce NOx emissions from the major stationary source sector by 2007.

1. Electricity-generating Units (EGUs)

The USEPA developed an inventory of emissions expected to occur from the EGU category in 2007 without additional controls. This is termed the "base year 2007" inventory. The USEPA then projected emissions that would result with the imposition of additional controls on units larger in capacity than 25 megawatts (MW). This is termed the "2007 budget" inventory. New Jersey's NO_x Budget Program goes beyond the "2007 budget" level of emissions reductions by imposing a cap of 8,200 tons on a specific group of large sources, which includes most sources in the EGU category and also large units in the non-EGU category.

The calculations applying to the base year 2007 inventory, the 2007 budget inventory, and the 8,200 NJDEP cap are discussed below.

The base year 2007 Inventory:

In order to develop the future "base year 2007" inventory for the electricity-generating units sector sources, the USEPA started with 1995-1996 time frame heat input and NO_x emissions data for each electricity-generating unit.[45] The 1995-1996 time frame was referred to as the "base year". The units included both electric utility units and non-utility electricity generating units. The non-utility electricity generating units include independent power producers (IPPs) and non-utility generators (NUGs).

As described by the USEPA,[46] eight data sources were used to develop the base year EGU data. These included the following:

USEPA's Acid Rain Data Base,

---

[43] N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen

[44] 31 N.J.R. 2100 (Aug. 2, 1999)

[45] USEPA, 1999, Inventories

[46] USEPA, 1999, Inventories

USEPA's 2007 Integrated Planning Model Year,
USEPA's Emission Tracking System/Continuous Emissions Monitoring System,
DOE's Form EIA-860,
DOE's Form EIA-767,
USEPA's National Emissions Trends Data Base,
DOE's Form EIA-867, and
The OTAG Emission Inventory.

Data from the above sources was further refined in response to comments submitted to the NO_x SIP call Notice of Proposed Rulemaking and subsequent notices. To determine the heat input for each unit, the higher of the 1995 or 1996 input, in millions of Btu (mmBtu) was used. The specific methods used by USEPA in arriving at the final heat input value to assign to each unit are described in detail in the referenced document.[47] Emissions for the ozone season, 1995 through 1996 period, were determined by multiplying the higher of the 1995 or 1996 heat input by the rate of NO_x emissions per mmBtu at that time, assuming that all applicable controls required by the Clean Air Act (CAA) were in place. For EGUs, these controls include Title IV Acid Rain controls and NO_x RACT.

Control measures assumed by USEPA; the 2007 budget inventory:

For EGUs, the USEPA projected emissions from each unit for the summer season, 2007. This projection effort involved two steps. First, the higher of the 1995 or 1996 heat input as above was multiplied by the growth factor from the IPM model. As shown in the database supplied by USEPA for this sector, nj_ut.xls,[48] specific factors were used for each New Jersey facility. The resulting heat input in mmBtus for each unit was then multiplied by an emissions factor. For units greater than 25 MW capacity, this factor was 0.15 lbs/mmBtu. For units less than or equal to 25 MW capacity, the NO_x emission rate used for the 1995/1996 value was used. In some cases, this rate was less than 0.15 lbs/mmBtu, and in some cases it was higher.

Control measures to be imposed by NJDEP; 8,200 ton cap for years 2003 and later:

[47] ibid

[48] USEPA, 1999, extracted from file "NJ.zip" , dated 5/13/99,
downloaded from **ftp.USEPA.gov/pub/scram001/modeling**center/NO_x_SIPcall/budget/May/

Pursuant to New Jersey's NO_x Budget Program[49] and proposed amendments to this rule,[50] the Department will require a subset of point sources, which includes units in both the EGU and non_EGU sectors as defined by USEPA, to further reduce their aggregate total emission of NO_x from 13,022 tons to 8,200 tons per ozone season by 2003. (The proposed amendments do not change the total allowable emission, but address timing requirements for allocation to sources and make other changes to bring New Jersey's NO_x Budget Program into full conformance with federal requirements.) The units covered by this program are units that operated during the May 1 through September 30, 1990 period and which are either a) a fossil fuel fired boiler or indirect heat exchanger with a maximum rated heat input capacity of at least 250 mmBtu per hour, or b) an electric generating unit with a rated output of at least 15 MW.

The emissions allocated by the NO_x Budget Program for the control period, May 1 through September 30, for this group of sources is 17,340 tons of NO_x for the years 1999, 2000, 2001, and 2002, and 13,022 tons of NO_x for the year 2003 and each year thereafter. However in the year 2003 and each year thereafter, the Department shall first reserve 4,822 of the allowances, each of which represents one ton of NO_x emission in the control period, by transferring them into the attainment reserve account held by the Department. The remaining 8,200 allowances will be allocated to covered units. The 4,822 allowances in the attainment reserve account shall either be retired, or used for a purpose which, in the judgement of the Commissioner, would contribute to the attainment or maintenance of the National Ambient Air Quality Standard for ozone. Unless it is determined that the use of these 4,822 allowances for NO_x emissions would somehow improve the ground level ozone problem, they will not be used. Therefore, 8,200 tons is the cap that units covered by New Jersey's NO_x Budget Program must meet by the year 2003 and thereafter.

2. Major Stationary Sources: Non-electricity-generating Units (non-EGUs)

The USEPA developed emissions estimates for this source category using data sources, assumptions, and calculations described in detail elsewhere.[51] The OTAG 1990 base year inventory served as the basis for these estimates. These data were supplemented with other data as necessary and as available. The 1990 emissions were grown to 1995 using BEA historical growth estimates of industrial earnings at the 2-digit SIC code level, as applied to specific SCC codes. Then, assumed levels of control as a result of implementation of NO_x RACT were applied to each unit, resulting in estimated 1995 emissions. The USEPA's bases for the various assumed control levels are also described in the document referenced above.

---

[49] 31 N.J.R. 2100 (Aug. 2, 1999)

[50] ibid

[51] USEPA, 1999, Inventories

The USEPA then projected the estimated 1995 emissions to 2007 using BEA projections of gross state product (GSP) at the 2-digit SIC level and supplemented with state, local, and industry provided growth factors as available. Where SICs were not provided, USEPA used a SIC-SCC cross-reference file to apply the growth factors.

Controls were then applied to large sources in categories including, in New Jersey, boilers and turbines that were, according to the data available to USEPA, larger in heat input capacity than 250 mmBtu/hr. In cases where heat input capacity data were not available for a unit, data from the NET inventory were used to determine whether a boiler or turbine was assumed to be large or small. This determination was based on a source's SCC code, using default capacities assumed by the USEPA to be typical of each specific SCC category. This method was used in New Jersey as well as in other states. The various assumed default control efficiencies were listed by the USEPA.[52]

The USEPA assumed a rule effectiveness of 100% for all units, and control efficiencies varying from zero to 61.83%. The control efficiency assumed by the USEPA to be in existence for each non-EGU point source in New Jersey as of 1995 may not reflect actual net control efficiencies implemented in New Jersey pursuant to its NO_x RACT rule.[53] Differences in the levels of estimated net NO_x control will affect estimates of the actual 1995 emissions. Differences in the latter estimates will, in turn, affect the projected 2007 emissions.

A method was developed and used as part of this SIP Revision to independently estimate the 1995 emissions from New Jersey sources in this category that are not included in the NO_x Budget Program. This method involved several steps. First, the units in USEPA's database, nj_pt.xls[54], that are included in the NO_x Budget Program were deleted, leaving only the units that are not included in New Jersey's NO_x Budget Program. Then, the uncontrolled emissions from each of these units in 1995 were estimated. The estimation methodology made use of fields in USEPA's database, nj_pt.xls, that represent the assumed NO_x control efficiency (field NO_xCE95), the assumed NO_x rule effectiveness (field NO_xRE95), and the estimated 1995 ozone season NO_x emission (field SNO_x95). In order to estimate the uncontrolled 1995 emission, the relationship:

$$E_{NOx\,95} = E_{NOx\,UNC95}\,[1 - CE_{95} \times RE_{95}]$$

was rearranged as:

---

[52] USEPA, 1999, Inventories

[53] N.J.A.C. 7:27-19, Control and Prohibition of Air Pollution from Oxides of Nitrogen

[54] USEPA, 1999, extracted from file "NJ.zip" , dated 5/13/99, downloaded from **ftp.USEPA.gov/pub/scram001/modeling**center/NO_x_SIPcall/budget/May

$$E_{NOx\ UNC95} = E_{NOx\ 95} / (1 - CE_{95} \times RE_{95})$$

Where:

$E_{NOx\ 95}$ is the controlled NO_x emission in 1995.

$E_{NOx\ UNC95}$ is the uncontrolled NO_x emission in 1995.

CE_{95} is the assumed USEPA control efficiency, and

RE_{95} is the assumed USEPA rule effectiveness.

The estimated uncontrolled emissions were then reduced by a quantity based on the assumed degree of control pursuant to NJ's NO_x RACT rule. The method used consisted of first sorting all sources (except, as noted above, those sources included in NJ's NO_x Budget Program) by SCC number, and then totaling the estimated uncontrolled 1995 emissions for that SCC grouping. Then, the mean degree of control, assuming full compliance with NJ's NO_x RACT rule, was estimated for each SCC grouping. The estimated levels of control, expressed as the ratio of controlled emissions rates to uncontrolled emissions rates, for SCC groups with significant emissions totals, are shown in Table 4. Details of the control level estimation methodology are presented in Appendix VI.

The estimated 1995 emissions, assuming the levels of control based on analysis of NJ's NO_x RACT rule as discussed above, were then totaled. As shown in Table 5, the estimated 1995 emission, 17,318 tons, is larger than USEPA's estimate for this subset of sources, which is 14,920 tons. The net growth factor for each SCC group used by USEPA to project emissions to 2007 can also be determined from the USEPA data. This net growth factor represents an average of individual growth factors assigned to each source, which vary by both SCC number and SIC code. The net growth factors were then multiplied by the estimated 1995 emissions to yield projected 2007 values. As shown in Table 5, the projected NJ emissions for 2007, assuming no further imposition of NO_x RACT controls beyond those estimated to be in place in 1995, is 19,795 tons. This compares with USEPA's projection of 16,829 tons for this group of sources.

Table 4: Non-electricity-generating Units Not included in NJ's Proposed Budget Cap: Source Classification Codes (SCCs) with Significant NO_x Emissions, Rates per N.J.A.C. 7:27-19, and Ratio of Estimated Controlled Rate to Estimated Uncontrolled Rate

SCC Number	Description	Sector	Fuel	Size	Uncontrolled emissions rate lb/MMBtu *	NJ NOx RACT rate lb/MMBtu *	NJ estimated Controlled/ uncont'd ratio	CE per NJ NOx RACT	Avg. CE in EPA database nj_pt.xls	Note
10300601	External Combustion Boilers	Commercial/Institutional	Natural Gas	> 100 Million Btu/hr	0.534	0.20	0.37	62.55	52.07	1
10200602	External Combustion Boilers	Industrial	Natural Gas	10-100 Million Btu/hr	0.136	0.11	0.82	18.38	32.34	1,2
10200401	External Combustion Boilers	Industrial	Residual Oil	Grade 6 Oil	0.367	0.34	0.92	8.27	13.31	1,3
39999994	Industrial Processes	Misc. Mfgr.	Misc. Industrial Processes	Other Not Classified	na	na	1.00	0.00	0.00	4
30199998	Industrial Processes	Chemical Mfgr.	Other Not Classified	na	na	na	1.00	0.00	0.00	4
10200601	External Combustion Boilers	Industrial	Natural Gas	> 100 Million Btu/hr	0.534	0.20	0.37	62.55	53.40	1
20200202	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating	*8.160*	*4.75*	0.58	41.79	29.81	5,6
10200603	External Combustion Boilers	Industrial	Natural Gas	< 10 Million Btu/hr	0.097	na	1.00	0.00	22.32	4
30199999	Industrial Processes	Chemical Mfgr.	Other Not Classified		na	na	1.00	0.00	30.00	4
10300602	External Combustion Boilers	Commercial/Institutional	Natural Gas	10-100 Million Btu/hr	0.136	0.11	0.82	18.38	13.46	1,2
50100102	Solid Waste Disposal	Government	Municipal Incineration	Mass Burn	na	na	1.00	0.00	0.00	4
20200401	Internal Combustion Engines	Industrial	Large Bore Engine	Diesel	*10.890*	*4.75*	0.44	56.38	24.38	5
10200501	External Combustion Boilers	Industrial	Distillate Oil	Grades 1 and 2 Oil	0.134	0.12	0.90	10.45	18.88	1,7
10300401	External Combustion Boilers	Commercial/Institutional	Residual Oil	Grade 6 Oil	0.367	0.34	0.92	8.27	4.43	1,3
10300603	External Combustion Boilers	Commercial/Institutional	Natural Gas	< 10 Million Btu/hr	0.097	na	1.00	0.00	11.67	4
20200402	Internal Combustion Engines	Industrial	Large Bore Engine	Dual Fuel (Oil/Gas)	*8.160*	*4.75*	0.58	41.79	31.58	5
20200201	Internal Combustion Engines	Industrial	Natural Gas	Turbine	na	na	0.50	0.50	24.80	8
10300501	External Combustion Boilers	Commercial/Institutional	Distillate Oil	Grades 1 and 2 Oil	0.144	0.12	0.83	16.67	8.33	1,7
10200204	External Combustion Boilers	Industrial	Coal	Spreader Stoker	0.586	0.45	0.77	22.64	50.00	1,9
30600201	Industrial Processes	Petroleum Industry	Catalytic Cracking Units	Fluid Cat. Cracking	na	na	1.00	0.00	40.00	4
10201001	External Combustion Boilers	Industrial	LPG	Butane	na	na	0.50	0.50	34.35	8
20200252	Internal Combustion Engines	Industrial	Natural Gas	2-cycle Lean Burn	na	na	0.50	0.50	24.00	8
20200101	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine	na	na	0.50	0.50	14.23	8

* Rates for engines, in italics, above, are expressed in grams/hp-hour. See Note 5, below.

NOTES

1	Uncontrolled rates for boilers are median rates reported in 1990 NJ Emission Statements for each SCC category.
2	Controlled rate multiplied by 1.11 to account for estimated portion of sources below NJ's NOx RACT size threshold.
3	Controlled rate varies by firing method and size of boiler. Average of three rates for non-tangential firing is assumed.
4	Emissions rate not available. No additional controls assumed.
5	Uncontrolled rates for engines are from AP-42 files downloaded from www.epa.gov/ttn/chief/ap42etc.html, 7/13/99
	NJ NOx RACT rate, 1.5 to 8 g/hphr, averaged to 4.75 g/hphr.
6	SCC 20200202 assumed to have same emission rate as SCC 20200402.
7	NJ NOx RACT requirement for units >= 50 and < 100 MMBtu/hr assumed to apply.
8	Source information insufficient to determine exact NJ NOx RACT control rate; 50% CE assumed.
9	Controlled rate is calculated average NJ NOx RACT rate for dry bottom combustion.

NJpoint Query2a.xls

Table 5: Non-electricity-generating Units Not included in NJ's Proposed NO_x Budget Cap, Source Classification Codes (SCCs) with Significant NO_x Emissions: Estimated Uncontrolled Ozone Season 1995 Emissions, Estimated Expected Emissions with NJ RACT Implementation, Estimated Expected Emissions with NJ RACT Implementation, and Projected 2007 Emissions (tons)

SCC Number	Sum of calc'd uncontrolled '95	Expected NJ tons, '95 (uncontrolled '95 x con/unc ratio)	Sum Of SNOX95[1]	SNOX07/ SNOX95 (net growth factor)	Sum Of SNOX07[2]	Sum Of SBNOX[3]	Projected NJ 2007 w/o add'l controls[4]
10300601	5501	2060	2102	1.41	2959	3089	2900
10200602	3596	2935	1562	1.08	1680	1722	3156
10200401	2401	2203	1874	1.10	2059	1490	2420
39999994	2165	2165	2165	1.07	2326	2326	2326
30199998	1705	1705	1705	1.14	1940	1940	1940
10200601	1361	510	527	1.11	587	605	568
20200202	1017	592	997	1.23	1227	1227	728
10200603	951	951	421	1.06	448	459	1011
30199999	848	848	817	1.12	913	913	947
10300602	609	497	291	1.27	370	370	631
50100102	592	592	592	0.86	509	509	509
20200401	572	249	375	1.24	464	464	309
10200501	549	491	310	1.16	361	325	572
10300401	492	452	403	1.23	495	495	555
10300603	265	265	113	1.19	135	135	315
20200402	205	120	104	1.18	123	123	141
20200201	154	77	71	1.21	85	85	93
10300501	137	114	94	1.19	112	112	136
10200204	113	88	57	1.12	63	63	98
30600201	112	112	67	0.94	63	63	106
10201001	107	53	42	1.11	47	47	59
20200252	78	39	59	1.23	73	73	48
20200101	75	38	49	1.15	56	56	43
Totals	**23,768**	**17,318**	**14,920**		**17,231**	**16,829**	**19,795**

SCC categories with insignificant emissions (~ 1% of total) are included in totals but not listed.

NOTES

1 "SNOX95" is name of field in EPA database, nj pt.xls, that represents EPA's assumed controlled emissions as of the 1995 ozone season.

2 "SNOX07" is name of field in EPA database, nj pt.xls, that represents EPA's assumed controlled emissions as projected to the 2007 season.

3 "SBNOX" is name of field in EPA database, nj pt.xls, that represents EPA's 2007 ozone season budget NOx emission, including new controls on a few sources.

4 Expected NJ tons, 1995, projected to 2007 using growth factors shown, which are net grouth factors for all sources in each SCC group from nj pt.xls.

NJPoint Query2a.xls

E. Comparison of USEPA's Projected Quantities by Sector with New Jersey's Projected SIP Budget Quantities

As discussed in Sections IV.A., IV.B., and IV.C., no additional measures are projected for three source sectors; area, non-road, and highway. The budget quantities projected by USEPA for these sectors are accepted in this SIP Revision. However, there are differences in the two other categories, EGU and non-EGU point sources, because New Jersey's NO_x Budget Program applies to units in both categories, and will require reductions in NO_x emissions for these applicable units beyond those projected by the USEPA.

A comparison of the USEPA budget and New Jersey projected emissions by sector is provided in Table 6. New Jersey's NO_x Budget Rule applies to EGUs with a capacity greater than 15 MW and to non-EGU point sources with a heat input greater than 250 mmBtu/hr. The USEPA's NO_x emission estimate for EGU's greater than 15 MW is 10,300 tons (only 84 tons results from units less than 15 MW capacity). The USEPA units in the non-EGU sector that are included in NJ's group of allocated sources (above 250 mmBtu/hr) account for projected 2007 emissions of 1,034 tons. The NJ NO_x Budget rule will limit these two groups of sources to 8,200 tons by 2003. This represents a significant emissions reduction from the USEPA budget for the sources under New Jersey's NO_x Budget Program rule, i.e., from 11,334 (10,300 + 1,034) tons to 8,200 tons.

When the non-EGU units that are in New Jersey's NO_x Budget Program, which are projected to emit 1,034 tons in the ozone season, 2007, are removed from the non-EGU point source group, the USEPA 2007 budget emission from the remaining non-EGU point sources totals 16,829 tons. Based on the analysis described in Section IV.E. that makes use of a comparison of uncontrolled NO_x emission rates with expected controlled rates pursuant to New Jersey's NO_x RACT rule, and USEPA's methodology for projecting emissions to 2007, the emission quantity for this non-EGU point source group will total 19,975 tons in 2007, which is 3,146 tons greater than the USEPA-projected 16,829 tons. These quantities are illustrated in Table 6.

Overall, as shown in Table 6, New Jersey's NO_x emissions in 2007 are expected to be lower than the overall 2007 budget quantity of 100,133 tons per ozone season assigned by the USEPA. This is because the projected emission reductions from the group of sources covered by New Jersey's NO_x Budget Program (the NO_x cap group) more than offset the higher value projected for non-EGU sources that are not in New Jerseys NO_x Cap and Trade Program.

Should this program not be implemented, the projected increase in emissions from the non-EGUs that are not in NO_x cap group would mean that the State would emit approximately 103,099 tons of NO_x in the year 2007 ozone season, exceeding the budget quantity assigned by USEPA by 2,966 tons.

Table 6: Comparison of Projected 2007 NO_x Total Emissions, by Sector (Tons)

Sector	USEPA 2007 Base	USEPA 2007 Budget	Sector Subtotal (USEPA 2007 Budget)	NJ Projected 2007 Emissions*
Area sources	12,431	12,431	12,431	12,431
Non-road sources	23,565	23,565	23,565	23,565
Highway sources	35,890	35,890	35,890	35,890
EGU sources	18,352	10,384		
Non-EGU sources	18,345	17,863		
NJ NO_x cap group; EGU s > 15 MW			10,300	
NJ NO_x cap group; Non-EGUs			1,034	
NJ NO_x cap group; all sources				8,200
EGUs ≤ 15 MW			84	84
Non-EGUs, not in NJ NO_x cap group			16,829	19,795
Totals	**108,583**	**100,133**	**100,133**	**99,965**

* Measures to be implemented in New Jersey are considered equivalent to those assumed by USEPA in its budget for area, non-road, and highway sources. For point sources subject to New Jersey's NO_x Budget, emissions will be limited to 8,200 pounds. For point sources not included in New Jersey's NO_x Budget except, emissions are estimated based on USEPA data and the degree of control expected with New Jersey's NO_x RACT rule. See text for further discussion.

F. Compliance, Monitoring, Record-keeping, and Reporting Commitments

The New Jersey NO_x Budget Program rule requires reporting of emissions of all covered units. As discussed in Section IV. D., the emissions from the units included in the NO_x Budget Program, which will be implemented by the Department, will be limited to 8,200 tons by 2003.

The New Jersey Department of Transportation participated in the development of, and will be involved in implementation and enforcement of those measures that relate to inspection and maintenance of mobile sources. The federal government is responsible for most other transportation-related measures.

The Department will retain all detailed data and calculations used in this SIP Revision and will make them available for public inspection and submit them to the USEPA at its request. Emissions data for the sources covered by the NO_x Budget Program are required to be reported quarterly and submitted to the USEPA, starting in 1999. Further, as New Jersey develops periodic inventories of statewide NO_x emissions pursuant to Clean Air Act Section 182 requirements, it will work with USEPA to harmonize these inventory reports with triennial reports and a 2007 report, to be submitted in accordance with the requirements of 40 CFR 51.122[55]. The NJDEP's Office of Compliance and Enforcement carries the responsibility for overseeing the implementation of the program.

V. Transportation Conformity Budgets

The Transportation conformity rules (40 C.F.R. 93) require each Metropolitan Planning Organization (MPO)[56] to assure their transportation plan, programs, and projects agree with the air quality plans contained in the State Implementation Plan (SIP). If an MPO cannot demonstrate conformance with the SIP, then the Transportation Plan and Transportation Improvement Program (TIP), will lapse and the federal oversight agencies will no longer be able to authorize funding for non-exempt projects[57]. These demonstrations are typically completed each spring and submitted to the federal oversight agencies for their approval by October 1 of each year.

The USEPA has informed the state that its Phase II Ozone State Implementation Plan (SIP) is missing transportation conformity budgets for the attainment years, 2005 in southern New Jersey, and 2007 in northern New Jersey[58]. Failure to correct this omission will result in the USEPA disapproving the Phase II Ozone SIP. Disapproval would result in an immediate transportation conformity freeze, the application of sanctions, 2:1 offsets in 18 months and

---

[55]USEPA, FR 63, pp. 57496-57498, October 27, 1998.

[56]There are three MPOs in New Jersey, the North Jersey Transportation Planning Authority (NJTPA), the Delaware Valley Regional Planning Commission (DVRPC), and the South Jersey Transportation Planning Organization (SJTPO).

[57]Exempt projects include items such as: safety projects and emissions neutral projects such as bridge replacements without any lane expansions. Projects with positive air quality benefits would also not be allowed during a lapse including transit projects.

[58]Letter dated August 6, 1999 from Kathleen C. Callahan, Director, Division of Environmental Planning and Protection, USEPA–Region II to John C. Elston, Administrator, Office of Air Quality Management, New Jersey Department of Environmental Protection.

the transportation funding sanction, transportation plan and program lapse, and, in 24 months, the imposition of a Federal Implementation Plan.

To correct this deficiency, this SIP revision presents specific emission limits or "budgets" for the transportation sector for the ozone attainment years, i.e., for 2005 for southern New Jersey and 2007 for northern New Jersey, that are consistent with the control assumptions in the State's Phase II Ozone ("Attainment Demonstration") SIP. These budgets were derived by applying the same control measures that were used in the Phase II Ozone SIP to the transportation demands generated by the Metropolitan Planning Organizations (MPOs) for 2005 and 2007 respectively.

The attainment year budgets are presented in Table 7, along with the existing transportation conformity budgets for 1999 that were established in the revisions to the State's 15% VOC Rate of Progress Plan[59], for comparative purposes.

In addition, on August 7, 1998, the State submitted a revision to its Carbon Monoxide (CO) SIP. This SIP revision demonstrated that the northeastern New Jersey carbon monoxide nonattainment area[60] could attain and maintain attainment with the carbon monoxide standard without the use of wintertime oxygenated gasoline. As part of the August, 1998 SIP revision, the NJDEP committed to updating the emission budget associated with this SIP in a subsequent SIP revision, once the wintertime oxygenated fuels program was no longer in effect. The USEPA has informed the State of its intention allow for the removal of the wintertime oxygenated fuels program in Northern New Jersey[61]; therefore this SIP revision provides a carbon monoxide emission transportation conformity budget. The budget limit of 689.21 tons per winter day is also illustrated in Table 7. For further information on the computation of the Transportation Conformity Budget, see Appendix VII. Appendices VII A. and B. are available in electronic format at **www.state.nj.us/dep/aqm/noxsip.htm.**

[59]New Jersey's VOC 15% Rate of Progress Plan Revision, February 8, 1999.

[60]This area is the New Jersey portion of the New York-Northern New Jersey-Long Island Moderate Carbon Monoxide Nonattainment Area and includes Bergen, Essex, Hudson, and Union Counties, and the Passaic County municipalities of Clifton, Passaic and Paterson.

[61]Letter dated June 24, 1999 from Jeanne M. Fox, Regional Administrator, United States Environmental Protection Agency, Region II to Robert C. Shinn, Jr., Commissioner, New Jersey Department of Environmental Protection.

Table 7: Transportation Conformity Budgets
Ozone and Carbon Monoxide

MPO	1999 Budget		Attainment[1] Year Budgets	
	VOC tons/day	NO_x tons/day	VOC tons/day	NO_x tons/day
DVRPC	57.97	81.57	33.41	64.09
SJTPO	21.45	33.86	10.69	27.41
NJTPA	182.23	279.14	82.38	196.95

[1] 2005 for DVRPC, SJTPO; 2007 for NJTPA.

Carbon Monoxide

Five county area	690.43 tons/day

VI. Conclusions

New Jersey has been actively involved in efforts to reduce ozone by controlling its precursors for more than two decades. In the early part of this period, the focus was on reduction of VOC emissions. Such reductions are believed to have been successful in reducing peak concentrations of ozone. Recently, in part through the work of OTAG, it has become clear that emissions of $NO_{x,}$ which have a large regional component, remain a significant cause of unacceptable levels of ozone in the northeast. New Jersey's NO_x RACT Program, part of the State's effort to reduce NO_x emissions, has already achieved significant reductions from major point sources in New Jersey. The requirements of the USEPA to further limit emissions of NO_x from New Jersey sources to a total of not more than 100,133 tons per ozone season, 2007, is consistent with New Jersey's own goals. The State has in place an additional measure, the NO_x Budget Program, that should ensure that this goal will be met, as demonstrated in this SIP revision. Reporting systems are in place to monitor progress towards the goal with data that will be publicly available.

This SIP Revision also provides VOC and NO_x transportation conformity budgets for the 1-hour ozone health standard for the attainment years for New Jersey; i.e., 2005 in southern New Jersey and 2007 in northern New Jersey, and a carbon monoxide (CO) transportation conformity budget for a five-county area in New Jersey within the New York-Northern New Jersey-Long Island CO non-attainment area.