**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 52**

**[FRL–5911–7]**

# Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Notice of proposed rulemaking (NPR).

**SUMMARY:** In accordance with the Clean Air Act (CAA), today's action is a proposed rulemaking to require certain States to submit State implementation plan (SIP) measures to ensure that emission reductions are achieved as needed to mitigate transport of ozone (smog) pollution and one of its main precursors—emissions of oxides of nitrogen ($NO_X$)— across State boundaries in the eastern half of the United States. The States affected by today's action are in the Ozone Transport Assessment Group (OTAG) Region.

Today's action proposes to find that the transport of ozone from certain States in the OTAG region (the 37 eastern most States and the District of Columbia) significantly contributes to nonattainment of the ozone national ambient air quality standards (NAAQS), or interferes with maintenance of the NAAQS, in downwind States. This proposal explains the basis for determining significant contribution or interference with maintenance for the affected States. Further, by today's action, EPA is proposing the appropriate levels of $NO_X$ emissions that each of the affected States will be required to achieve.

The EPA is committed to promulgate final action on the proposed rule within 12 months from the date of publication of today's action.

**DATES:** The EPA is establishing a 120-day comment period, ending on March 9, 1998. For additional information on the comment period, please refer to **SUPPLEMENTARY INFORMATION.** A public hearing will be held during the comment period, if requested. If a public hearing is requested, EPA will make an announcement in the **Federal Register**.

**ADDRESSES:** Documents relevant to this matter are available for inspection at the Air and Radiation Docket and Information Center (6101), Attention: Docket No. A–96–56, U.S. Environmental Protection Agency, 401 M Street SW, room M–1500, Washington, DC 20460, telephone (202) 260–7548, between 8:00 a.m. and 4:00 p.m., Monday through Friday, excluding legal holidays. A reasonable fee may be charged for copying. Comments and data may also be submitted electronically by following the instructions under **SUPPLEMENTARY INFORMATION** of this document. No Confidential Business Information (CBI) should be submitted through e-mail.

**FOR FURTHER INFORMATION CONTACT:** General questions concerning today's action should be addressed to Kimber Smith Scavo, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division, MD–15, Research Triangle Park, NC 27711, telephone (919) 541–3354. Please refer to **SUPPLEMENTARY INFORMATION** below for a list of contacts for specific subjects described in today's action.

**SUPPLEMENTARY INFORMATION:**

## Comment Period

Because commenters may wish to submit technical information that may require additional time to develop, EPA will accept additional pertinent information beyond the 120-day time frame and will do what is possible to take the information into account for the final rulemaking. The EPA will make every effort to consider this information. However, due to the time frames associated with this action, EPA cannot guarantee that information submitted after the close of the comment period will be considered. The EPA is committed to publish the final rulemaking within 12 months of the date of today's action.

## Electronic Availability

The official record for this rulemaking, as well as the public version, has been established under docket number A–96–56 (including comments and data submitted electronically as described below). A public version of this record, including printed, paper versions of electronic comments, which does not include any information claimed as CBI, is available for inspection from 8 a.m. to 4 p.m., Monday through Friday, excluding legal holidays. The official rulemaking record is located at the address in **ADDRESSES** at the beginning of this document. Electronic comments can be sent directly to EPA at: A-and-R-Docket@epamail.epa.gov. Electronic comments must be submitted as an ASCII file avoiding the use of special characters and any form of encryption. Comments and data will also be accepted on disks in WordPerfect in 5.1 file format or ASCII file format. All comments and data in electronic form must be identified by the docket number A–96–56. Electronic comments on this proposed rule may be filed online at many Federal Depository Libraries.

## Availability of Related Information

Documents related to OTAG are available on the Agency's Office of Air Quality Planning and Standards' (OAQPS) Technology Transfer Network (TTN) Bulletin Board System (BBS). The telephone number for the TTN BBS is (919) 541–5742. To access the bulletin board a modem and communications software are necessary. The following parameters on the communications software are required: Data Bits-8; Parity-N; and Stop Bits-1. The documents are located on the OTAG BBS. The TTN can also be accessed via the web at http://www.epa.gov/ttn. If assistance is needed in accessing the system, call the help desk at (919) 541-5384 in Research Triangle Park, NC. Other documents related to OTAG can be downloaded from OTAG's webpage at http://www.epa.gov/ttn/otag. The OTAG's technical data are located at http://www.iceis.mcnc.org/OTAGDC.

## For Additional Information

For technical questions related to the determination of significant contribution, please contact Norm Possiel, Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division, MD–13, Research Triangle Park, NC 27711, telephone (919) 541–5692. For legal questions, please contact Howard Hoffman, Office of General Counsel, 401 M Street SW, MC–2344, Washington, DC, 20460, telephone (202) 260–5892. For questions concerning the statewide emission budgets, please contact Doug Grano, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division, MD–15, Research Triangle Park, NC 27711, telephone (919) 541–3292. For questions concerning SIP approvability, please contact Carla Oldham, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division, MD–15, Research Triangle Park, NC 27711, telephone (919) 541–3347. For questions concerning the cost analysis, please contact Sam Napolitano, Office of Atmospheric Programs, MC–6201J, 401 M Street SW, Washington, DC 20460, telephone (202) 233–9751.

*Outline*

## I. Preamble

### *A. Summary of Rulemaking and Affected States*

The CAA has set forth many requirements to address nonattainment of the ozone NAAQS. Many States have found it difficult to demonstrate attainment of the NAAQS due to the widespread transport of ozone and its precursors. The Environmental Council of the States (ECOS) recommended formation of a national work group to allow for a thoughtful assessment and development of consensus solutions to the problem. This work group, OTAG, was established 2 years ago to undertake an assessment of the regional transport problem in the Eastern half of the United States. The OTAG was a collaborative process conducted by representatives from the affected States, EPA, and interested members of the public, including environmental groups and industry, to evaluate the ozone transport problem and develop solutions. The OTAG region includes the following 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, West Virginia and Wisconsin. Today's action builds on the work of OTAG.

Through the OTAG process, the States concluded that widespread $NO_X$ reductions are needed in order to enable areas to attain and maintain the ozone NAAQS. The EPA believes, based on data generated by OTAG and other data sources, that certain downwind States receive amounts of transported ozone and ozone precursors that significantly contribute to nonattainment in the downwind States. Today's action proposes SIP requirements under section 110(a)(1) and section 110(k)(5) in order to meet the requirements of section 110(a)(2)(D) to prohibit ozone precursor emissions from sources or activities in those States from ''contribut(ing) significantly to nonattainment in, or interfer(ing) with maintenance by,'' a downwind State of the ozone NAAQS.

Upon this determination, the EPA is requiring SIP revisions in order to take steps toward ensuring that the necessary regional reductions are achieved that will enable current ozone nonattainment areas in the eastern half of the United States to prepare attainment demonstrations and that will enable all areas to demonstrate noninterference with maintenance of the ozone standard.

The OTAG's July 8, 1997 final recommendations (see Section I.F. OTAG Process and Appendix B) identify control measures for States to achieve additional reductions in emissions of $NO_X$ and do not identify such measures for volatile organic compounds (VOC) beyond EPA's promulgation of national VOC measures. The OTAG Regional and Urban Scale Modeling and Air Quality Analysis Work Groups reached the following relevant conclusions:

- Regional $NO_X$ emissions reductions are effective in producing ozone benefits; the more $NO_X$ reduced, the greater the benefit.
- VOC controls are effective in reducing ozone locally and are most advantageous to urban nonattainment areas. (See Appendix B).

The EPA agrees with these OTAG conclusions and, thus, is not proposing new SIP requirements for VOC emissions for the purpose of reducing the interstate transport of ozone. States may, however, need to consider additional reductions in VOC emissions as they develop local plans to attain and maintain the ozone standards.

Therefore, this rulemaking is intended to make a finding of significant contribution to a nonattainment problem, or interference with a maintenance problem, and to assign, specifically, the emissions budgets for $NO_X$ that each of the identified States must meet through SIP measures. As indicated, the EPA is proposing to require the submission of SIP controls to meet the specified budgets. However, this requirement permits each State to choose for itself what measures to adopt to meet the necessary emission budget. Consistent with OTAG's recommendations to achieve $NO_X$ emission decreases primarily from large stationary sources in a trading program, EPA encourages States to consider electric utility and large boiler controls under a cap-and-trade program as a cost-effective strategy. This is described in more detail in section III, Statewide Emission Budgets. The EPA also recognizes that promotion of energy efficiency can contribute to a cost-effective strategy. The EPA is working to develop guidance on how States can integrate energy efficiency into their SIPs to help meet their $NO_X$ budgets at least cost.

The EPA proposes to find, after considering OTAG's recommendations and other relevant information, that the following 22 States and the District of Columbia significantly contribute to nonattainment in, or interfere with maintenance by, a downwind State: Alabama, Connecticut, Delaware, Georgia, Illinois, Indiana, Kentucky, Massachusetts, Maryland, Michigan, Missouri, North Carolina, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin. These findings proposed today reflect the air quality modeling and other technical work done by OTAG, as well as other relevant information.

Under this proposal, these States would be required to adopt and submit, within 12 months after publication of the notice of final rulemaking, SIPs containing control measures that will mitigate the ozone transport problem by meeting the assigned statewide emissions budget. Section II, Weight of Evidence Determination of Significant Contribution, describes how EPA determined which States to propose as significant contributors, and section III, Statewide Emission Budgets, describes how EPA determined the appropriate statewide emission budgets and proposes to assign specific emission budgets for the States identified above. Section V, SIP Revisions and Approvability Criteria, describes the proposed SIP requirements.

The EPA believes that expedited implementation of regional control strategies to facilitate attainment is necessary. On July 18, 1997, EPA published its final rule for strengthening the NAAQS for ozone by establishing a new, 8-hour NAAQS (62 FR 38856). This results in more areas and larger areas with monitoring data indicating nonattainment. Thus, it will be even more critical to implement regional control strategies which will mitigate transport into areas in violation of the new standard and thus enable these areas to demonstrate attainment. The regional $NO_X$ reduction strategy proposed in today's action will provide a mechanism to achieve reductions that will be necessary for States to enable them to attain and maintain this revised standard. The proposed regional reductions alone should be enough to allow most of the new nonattainment counties in States covered by this rulemaking to be able to comply with the new standard. States that are not required to comply with the requirements set forth in today's action would also benefit from the $NO_X$ strategy EPA is proposing if they adopt similar measures. On July 16, 1997, President Clinton issued a directive on the implementation of the revised air quality standards. This implementation policy is described in section IV, Implementation of Revised Air Quality Standards.

Many of the States that EPA is not proposing to find as significant contributors to the ozone nonattainment problem, and, therefore, do not have a proposed $NO_X$ statewide emissions budget to mitigate ozone transport, still may need, as recommended by OTAG, to cooperate and coordinate SIP development activities with other States. States with local interstate nonattainment areas for the 1-hour standard and/or the new 8-hour standard are expected to work together to reduce emissions to mitigate local scale interstate transport problems in order to provide for attainment in the nonattainment area as a whole.

In addition, areas in these States (those covered by OTAG modeling but not covered by this proposal) may be able to receive the transitional classification as described in section IV, Implementation of Revised Air Quality Standards. An area in the State would satisfy one of the eligibility requirements for the transitional area classification by attaining the 1-hour standard and submitting a SIP attainment demonstration by 2000 for the 8-hour standard. The OTAG's modeling (in particular, OTAG strategy Run 5 described in section II.B.2, OTAG Strategy Modeling) shows that a strategy in which a State adopted $NO_X$ emission decreases similar to those EPA proposes to establish in this rulemaking would be helpful in achieving attainment in most of these areas. The EPA strongly suggests that these States (those covered by OTAG modeling but not covered by this proposal) with new nonattainment counties for the 8-hour standard should consider the option of this strategy since our analysis indicates that nearly all new nonattainment counties are projected to come into attainment as a result of this strategy. The benefits of this regional strategy for States not required to implement the proposed strategy under this rulemaking are described below in section VI, States Not Covered by this Rulemaking.

The EPA plans to publish a supplemental notice of proposed rulemaking (SNPR) in early 1998. The Agency intends to include in the SNPR a proposed model cap-and-trade rule, air quality analyses of the proposed statewide emission budgets, emissions reporting and State reporting requirements, a discussion of the interaction with the Title IV $NO_X$ rule (including EPA's plans to proceed with rulemaking on remanded elements of that rule relating to flexible implementation where an appropriate cap-and-trade system is in place), and proposed rule language for the rulemaking discussed in today's action. There will be another public comment period following publication of the SNPR. All comments received regarding either today's action or the proposed rule language in the SNPR will be considered before promulgation of a final rule.

*B. General Factual Background*

In today's proposal, EPA takes a significant step in order to reduce ozone in the eastern half of the country. Ground-level ozone, the main harmful ingredient in smog, is produced in complex chemical reactions when its precursors, VOC and $NO_X$, react in the presence of sunlight. The chemical reactions that create ozone take place while the pollutants are being blown through the air by the wind, which means that ozone can be more severe many miles away from the source of emissions than it is at the source.

At ground level, ozone can cause a variety of ill effects to human health, crops and trees. Specifically, ground-level ozone induces the following health effects:

- Decreased lung function, primarily in children active outdoors.
- Increased respiratory symptoms, particularly in highly sensitive individuals.
- Hospital admissions and emergency room visits for respiratory causes, among children and adults with pre-existing respiratory disease such as asthma.
- Inflammation of the lung.
- Possible long-term damage to the lungs.

The new 8-hour primary ambient air quality standard will provide increased protection to the public from these health effects.

Each year, ground-level ozone above background is also responsible for several hundred million dollars worth of agricultural crop yield loss. It is estimated that full compliance of the newly promulgated ozone NAAQS will result in about $500 million of prevented crop yield loss. Ozone also causes noticeable foliar damage in many crops, trees, and ornamental plants (i.e., grass, flowers, shrubs, and trees) and causes reduced growth in plants. Studies indicate that current ambient levels of ozone are responsible for damage to forests and ecosystems (including habitat for native animal species).

The science of ozone formation, transport, and accumulation is complex. Ozone is produced and destroyed in a cyclical set of chemical reactions involving $NO_X$, VOC and sunlight. Emissions of $NO_X$ and VOC are necessary for the formation of ozone in the lower atmosphere. In part of the cycle of reactions, ozone concentrations in an area can be lowered by the reaction of nitric oxide with ozone, forming nitrogen dioxide; as the air moves downwind and the cycle continues, the nitrogen dioxide forms additional ozone. The importance of this reaction depends, in part, on the relative concentrations of $NO_X$, VOC and ozone, all of which change with time and location.

As part of the efforts to reduce harmful levels of smog, EPA today proposes to require certain States to revise their SIPs in order to implement the regional reductions in transported ozone and its precursors that are needed to enable areas in the Eastern United States to attain and maintain the NAAQS. Since air pollution travels across county and State lines, it is essential for State governments and air pollution control agencies to cooperate to solve the problem.

*C. Statutory and Regulatory Background*

1. Clean Air Act Provisions

*a. 1970 and 1977 Clean Air Act Amendments.* For almost 30 years, Congress has focused major efforts on curbing tropospheric ozone. In 1970, Congress amended title I of the CAA to require, among other things, that EPA issue, and periodically review and if necessary revise, NAAQS for ubiquitous air pollutants (sections 108 and 109). Congress required the States to submit SIPs to attain those NAAQS, and Congress included, in section 110, a list of minimum requirements that SIPs must meet. Congress anticipated that areas would attain the NAAQS by 1975.

In 1977, Congress amended the CAA to provide, among other things, additional time for areas to attain the ozone NAAQS, as well as to impose specific SIP requirements for those nonattainment areas. These provisions first required the designation of areas as attainment, nonattainment, or unclassified, under section 107; and then required that SIPs for ozone nonattainment areas include the additional provisions set out in part D of title I, as well as demonstrations of attainment of the ozone NAAQS by either 1982 or 1987 (section 172).

In addition, the 1977 Amendments included two provisions focused on interstate transport of air pollutants: the predecessor to current section 110(a)(2)(D), which requires SIPs for all areas to constrain emissions with certain adverse downwind effects; and section 126, which authorizes a downwind State (or political subdivision) to petition for EPA to impose limits directly on upwind sources found to adversely affect that State. Section 110(a)(2)(D), which is key to the present action, is described in more detail below.

*b. 1990 Clean Air Act Amendments.* In 1990, Congress amended the CAA to better address, among other things, continued nonattainment of the 1-hour ozone NAAQS, the requirements that would apply if EPA revised the 1-hour standard, and transport of air pollutants across State boundaries (Pub. L. 101–549, Nov. 15, 1990, 104 Stat. 2399, codified at 42 U.S.C. 7401–7671q). Numerous provisions added, or revised, by the 1990 Amendments are relevant to today's proposal.

i. 1-hour Ozone NAAQS. In the 1990 Amendments, Congress required the States and EPA to review and, if necessary, revise the designation of areas as attainment, nonattainment, and unclassifiable under the ozone NAAQS in effect at that time, which was the 1-hour standard (section 107(d)(4)). Areas designated as nonattainment were divided into, primarily, five classifications based on air quality design value (section 181(a)(1)). Each classification carries specific requirements, including new attainment dates (sections 181–182). In increasing severity of the air quality problem, these classifications are marginal, moderate, serious, severe and extreme. The OTAG region includes all classifications except extreme.

As amended in 1990, the CAA requires States containing ozone nonattainment areas classified as serious, severe, or extreme to submit several SIP revisions at various times. One set of SIP revisions included specified control measures, such as reasonably available control technology (RACT) for existing VOC and $NO_X$ sources (section 182(b)(2), 182(f)). In addition, the CAA requires the reduction of VOC in the amount of 15 percent by 1996 from a 1990 baseline (section 182(b)(1)). Further, the CAA requires the reduction of VOC or $NO_X$ emissions in the amount of 9 percent over each 3-year period from 1996 through the attainment date (the rate-of-progress (ROP) SIP submittals) under section 182(c)(2)(B). In addition, the CAA requires a demonstration of attainment (including air quality modeling) for the nonattainment area (the attainment demonstration), as well as SIP measures containing any additional reductions that may be necessary to attain by the applicable attainment date (section 182(c)–(e)). The CAA established November 15, 1994 as the required date for the ROP and attainment demonstration SIP submittals.[1]

ii. Revised Ozone NAAQS. Section 109(d) of the CAA requires periodic review and, if appropriate, revision of the NAAQS. As amended in 1990, the CAA further requires designating areas as attainment, nonattainment, and unclassifiable under a revised NAAQS (section 107(d)(1)). The CAA authorizes EPA to classify areas that are designated nonattainment under a new NAAQS, and to establish for those areas attainment dates not to exceed 10 years from the date of designation (section 172(a)).

The CAA continues, in revised form, certain requirements, dating from the 1970 Amendments, which pertain to all areas, regardless of their designation. All areas are required to submit SIPs within certain time frames (section 110(a)(1)), and those SIPs must include specified provisions, under section 110(a)(2). In addition, SIPs for nonattainment areas are generally required to include additional specified control requirements, as well as controls providing for attainment of the revised NAAQS and periodic reductions providing ''reasonable further progress'' in the interim (section 172(c)).

iii. Provisions Concerning Transport of Ozone and Its Precursors. The 1990 Amendments reflect general awareness by Congress that ozone is a regional, and not merely a local, problem. As described above, ozone and its precursors may be transported long distances across State lines to combine with ozone and precursors downwind, thereby exacerbating the ozone problems downwind. In the case of ozone, this transport phenomenon was not generally recognized until relatively recently. Yet, ozone transport is a major reason for the persistence of the ozone problem, notwithstanding the imposition of numerous controls, both Federal and State, across the country.

Section 110(a)(2)(D) provides one of the most important tools for addressing the problem of transport. This provision, which applies by its terms to all SIPs for each pollutant covered by a NAAQS, and for all areas regardless of their attainment designation, provides that a SIP must contain provisions preventing its sources from contributing significantly to nonattainment problems or interfering with maintenance in downwind States.

Section 110(k)(5) authorizes EPA to find that a SIP is substantially inadequate to meet any CAA requirement, as well as to mitigate interstate transport of the type described in section 184 (concerning ozone transport in the northeast) or section 176A (concerning interstate transport in general) and thereby require the State to submit, within a specified period, a SIP revision to correct the inadequacy. The CAA further addresses interstate transport of pollution in section 126, which Congress clarified in 1990. Subparagraph (b) of that provision authorizes each State (or political subdivision) to petition EPA for a finding that emissions from ''any major source or group of stationary sources'' in an upwind State contribute significantly to nonattainment in, or interfere with maintenance by, the downwind State. If EPA makes such a finding in support of a section 126 petition, EPA would impose limits on the affected source or group of sources (section 126(c)).[2]

In addition, the 1990 Amendments included specific provisions focused on the interstate transport of ozone. Section 184 delineates a multistate ozone transport region (OTR) in the Northeast, requires specific additional controls for all areas (not only nonattainment areas) in that region, and establishes the Ozone Transport Commission (OTC) for the purpose of recommending to EPA regionwide controls affecting all areas in that region.

2. Regulatory Structure

*a. March 2, 1995 Policy.* Notwithstanding significant efforts, the States generally were not able to meet the November 15, 1994 statutory deadline for the attainment demonstration and other SIP submissions required under section 182(c). The major reason for this failure was that States were not able to address or control transport. As a result, in a memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation, dated March 2, 1995, entitled ''Ozone Attainment Demonstrations,'' (March 2, 1995 Memorandum or the Memorandum), EPA recognized the efforts made by States and the remaining difficulties in making the ROP and attainment demonstration submittals. The EPA recognized that development of the necessary technical information, as well as the control measures necessary to achieve the large level of reductions likely to be required, had been particularly difficult for the States affected by ozone transport.

Accordingly, as an administrative remedial matter, the Memorandum indicated that EPA would establish new time frames for SIP submittals. The Memorandum indicated that EPA would divide the required SIP submittals into two phases. Phase I generally consisted of: SIP measures providing for ROP reductions due by the end of 1999, an enforceable SIP commitment to submit any remaining required ROP reductions on a specified schedule after 1996, and an enforceable SIP commitment to submit the additional SIP measures needed for attainment. Phase II consists of the remaining submittals, beginning in 1997.

Ten States and the District of Columbia failed to submit Phase I

[1] For moderate ozone nonattainment areas, the attainment demonstration was due November 15, 1993 (section 182(b)(1)(A), except that if the State elected to conduct an urban airshed model, EPA allowed an extension to November 15, 1994.

[2] In addition, section 115 authorizes EPA to require a SIP revision when a State's emitters ''cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country.''

elements within the specified time. By notice dated July 10, 1996 (61 FR 36292), EPA issued findings and thereby started sanctions clocks for these areas for those Phase I submittals.

The Phase II submittals primarily consisted of the remaining ROP SIP measures, the attainment demonstration and additional local rules needed to attain, and any regional controls needed for attainment by all areas in the region. The March 2, 1995 Memorandum indicated that the attainment demonstration, target calculations for the post-1999 ROP milestones, and identification of rules needed to attain and for post-1999 ROP were due in mid-1997. To allow time for States to incorporate the results of the OTAG modeling into their local plans, EPA, in its Final Policy for Implementation of the 1-hour and Pre-Existing PM–10 Standards, is extending the mid-1997 submittal date to April 1998.

*b. OTAG.* In addition, the March 2 1995 Memorandum called for an assessment of the ozone transport phenomenon. The Environmental Council of States (ECOS) had recommended formation of a national work group to allow for a thoughtful assessment and development of consensus solutions to the problem. The OTAG has been a partnership between EPA, the 37 easternmost States and the District of Columbia, industry representatives and environmental groups. This effort has created an opportunity for the development of an Eastern United States ozone strategy to address transport and to assist in attainment of the 1-hour ambient ozone standard.

The EPA believes that the OTAG process has been invaluable in demonstrating the types of regional ozone precursor reductions that are needed to enable areas in the Eastern United States to attain and maintain the ambient air quality standard for ozone. Indeed, today's action to propose to mandate SIP revisions under section 110(a)(2)(D) is a first step directed at providing the regulatory structure to implement the kinds of broad regional precursor reductions recommended by OTAG.

*c. EPA's Transport SIP Call Regulatory Efforts.* Shortly after OTAG began its work, EPA began to indicate that it intended to issue a SIP call to require States to implement the reductions necessary to address the ozone transport problem. On January 10, 1997 (62 FR 1420), EPA published a Notice of Intent that articulated this goal and indicated that before taking final action, EPA would carefully consider the technical work and any recommendations of OTAG.

By a letter to Mary Gade, Chair of OTAG, dated April 16, 1997, EPA Assistant Administrator Mary D. Nichols stated that on the basis of technical work performed by EPA staff, it appeared that EPA would issue a SIP call to specified States and the District of Columbia. The EPA staff issued a technical support document, ''Preliminary Assessment of States Making a Significant Contribution to Downwind Ozone Nonattainment,'' dated April, 1997, which explained EPA's technical basis for those tentative conclusions. Please refer to section II, Weight of Evidence Determination of Significant Contribution, for EPA's revised conclusions.

As described below in section I.F., OTAG Process, OTAG completed its work in June 1997 and issued its final recommendations to EPA on July 8, 1997. The OTAG's technical work and recommendations form part of the basis of today's proposal.

*d. Revision of the Ozone NAAQS.* On July 18, 1997 (62 FR 38856), EPA issued its final action to revise the NAAQS for ozone. The EPA's decision to revise the standard was based on the Agency's review of the available scientific evidence linking exposures to ambient ozone to adverse health and welfare effects at levels allowed by the pre-existing 1-hour ozone standards. The 1-hour primary standard was replaced by an 8-hour standard at a level of 0.08 parts per million (ppm), with a form based on the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration measured at each monitor within an area. The new primary standard will provide increased protection to the public, especially children and other at-risk populations, against a wide range of ozone-induced health effects. Health effects are described in section I.B, General Factual Background. The EPA retained the applicability of the 1-hour NAAQS for certain areas to ensure adequate health protection during the transition to full implementation of the 8-hour NAAQS.

The pre-existing 1-hour secondary ozone standard was replaced by an 8-hour standard identical to the new primary standard. The new secondary standard will provide increased protection to the public welfare against ozone-induced effects on vegetation as described in section I.B, General Factual Background.

*e. Impacts of $NO_X$ Emissions.* At the August 7, 1997 Clean Air Act Advisory Committee meeting, EPA announced the availability of a document (''Nitrogen Oxides: Impacts on Public Health and the Environment,'' EPA–452/R–97–002, August 1997) that describes the multiple impacts of $NO_X$ emissions on public health and the environment and the consequent implications for national policy. In addition to helping attain public health standards for ozone, decreases in emissions of $NO_X$ are helpful to reducing acid deposition, greenhouse gases, nitrates in drinking water, stratospheric ozone depletion, excessive nitrogen loadings to aquatic and terrestrial ecosystems, and ambient concentrations of nitrogen dioxide, particulate matter and toxics. These impacts are described in more detail in section X, Nonozone Benefits of $NO_X$ Reductions.

*D. EPA's Proposed Analytical Approach*

1. Process for Requiring Submission of Section 110(a)(2)(D) SIP Revisions

As described above, SIPs for all areas must meet the requirements of section 110(a)(2), including section 110(a)(2)(D), which imposes limits on sources that affect the ability of downwind areas to attain and maintain the NAAQS. Because many areas are currently required to attain two ozone NAAQS—the 1-hour standard and the 8-hour standard—with different SIP planning requirements, EPA proposes that section 110(a)(2)(D) be applied in different ways with respect to each of the ozone NAAQS.

Under the 1-hour ozone NAAQS, each area is currently required to have a SIP in place. Moreover, EPA has determined that the 1-hour standard will continue to apply to areas designated nonattainment for the 1-hour NAAQS until EPA determines that the area has air quality meeting this standard (40 CFR 50.9(a) (62 FR 38894 (July 18, 1997)). Accordingly, each area is under a current obligation to include in its SIP, provisions that meet the requirements of section 110(a)(2)(D) for the 1-hour NAAQS.

This obligation to meet section 110(a)(2)(D) under the 1-hour standard applies even after EPA determines that an upwind area has attained the 1-hour standard, and the applicability of that standard thereby terminates for the upwind area. Regardless of the status of the 1-hour standard with respect to the upwind area's air quality, a downwind area may continue to have a nonattainment problem under the 1-hour standard, and the upwind area's sources may continue to impact that downwind nonattainment problem. Under these circumstances, the upwind area would be required to retain or adopt SIP provisions that meet the requirements of section 110(a)(2)(D).

To assure that SIPs include required controls, section 110(k)(5) authorizes EPA to find that a SIP is substantially inadequate to meet an CAA requirement, and to require (''call for'') the State to submit, within a specified period, a SIP revision to correct the inadequacy. This EPA requirement for a SIP revision is known as a ''SIP call.'' Specifically, section 110(k)(5) provides, in relevant part:

> Whenever the Administrator finds that the applicable implementation plan for any area is substantially inadequate to attain or maintain the relevant [NAAQS], to mitigate adequately the interstate pollutant transport described in section 176A or section 184, or to otherwise comply with any requirement of this Act, the Administrator shall require the State to revise the plan as necessary to correct such inadequacies. The Administrator shall notify the State of the inadequacies, and may establish reasonable deadlines (not to exceed 18 months after the date of such notice) for the submission of such plan revisions.

By today's action, EPA is proposing to determine that the SIPs under the 1-hour ozone NAAQS for the States identified in today's action are substantially inadequate to comply with the requirements of section 110(a)(2)(D) and to mitigate adequately the regional, interstate ozone transport described in section 184, because ozone precursor emissions and transported ozone from those States contribute significantly to nonattainment downwind. Based on these findings, EPA today proposes a SIP call to require the identified States to reduce emissions to mitigate their contribution.

If a State fails to submit the required SIP provisions in response to this SIP call, EPA is required to issue a finding that the State failed to make a required SIP submittal under section 179(a). This finding has implications for sanctions as well as EPA's promulgation of a Federal implementation plan (FIP). Sanctions and a FIP are discussed in section V., SIP Revisions and Approvability Criteria.

Under the 8-hour ozone NAAQS, areas have not yet been designated as attainment, nonattainment, or unclassifiable, and are not yet required to have SIPs in place. When those SIPs become due, they must meet the applicable requirements of section 110, which apply to all areas, and SIPs for areas designated nonattainment must also meet the additional requirements in subpart 1 of part D applicable to nonattainment areas.

Section 110(a)(1) provides, in relevant part—

> Each State shall * * * adopt and submit to the Administrator, within 3 years (or such shorter period as the Administrator may prescribe) after the promulgation of a national primary ambient air quality standard (or any revision thereof) * * * a plan which provides for implementation, maintenance, and enforcement of such primary standard in each (area) within such State.

Section 110(a)(2) provides, in relevant part—

> Each implementation plan submitted by a State under this CAA shall be adopted by the State after reasonable notice and public hearing. Each such plan shall (meet certain requirements, including those found in section 110(a)(2)(D)).

These two provisions, read together, require SIP revisions under the revised NAAQS within 3 years of the date of the revision, or earlier if EPA so requires, and require that those SIP revisions meet the requirements of section 110(a)(2), including subparagraph (D). It should be noted that the schedule for these section 110(a)(2) SIP submissions for all ozone areas differs from the schedule for the SIP submissions required under section 172(b) for part D SIP submissions for ozone nonattainment areas. These part D SIP submissions are required for all areas that are designated nonattainment under the 8-hour NAAQS and must be submitted within 3 years of the date of designation. The submission of SIP revisions containing the regional $NO_X$ reductions proposed under this rulemaking earlier than the part D nonattainment submissions will assist the downwind nonattainment areas in their attainment planning.

The EPA believes it has the authority to establish different submittal schedules for different parts of the section 110(a)(1) SIP revision. Specifically, EPA proposes to require first the portion of the section 110(a)(1) SIP revision that contains the controls required under section 110(a)(2)(D). The EPA proposes to require the section 110(a)(2)(D) submittal first for the purpose of securing upwind reductions at an earlier stage in the regional SIP planning process. This information on controls in upwind States is essential to the downwind States in the latter States' attainment planning.

In summary, EPA is proposing to determine, under section 110(k), that the 1-hour ozone NAAQS SIPs for certain States are deficient because the SIPs do not impose sufficient controls on their sources to meet the requirements of section 110(a)(2)(D), and EPA is proposing to require those States to submit SIP revisions containing adequate controls. The EPA is proposing to require, under section 110(a)(1), that certain States must submit SIP revisions under the 8-hour ozone NAAQS to meet the requirements of section 110(a)(2)(D). For simplicity, today's rulemaking occasionally uses the term ''SIP call'' to describe both EPA actions.

2. Overview of Elements of Section 110(a)(2)(D)

a. *Summary of Section 110(a)(2)(D).* As noted above, section 110(a)(2)(D) is the operative provision for determining whether additional controls are required to mitigate the impact of upwind sources on downwind air quality, with respect to both the 1-hour and 8-hour ozone NAAQS. Separate determinations must be made for each NAAQS.

Section 110(a)(2)(D) provides, in relevant part, that each SIP must:

> * * * contain adequate provisions * * * prohibiting, consistent with the provisions of this title, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will * * * contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard * * *.

According to section 110(a)(2)(D), the SIP for each area, regardless of its designation as nonattainment or attainment (including unclassifiable), must prohibit sources within the area from emitting emissions that: ''contribute significantly'' to ''nonattainment'' in a downwind State, or that ''interfere with maintenance'' in a downwind State.

*b. Significant Contribution to Nonattainment.* The initial prong under section 110(a)(2)(D) is whether sources ''contribute significantly'' to ''nonattainment in * * * any other State'' with respect to the NAAQS. The initial inquiry for this prong is to identify and determine the geographic scope of ''nonattainment'' downwind. The EPA proposes to interpret this term to refer to air quality and not to be limited to currently-designated nonattainment areas. Section 110(a)(2)(D) does not refer to ''nonattainment areas,'' which is a phrase that EPA interprets to refer to areas that are designated nonattainment under section 107 (section 107(d)(1)(A)(I)). Rather, the provision includes only the term ''nonattainment'' and does not define that term. Under these circumstances, EPA has discretion to give the term a reasonable definition, and EPA proposes to define it to include areas whose air quality currently violates the NAAQS, and will likely continue for some time to violate, regardless of the designation of those areas (compare section 181(b)(2)(A) (referring to ozone ''nonattainment area'' which EPA interprets as an area designated nonattainment) and section 211(k)(10)(D)).

For present purposes, EPA is examining the air quality for the 1993–1995 years, but EPA expects to refer to 1996 (and perhaps 1997) data as the rulemaking proceeds.

As discussed below, to determine whether emissions from sources in an upwind area significantly contribute to nonattainment downwind, EPA proposes to compare $NO_X$ emissions reductions upwind with ozone reductions downwind. For this purpose, EPA assumes that areas with current air quality indicating nonattainment for the 1-hour standard will be required to implement certain controls under the CAA, through the year 2007, which is the attainment date for ozone nonattainment areas classified as severe-17. Accordingly, EPA proposes to determine, through air quality modeling, which areas with current air quality indicating nonattainment for both the 1-hour and 8-hour standards will continue to be in nonattainment in the year 2007, even after implementation of controls specifically required under the CAA. Because this projection is occurring through the year 2007, it is also necessary to take into account growth in emissions, generally due to economic growth and greater use of vehicles, to that time. If an area with air quality currently indicating nonattainment is modeled to continue to be in nonattainment as of the year 2007, then emissions from sources in upwind areas may be considered to ''contribute significantly'' to the current nonattainment problem, depending on the factors described below. On the other hand, if an area the current air quality of which measures nonattainment is modeled to be in attainment in the year 2007 due to imposition of required CAA controls, then EPA proposes not to consider emissions from sources in upwind areas to ''contribute significantly'' to that downwind area.

The EPA's decision is explained below for choosing the year 2007 as the date for assuming the implementation of controls and for modeling air quality.

The EPA proposes a similar analysis for purposes of the 8-hour NAAQS. The EPA will consider as ''nonattainment'' any area that has monitored nonattainment air quality currently, and for which modeling shows is likely to continue to be in nonattainment in the year 2007 after application of controls specifically required under the CAA.

After determining the scope of the downwind nonattainment problem, EPA must next analyze whether the emissions from sources in the upwind area ''contribute significantly'' to the nonattainment problem. As described below, EPA analyzed all $NO_X$ emissions in specified upwind areas, made proposed determinations as to significant contributions based on the entire inventory of the area's $NO_X$ emissions and is requiring SIP revisions that address overall levels of $NO_X$ emissions. By contrast, EPA is not, in this rulemaking, determining whether particular sectors of the $NO_X$ inventory ''contribute significantly'' and is not mandating controls on particular sectors of that inventory.

Neither the CAA nor its legislative history provides meaningful guidance for interpreting the term, ''contribute significantly'' (H.Rept. 101–491, 101st Cong., 2d sess., 1990, 218). The simpler part of the analysis concerns the term, ''contribute.'' In EPA's view, if emissions have an impact on downwind nonattainment, those emissions should be considered to contribute to the nonattainment problem. Generally, because ozone is a secondary pollutant formed as a result of complex chemical reactions, it is not possible to determine downwind impact on a source-by-source basis. However, if air quality modeling shows that the aggregation of emissions from a particular geographic region affect a nonattainment problem, then all of the emissions in that region should be considered as contributors to that nonattainment problem.

Whether a contribution from sources in a particular upwind area is ''significant'' depends on the overall air quality context. The EPA is proposing a ''weight of evidence'' test under which several factors are considered together, but none of them individually constitutes a bright-line determination.

The EPA is proposing and soliciting comment on two alternative interpretations of section 110(a)(2)(D). Each of the two interpretations relies on a set of factors to make the determinations required under section 110(a)(2)(D). In addition, each of the two relies on the same factors. However, each relies on different factors in different parts of the analysis.

Under the first interpretation of section 110(a)(2)(D), the weight of evidence test for determining significant contribution focuses on factors concerning amounts of emissions and their ambient impact, including the nature of how the pollutant is formed, the level of emissions and emissions density (defined as amount of emissions per square mile) in the particular upwind area, the level of emissions in other upwind areas, the amount of contribution to ozone in the downwind area from upwind areas, and the distance between the upwind sources and the downwind nonattainment problem. Under this approach, when emissions and ambient impact reach a certain level, as assessed by reference to the factors identified above, those emissions would be considered to ''contribute significantly'' to nonattainment. The EPA would then determine what emissions reductions must be required in order to adequately mitigate these contributions. Evaluation of the costs of available measures for reducing upwind emissions enters into this determination, as well as to the extent known (at least qualitatively), the relative costs of, amounts of emission reductions from, and ambient impact of, measures available in the downwind areas. The EPA proposes to require upwind areas to implement a $NO_X$ budget reflecting cost-effective controls that compare favorably, at least qualitatively, with the costs of controls downwind and that reduces ozone levels downwind.

Under the second interpretation of section 110(a)(2)(D), the weight of evidence test for determining significant contribution includes all of the factors identified immediately above, including the factors that comprise the adequate mitigation test. That is, the relevant factors concern upwind emissions and ambient impact therefrom, as well as the costs of the available measures for reducing upwind emissions and, to the extent known (at least qualitatively), the relative costs of, amounts of emissions reductions from, and ambient impact of measures available in the downwind areas. Thus, under this second interpretation, the cost effectiveness of controlling upwind emissions would be an important, but not necessarily a controlling factor in evaluating whether emissions meet the significant contribution test. As a result, EPA may conclude that a certain amount of the upwind emissions contributes significantly to downwind problems because, among other things, that amount may be eliminated through controls that are relatively more cost effective. However, EPA would not conclude that the remaining emissions contribute significantly because the additional available controls that might be implemented are not as cost effective. Under this second interpretation, once EPA determines what amount of emissions contribute significantly to problems downwind, the remedy would be for EPA to require the elimination of that amount of upwind emissions and to determine the $NO_X$ budgets accordingly.

Under either the first or second interpretation of section 110(a)(2)(D), EPA would be considering the relative costs and cost effectiveness of various controls in deciding how much each State would need to reduce its emissions. The methodology EPA would employ to reach this result under either interpretation is set forth more fully in sections II and III of today's action.

As discussed above, unhealthful levels of ozone result from emissions of $NO_X$ and VOC from thousands of stationary sources and millions of mobile sources across a broad geographic area. Each source's contribution is a small percentage of the overall problem; indeed, it is rare for emissions from even the largest single sources to exceed 1 percent of the inventory of ozone precursors for a single metropolitan area. Under these circumstances, even complete elimination of any given source's emissions may well have no measurable impact in ameliorating the nonattainment problem. Rather, attainment requires controls on numerous sources across a broad area. Ozone is a regional scale problem that requires regional scale reductions.

The National Academy of Sciences (NAS) study, ''Rethinking the Ozone Problem in Urban and Regional Air Pollution'' (2) emphasized this aspect of ozone formation. According to this report, high concentrations of ozone occur concurrently in the Eastern United States in urban, suburban and rural areas on scales of over 1000 kilometers. The NAS report describes a ''persistent blanket of high ozone in the Eastern United States'' that can last for several days. Since rural ozone values commonly exceed 90 parts per billion (ppb) on these occasions, an urban area needs an ozone increment of only 30 ppb to cause an exceedance of the 1-hour ozone standard in a downwind area. Clearly, attainment strategies must include controls on numerous sources across broad areas.

In light of this ''collective contribution'' characteristic of ozone formation and control, EPA proposes that if contributions from an upwind area's emissions, taken together, are considered to be an important portion of the downwind area's nonattainment problem, then this factor tends to indicate that the upwind emissions as a whole, as well as each of the upwind emitters, make a ''significant'' contribution. The fact that emissions from any particular source, or even a group of sources, may in-and-of-themselves be small, does not mean those sources' emissions are not ''significant'' within the meaning of section 110(a)(2)(D). Those sources' emissions are generally ''significant'' if, when they are combined with emissions from other sources in the same upwind area, they total upwind emissions that are ''significant.'' Even so, it should be noted that the collective contribution factor is only one of various factors that EPA proposes to consider in determining whether emissions from an area constitute a ''significant'' contribution to a downwind problem. The amounts of emissions from the area and, in certain cases, emissions density, remain important factors. Depending on all the facts and circumstances, these other factors may tend to indicate that emissions from a particular area should not be considered to contribute significantly, notwithstanding the fact that those emissions may be linked in some manner with emissions from other upwind areas that are considered to be significant contributors.

In several rulemakings promulgated and court decisions handed down, in the 1980's, EPA interpreted and applied the predecessors to sections 110(a)(2)(D) and 126 (e.g., *State of New York* v. *EPA,* 852 F.2d 574 (D.C. Cir. 1988); *Air Pollution Control District of Jefferson County, Kentucky* v. *EPA,* 739 F.2d 1071 (6th Cir. 1984); *Connecticut* v. *EPA,* 696 F.2d 147 (2d Cir. 1982)). Although these rulemakings and court decisions generally employed multifactor formulas for the ''significant contribution'' test that bear some similarity to the formula EPA is proposing today, they have limited relevance to the issues in the present rulemaking because of the numerous differences in the relevant factors. For example, in the earlier rulemakings compared to the present rulemaking, the pollutants and precursors are different, and the inventories of emissions and number of emitters in the upwind and downwind areas are different. The significant contribution test is a facts-and-circumstances analysis that depends on these factors, and differences among these factors may yield different results under this test. Accordingly, the differences in the key factors between the earlier decisions and today's proposal means that those earlier decisions are not determinative for today's proposed action.

For purposes of today's rulemaking, EPA determined the amount of contribution to downwind air quality, under both the 1-hour NAAQS and the 8-hour NAAQS, by employing an air quality model that assumed a zero level of anthropogenic emissions from the various upwind areas. The results of those model runs, as well as their other assumptions and characteristics, are described in detail below.

As described below, EPA made separate determinations as to which upwind areas ''contribute significantly'' to nonattainment under the 1-hour NAAQS and under the 8-hour NAAQS. Those separate determinations resulted in identifying the same States for both the 1-hour and the 8-hour NAAQS.

*c. Interfere with Maintenance.* Section 110(a)(2)(D) also prohibits emissions that ''interfere with maintenance'' of the NAAQS in a downwind State. An area is obligated to maintain the NAAQS after the area has reached attainment. This requirement of section 110(a)(2)(D) does not, by its terms, incorporate the qualifier of ''significantly.'' Even so, EPA believes that for present purposes, the term ''interfere'' should be interpreted much the same as the term ''contribute significantly,'' that is, through the same weight of evidence approach.

With respect to the 1-hour NAAQS, the ''interfere-with-maintenance'' prong appears to be inapplicable. The EPA has determined that the 1-hour NAAQS will no longer apply to an area after EPA has determined that the area has attained that NAAQS. Under these circumstances, emissions from an upwind area cannot interfere with maintenance of the 1-hour NAAQS.

With respect to the 8-hour NAAQS, the ''interfere-with-maintenance'' prong remains important. After an area has reached attainment of the 8-hour NAAQS, that area is obligated to maintain that NAAQS (sections 110(a)(1) and 175A). Emissions from sources in an upwind area may interfere with that maintenance.

The EPA proposes to apply much the same approach in analyzing the first component of the ''interfere-with-maintenance'' issue, which is identifying the downwind areas whose maintenance of the NAAQS may suffer interference due to upwind emissions. The EPA has analyzed the ''interfere-with-maintenance'' issue for the 8-hour NAAQS by examining areas whose current air quality is monitored as attaining the 8-hour NAAQS, but for which air quality modeling shows nonattainment in the year 2007. This result is projected to occur, notwithstanding the imposition of certain controls required under the CAA, because of projected increases in emissions due to growth in emissions generating activity. Under these circumstances, emissions from upwind areas may interfere with the downwind area's ability to maintain the 8-hour NAAQS. Ascertaining the impact on the downwind area's air quality of the upwind area's emissions aids in determining whether the upwind emissions interfere with maintenance.

*d. Remedying the Significant Contribution.* After identifying States whose sources do ''contribute significantly'' to a nonattainment problem or interfere with maintenance downwind, it is necessary to determine the appropriate limit on emissions required in each upwind SIP. The EPA is proposing, in the alternative, two different analyses for the remedies which are tied to the two alternatives for the ''weight of evidence'' test.

i. Adequate Mitigation. Under the first interpretation of section 110(a)(2)(D), EPA does not consider costs in determining whether upwind emissions contribute significantly to nonattainment or interfere with maintenance. Instead, once EPA determines, on the basis of factors generally related to emissions, that those emissions do contribute significantly to nonattainment (or interfere with maintenance), EPA then determines what emissions reductions must be required in order to adequately mitigate these contributions. Evaluation of relative costs enters into this determination.

Adequate mitigation would amount to eliminating a sufficient portion of the upwind emissions so that they no longer contribute significantly to nonattainment or interfere with maintenance.

In the present case, EPA proposes to determine an allowable level of $NO_X$ emissions for each of the 23 jurisdictions with sources that trigger the requirements of section 110(a)(2)(D). Given the need to reduce this overall regional level of ozone, as discussed earlier, EPA determined this ''budget'' of emissions by, in the first instance, calculating the emissions achievable by applying the most reasonable, cost-effective controls on $NO_X$ emissions in the 23 jurisdictions. The control measures considered and those determined to be the most reasonable and cost-effective are detailed below. In selecting those control measures determined to be the most reasonable and cost-effective, EPA carefully considered the recommendations made by OTAG on July 8, 1997. (The OTAG process is described in section I.F. of this rulemaking.) The budget calculations described below generally fall within the range of OTAG's recommendations.

The statewide emissions budgets proposed in this rulemaking were not modeled directly to determine their air quality benefits. The EPA believes, however, that the air quality impact of implementing these reductions would be very similar to results previously modeled by OTAG. This modeling is identified in section IX, Air Quality Analyses. The downwind air quality benefits from these reductions are sufficient for EPA to conclude that they would adequately mitigate the contribution from the upwind sources.

ii. Elimination of Contribution. Under the second interpretation of section 110(a)(2)(D), costs are considered as part of the calculation as to what (if any) amount of emissions contribute significantly to nonattainment or interfere with maintenance. The EPA proposes to determine those amounts for each State by considering the factors described above and the extent to which the State's emissions can be reduced through the most cost-effective controls that reduce ozone levels downwind. Once EPA makes this determination, EPA would conclude that requiring those cost-effective controls is mandated under the provisions of section 110(a)(2)(D) that require SIP provisions ''prohibiting'' that amount of emissions. Thus, under this alternative interpretation, a SIP meets the requirement for ''prohibiting'' emissions that contribute significantly to nonattainment, or interfere with maintenance, downwind, by implementing cost-effective controls determined to improve air quality downwind.

iii. Comparison of the Two Legal Interpretations of Section 110(a)(2)(D). The EPA solicits comments on which of the two legal interpretations of section 110(a)(2)(D), as described above, should be used. Each interpretation relies on the same factors (although certain factors enter into different parts of the analysis under the two interpretations). Because each relies on the same factors, there is little technical difference between the two interpretations. Each requires the same determinations as to, for example, the ambient impact of upwind emissions and the cost effectiveness of controls.

Moreover, as proposed in today's action, each interpretation leads to the same conclusion as to which States are considered to have emissions that significantly contribute to downwind problems, and as to the amounts of $NO_X$ budgets that those States should meet.

However, the two interpretations have different legal justifications. As noted above, section 110(a)(2)(D) provides that the SIP for the upwind area must ''contain adequate provisions * * * prohibiting * * * [sources] from emitting any air pollutant in amounts which will * * * contribute significantly to nonattainment in, or interfere with maintenance by, any other State * * *'' Under the first interpretation, EPA may determine that a relatively larger inventory of emissions contributes significantly to nonattainment (or interferes with maintenance) in light of the fact that the costs of controlling those emissions are not considered in determining significant contribution. The EPA would then require adequate mitigation of the full set of emissions that contribute to nonattainment or interfere with maintenance.

Other relevant provisions indicate that the CAA could be construed to require mitigation, and not necessarily complete elimination, of emissions that contribute to air quality problems downwind. Section 110(k)(5) authorizes the Administrator to promulgate a SIP call whenever she finds that a SIP is ''substantially inadequate to attain or maintain the relevant [NAAQS], *to mitigate adequately the interstate pollutant transport described in section 176A or 184,* or to otherwise comply with any requirement of this Act'' (emphasis added). Section 176A describes interstate transport of air pollutants generally, and section 184 describes ozone transport in the northeast region in particular, which constitutes part of the transport phenomenon at issue in today's proposal. Section 176A authorizes the creation of a transport region when emissions from one or more States contribute significantly to a NAAQS violation in another State and further authorizes a transport commission to, among other things, assess strategies for mitigating the interstate pollution. These provisions, read together, indicate that adequate mitigation of transport is an appropriate response to a SIP call. Arguably, this interpretation should hold when EPA issues a SIP call based on section 110(a)(2)(D), and when EPA mandates a SIP revision under section 110(a)(1), based on section 110(a)(2)(D).

The second interpretation focuses on the provisions of section 110(a)(2)(D) that the SIP must include provisions to ''prohibit'' any emitting activity from emitting in ''amounts'' that contribute significantly to downwind nonattainment or interfere with maintenance. The EPA has determined the States whose full set of $NO_X$ emissions contribute markedly to downwind problems. The term ''prohibit'' could be interpreted to require EPA, upon finding that a State's full set of emissions ''contribute significantly'' to nonattainment, must then require the SIP to eliminate that full set of emissions. This construction could mean that EPA must require the State to shut down all of the emission-generating activities. It is doubtful Congress would have intended this result.

The EPA's second interpretation avoids this possible result by taking into account the relative cost effectiveness of the upwind and downwind controls in defining the ''amounts'' of emissions in each State that contribute significantly to the downwind problem. Once EPA has set those ''amounts'' in light of its consideration of the cost factors, the SIPs for the affected States would then need to prohibit only those amounts.

iv. Other Issues. States will have the flexibility to choose their own mix of control measures to meet the proposed statewide emissions budgets. That is, States are not constrained to adopt measures that mirror the measures EPA used in calculating the budgets. In fact, EPA believes that many control measures not on the list relied upon to develop EPA's proposed budgets are reasonable—especially those like enhanced vehicle inspection and maintenance programs that yield both $NO_X$ and VOC emissions reductions. Thus, one State may choose to primarily achieve emissions reductions from stationary sources while another State may focus emission reductions from the mobile source sector. Furthermore, States may choose to pursue cost-effective energy efficiency opportunities as a means to reduce the control measures necessary to meet their statewide emission budgets.

*e. Control Implementation and Budget Attainment Dates.* The EPA proposes to require that the SIP revisions impose an implementation date for the required controls of 3 years from the date of the required SIP submission, which would result in compliance by those sources by no later than September 2002. However, the EPA is soliciting comments on the range of implementation dates from between September 2002 and September 2004. The EPA seeks comment on which date within this 2-year range is appropriate, in light of the feasibility of implementing controls and the need to provide air quality benefits as expeditiously as practicable. The EPA is proposing an implementation date of September 2002 in order to allow coordination of this rulemaking with its response to 8 section 126 petitions which are discussed below in section I.E, Section 126 Petitions. Although the EPA's actual proposed compliance date is September 2002, because the Agency is seeking comment on a range from September 2002 to September 2004, the Agency refers to the range of implementation dates throughout this rulemaking. The EPA further proposes that States be required to meet the mandated budgets by the end of the year 2007, by which time additional reductions from various Federal measures will also be achieved.

The EPA believes that requiring implementation of the upwind controls, and thereby mandating upwind reductions, by no later than these 2002–4 dates, is consistent with the attainment schedule for the downwind areas. Because the downwind areas depend on upwind reductions to reach attainment, mandating upwind controls on a schedule consistent with downwind attainment requirements is appropriate.

A review of the attainment schedule under the 1-hour NAAQS would be useful. Under the attainment schedule, serious areas are required to attain by the end of 1999, severe-15 areas are required to attain by the end of 2005, and severe-17 areas are required to attain by the end of 2007 (section 181(a)(1)). If a serious area fails to meet its 1999 attainment date, it is to be reclassified (''bumped up'') to severe-15 (section 181(b)(2)). However, an area may fail to reach attainment by its attainment date, but avoid bump up, if EPA grants a 1-year extension. An area is eligible for a 1-year extension if, among other things, it has no more than one exceedance of the NAAQS in the attainment-date year. The EPA may grant another extension for the next year under the same conditions (section 181(a)(5)). If an area receives two 1-year extensions, it may reach attainment in the following year (the second year after the attainment-date year) if, again, it has no more than one exceedance of the NAAQS. Under these circumstances, the area will have had no more than three exceedances over a 3-year period (the attainment-date year and the 2 next years), which would qualify it for attainment under the 1-hour NAAQS. The EPA has indicated that once it determines that an area has achieved air quality that satisfies the 1-hour NAAQS, the NAAQS will be rescinded with respect to that area.

Although controls on upwind emissions are designed to assist downwind nonattainment areas in reaching the NAAQS, EPA is aware that at this point, it is not possible for EPA to mandate controls on upwind areas within the OTAG region in sufficient time to help serious areas reach attainment by their end-of-1999 attainment date. The amount of time that is necessary to assure that the rulemaking proposed today is well considered by all affected parties, added to the amount of time necessary for the States to adopt the required SIP revisions, and the amount of lead-time necessary to implement the required controls, means that those controls cannot be expected to be in place in time to assist the serious areas in reaching their attainment date.

The next attainment date is 2005, which applies to severe-15 areas, such as the Baltimore area, and which would apply to any serious area that is bumped up. The EPA's proposal to require upwind controls to be implemented by no later than September 2004—in time for the beginning of the ozone season for the affected States—is sensible in light of this 2005 attainment date. Implementing controls earlier than September 2004, or at least phasing in some controls, if not all of them, prior to that date, would improve the chance for minimizing exceedances during the 3-year period up to, and including, 2005, which will facilitate reaching attainment as of this date. In particular, to the extent that the State chooses controls on major stationary sources of NOx, EPA believes it would be feasible to implement some of those controls earlier than September 2004. However, EPA is aware that implementation of controls for other sources may be more problematic. The EPA solicits comments on what dates within the range of 3 to 5 years of the required SIP submission would be appropriate for implementation of the controls.

Full implementation by no later than September 2004 would mean that all of the upwind controls required under the rulemaking proposed today would be in place as of the November 15, 2005 attainment date for the downwind severe-15 areas. Failure to implement those controls prior to September 2004 may mean that the downwind area may record too many exceedances in the 3-year period prior to the end of 2005, so that it would not be possible to reach attainment as of that time. However, implementation of these reductions by September 2004, coupled with any necessary additional reductions from the downwind sources, may result in no more than one exceedance in the downwind area during the attainment year and during each of the next 2 years thereafter. Under these circumstances, the downwind area would be eligible for the 1-year extensions described above and would reach attainment by the year 2007.

Similarly, full implementation by September 2004 would mean that severe-17 areas would receive the benefit of reduced upwind emissions during the 3-year period up to, and including, their 2007 attainment year. In the OTAG region, the severe-17 areas include the Philadelphia, New York, Milwaukee, and Chicago areas. These reductions should greatly assist the downwind areas in reaching attainment by the end of 2007.

An implementation date of between September 2002 September 2004 is also consistent with the attainment date scheme for the 8-hour NAAQS. The EPA intends to promulgate designations for areas under the 8-hour NAAQS by the year 2000. The CAA provides for attainment dates of up to 5 years or 10 years after designation. Therefore, the first attainment date for many areas under the 8-hour standard could be 2005. Section 172(a)(2)(C) has a two, 1-year extension scheme applicable for areas under the 8-hour NAAQS that is similar to that described above, under section 181(a)(5), applicable to areas under the 1-hour NAAQS. Accordingly, full implementation of mandated SIP controls in the upwind areas by no later than September 2004 may allow downwind areas to reach attainment of the 8-hour NAAQS by 2007, counting the two 1-year extensions in the same manner as for severe-15 areas under the 1-hour NAAQS. In addition, the EPA believes that compliance no later than September 2004 by the utility and nonutility sector, with the emission limits assumed in setting the emission budgets or application of controls to other source categories, is feasible.

Further, EPA notes that the September 27, 1994 OTC $NO_X$ Memorandum of Understanding (MOU) provides that large utility and nonutility NOx sources should comply with the Phase III controls by the year 2003. The levels of control in the MOU are 75 percent or 0.15 lb/$10^6$ btu in the inner and outer zones, levels comparable to the controls assumed in setting the budget for this rulemaking. In addition, in comments to EPA's proposed Phase II NOx reduction program under the Acid Rain provisions of the CAA [3], the Institute of Clean Air Companies (ICAC) stated that more than sufficient vendor capacity existed to supply retrofit of selective catalytic control to the boilers affected by the proposed rule. The ICAC in fact indicated that additional catalyst capacity could be added if needed.

Although EPA is proposing today that SIPs mandate implementation of the required SIP controls by a date within a range of September 2002 and September 2004, EPA is also proposing that the affected States demonstrate achievement of their $NO_X$ budgets as of the end of the year 2007. In addition, EPA used the 2007 date to analyze for modeling purposes the impact of upwind emissions on nonattainment air quality. Using the 2007 date means that the States will be able to account for the additional reductions from Federal measures occurring between the date that SIP controls are implemented and the end of 2007, although the State must also account for growth in emissions during this time. Using the 2007 date is sensible in part because OTAG used this date for these purposes and compiled substantial technical information—such as information concerning inventories—based on this date. It is, therefore, efficient for EPA to use this same information. Developing comparable information for an earlier date would be time consuming and resource intensive. In addition, it is uncertain that there would be significant differences in amounts of emissions and impact on ambient air quality between an earlier date and 2007, in light of the fact that during this period, emissions would generally increase somewhat as a result of growth in activities that generate emissions, but would also decrease due to continued application of federally mandated controls. Accordingly, requiring accounting for a budget as of the 2007 date is both practicably indicated and is a reasonable surrogate for requiring this accounting as of September 2004.

*E. Section 126 Petitions*

The EPA has received section 126 petitions from eight States: Connecticut, Maine, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island and Vermont. The petitions vary as to the type and geographic location of sources they identify as meriting a finding of significant contribution. The petitions also vary as to the levels of controls they recommend. In addition, EPA has received a petition from the State of Wisconsin asking EPA to promulgate a SIP call under section 110(k)(5) requiring the States of Illinois, Indiana, Iowa, Kentucky and Missouri to submit SIP revisions addressing the purported impact of their emissions on Wisconsin. By letter dated August 8, 1997, from Mary D. Nichols, Assistant Administrator for Air and Radiation, to Michael J. Walls, Chief, Environmental Protection Bureau, Office of the Attorney General, State of New Hampshire, EPA provided technical guidance concerning section 126 petitions. The EPA is now studying the petitions and will prepare a notice(s) of proposed rulemaking to grant or deny them.

The EPA's response to a section 126 petition differs from today's action in several ways. Today's action is a proposed SIP call under section 110(k)(5) for SIP provisions meeting the requirements of section 110(a)(2)(D) for the 1-hour ozone NAAQS, coupled with a proposed requirement under section 110(a)(1) for submission of SIP provisions meeting the requirements of section 110(a)(2)(D) for the 8-hour ozone NAAQS. The EPA bases this action on a technical analysis as to whether the entire $NO_X$ emissions inventory of an individual upwind State contributes significantly to an ozone nonattainment problem downwind. If EPA concludes that the $NO_X$ emissions from that State make such a significant contribution, EPA will require the State to submit SIP provisions that limit the State's $NO_X$ emissions to the level mandated by EPA, but through any combination of measures affecting any sector of the inventory chosen by the State. If the State does not make the required submission, EPA may, among other things, promulgate a FIP in accordance with section 110(c).

By comparison, a section 126 petition, by the terms of section 126(b)–(c), is limited to upwind major stationary sources and not other sectors of the upwind emissions inventory. Moreover, a section 126 petition may seek a finding concerning upwind sources in more than one State. Further, if EPA grants the petition, it is EPA, and not the States, that promulgates direct controls for the major sources.

The EPA's response to section 126 petitions would bear relevance to today's action. The section 126 petitions and section 110(k)(5)/110(a)(1) action both require technical analysis of whether upwind sources contribute significantly to a downwind nonattainment or maintenance problem. However, EPA's section 110(k)(5)/110(a)(1) action results in a mandate for the States to submit SIP revisions that conform to only minimum guidance provided by EPA. On the other hand, the section 126 petitions, if granted, would result in EPA selection and imposition of controls directly on major stationary sources. These controls could provide a template for the SIP provisions the States must include in their rulemaking response to EPA's section 110(k)(5)/110(a)(1) rulemaking or, if necessary, a FIP.

EPA believes that both the 110 process as outlined and 126 petition processes are aimed at addressing regional transport of ozone forming pollutants and can be fully coordinated. The 110 process outlined provides the potential to deal comprehensively with

[3] Letter of January 29, 1997 from Jeffrey C. Smith, Executive Director, Institute of Clean Air Companies, to Docket No. A–95–28: Acid Rain Program, Nitrogen Oxides Emission Reduction.

transported pollutants that contribute significantly to downwind nonattainment, and importantly, allows individual States to make choices about cost-effective source controls best fitting their unique State situations. The 126 petition process provides assurance to petitioning States that upwind sources of air pollution will be addressed in a timely manner. Thus, each of these processes may provide important and complementary tools to address the regional ozone transport problem.

Over the next several months, EPA will be working with the affected States to ensure these two processes are fully coordinated. This will provide maximum certainty for State and business planning requirements. The EPA's goal in this effort will be to ensure that States achieve the air quality reductions EPA determines through rulemaking are necessary to address regional transport while providing the maximum flexibility to those States in identifying the appropriate means to meet those goals.

*F. OTAG Process*

The OTAG has completed the most comprehensive analysis of ozone transport ever conducted. The process has resulted in more technical information being gathered and more modeling and monitoring analyses on regional ozone transport than ever before. The OTAG process was fundamentally different from previous efforts undertaken by the Federal Government and the States to assess and solve air pollution problems. What was unique about the multistate, multistakeholder OTAG process is that for the first time, the Federal Government has looked to the States involved to provide the necessary technical information and to aid in determining an outcome which has local, regional and national implications.

The OTAG was organized into a number of subgroups and work groups that included members from the States, EPA, industry and environmental groups. The OTAG's Policy Group, comprised of the State Environmental Commissioners, provided overall direction to its subgroups for the assessment of ozone formation and transport, as well as the development of control strategies that will reduce concentrations of ozone and its precursors. The subgroups within OTAG addressed issues relating to emissions inventories, monitoring, modeling, and evaluated the availability, effectiveness, and costs of potential national, regional and local air pollution control strategies. Specific issues such as trading and market-based incentives were also addressed.

The OTAG's initial meetings were on May 18, 1995, in Reston, VA, and June 19, 1995, in Washington, DC. The OTAG continued to meet regularly for 2 years until their final meeting in Washington, DC on June 19, 1997. The goal of OTAG was to:

> * * * identify and recommend a strategy to reduce transported ozone and its precursors which, in combination with other measures, will enable attainment and maintenance of the national ambient ozone standard in the OTAG region. A number of criteria will be used to select the strategy including, but not limited to, cost effectiveness, feasibility, and impacts on ozone levels. (1)

To meet its goal, OTAG used technical information from air quality analyses and photochemical modeling. The OTAG modeled three rounds of emission reduction scenarios and strategies, including varying control measures geographically. The first round of modeling was performed during September and October 1996 and provided an initial evaluation of possible OTAG emission reduction scenarios. The second round was performed during November and December 1996 and refined the emission reduction level for the strategies. The third round was performed during January through March 1997 and evaluated the geographic applicability of the OTAG strategies. These geographic modeling runs provided information on applying different levels of controls on utilities and nonutility point sources at incremental steps. Round-3 also included a limited number of additional modeling runs needed to address comments made by a number of States related to the geographical boundaries of the zones defined for round-3 modeling. The OTAG modeling results are discussed in section II, Weight of Evidence Determination of Significant Contribution, and are also available on the OTAG webpage. This modeling, along with other OTAG-generated information, provided the technical information necessary to make recommendations to the Policy Group and to EPA on what is needed to meet the OTAG goal. The EPA received OTAG's final recommendations on July 8, 1997. These recommendations are included in Appendix B.

## II. Weight of Evidence Determination of Significant Contribution

*A. Introduction*

This section documents the technical information and analyses for the factors concerning emissions and contributions to ambient air quality that EPA uses to determine which States in the OTAG domain make a significant contribution to nonattainment in downwind States.[4] To a large extent, this assessment is based upon the results of OTAG modeling and air quality analyses as well as information from other non-OTAG modeling studies. The OTAG modeling available for this analysis includes a set of initial emissions sensitivity runs, the regional strategy runs in rounds 1, 2, and 3, and the geographic sensitivity runs performed to support the design of strategies in round-3.

*B. Background Technical Information*

The importance of interstate transport to the regional ozone problem and contributions from upwind States to downwind States is supported by numerous studies of air quality measurements and modeling analyses. In general, ozone episodes can occur on many spatial and temporal scales ranging from localized subregional events lasting a day or 2, up to regionwide episodes lasting as long as 10–14 days. The frequency of localized versus regional episodes depends on the characteristics of the large-scale meteorological patterns which control the weather in a particular summer season. Local controls alone are not sufficient to reduce ozone during regionwide episodes since a substantial amount of ozone may be transported into the area from upwind sources. The National Research Council report, ''Rethinking the Ozone Problem in Urban and Regional Air Pollution'', (2) cites numerous studies of widespread ozone episodes during summertime meteorological conditions in the East. These episodes typically occur when a large, slow-moving, high pressure system envelopes all, or a large portion of, the Eastern United States. The relatively clear skies normally associated with such weather systems favor high temperatures and strong sunlight, which enhances the formation of high ozone concentrations. In addition, the wind flow patterns can lead to a build up of ozone concentrations and the potential for long-range ozone transport. Specifically, winds are generally light in the center of high pressure systems so that areas

[4] Under the two alternative interpretations of section 110(a)(2)(D) that EPA is proposing today, if upwind emissions meet the factors related to emissions and contribution to ambient air quality, EPA would conclude either that the emissions significantly contribute to a nonattainment problem, or the emissions may significantly contribute, depending on further analysis of other factors, including costs.

under the center may have near-stagnation conditions resulting in the formation of high ozone levels. As the high pressure system moves eastward, winds become stronger on the ''backside'' which increases the potential for these high ozone levels to be transported to more distant downwind locations. Over several days, the emissions from numerous small, medium and large cities, major stationary sources in rural areas, as well as natural sources, combine to form a ''background'' of moderate ozone levels ranging from 80 to 100 ppb (2) of which 30 to 40 ppb may be due to natural sources. Concentration levels in the range of 80 to 100 ppb and higher have also been measured by aircraft aloft, upwind of the Lake Michigan area (3), as well as the Northeast Corridor (4). Because this level of background ozone is so close to the NAAQS, even a small amount of locally-generated ozone will result in an exceedance.

The importance of the episodic meteorological conditions is heightened by the spatial distribution of emissions across the region. The EPA has examined the State total emissions and emissions density projected by OTAG to 2007, as described in section B.2, OTAG Strategy Modeling. Both of these measures of emissions (i.e., total and density) are important considerations for ozone formation. Total emissions indicate the amount of mass emitted by a State while emissions density indicates the degree to which those emissions are concentrated within the State and provides a way to compare emissions between geographically large and small States on a more equivalent basis. The State total emissions in Table II–1 indicate that there is no single State or group of adjacent States that stand out as the major contributors to the total manmade emissions in the OTAG region. Rather, many States in the Midwest, Northeast and Southeast have high levels of emissions. For example, Illinois, Indiana, Ohio, Kentucky, Michigan, Pennsylvania, New York, Alabama, Georgia, Florida, North Carolina and Tennessee each have total $NO_X$ emissions exceeding 1000 tons per day. Even some other smaller States like Connecticut, Delaware, Maryland, Massachusetts, and Rhode Island, along with the District of Columbia, have a high spatial density of $NO_X$ emissions as indicated in Table II–2. Thus, considering the distribution of emissions, a broad range of emissions from many States contribute to the regional background ozone during episodic meteorological conditions. In this situation, there is a cumulative effect in that the thousands of stationary sources and millions of motor vehicles throughout the OTAG region collectively cause downwind contributions as they generate emissions and those emissions interact over multiple days.

1. OTAG Modeling Process

As described in the OTAG Modeling Protocol (5), state-of-the-science models and data bases were used in OTAG for simulating the physical and chemical processes involved in the formation and transport of ozone and precursor species over multiday episodes and regional scales. As such, the OTAG modeling system provides the most complete, scientifically-credible tools and data available for the assessment of interstate transport. All of the OTAG model runs were made for an area covering a large portion of the Eastern United States, as shown in Figure II–1. This area includes all or portions of 37 States, the District of Columbia and southern Canada. In general, the OTAG ''modeling domain'' (*i.e.*, OTAG region) was set large enough to encompass the widespread spatial extent of high ozone levels measured during multiday episodes in the eastern half of the United States. As such, the domain is designed to handle the synoptic (*i.e.*, large) scale meteorological conditions associated with regional transport and to include the major emissions source areas in the East. The horizontal grid configuration used by OTAG (see Figure II–1) includes a ''Fine Grid'' at 12 km resolution ''nested'' within a ''Coarse Grid'' at 36 km resolution. The size and location of the ''Fine Grid'' was determined based on the location of areas with high ozone concentrations, the geographic variations in emissions density, the meaningful resolution of some model inputs, computer hardware limitations, and model run times. As described in section B.3, OTAG Geographic Modeling, OTAG applied different levels of controls in the ''Fine Grid'' versus the ''Coarse Grid'' as part of the round-3 modeling.

Four specific episodes were selected by OTAG for model simulations in order to provide information on a range of meteorological conditions which occur during periods of elevated ozone levels. These episodes are: July 1–11, 1988; July 13–21, 1991; July 20–30, 1993 and July 7–18, 1995. Each of these episodes represents somewhat different episodic characteristics in terms of transport patterns and the spatial extent of high ozone concentrations in the East (6). The 1988 and 1995 episodes featured high ozone concentrations in the Northeast, Midwest, and Southeast with wind regimes that provided the meteorological potential for intra- and inter-regional transport. During the 1991 episode, high ozone was confined mainly to the northern portion of the OTAG domain, whereas the 1993 episode was a ''Southeast'' episode with relatively low ozone levels outside this region. It should be noted that none of the OTAG episodes include extensive periods of high ozone in the far western portions of the domain nor in areas along the gulf coast.

As part of OTAG, an objective evaluation of model predictions was conducted for each of these four episodes in order to determine the performance of the modeling system for representing regional ozone concentration levels. This evaluation focused on a number of statistical metrics comparing predicted ozone to ground-level ozone measurements (7). The results indicate generally good agreement between simulated and observed values. Most importantly, areas of predicted high ozone correspond to areas of observed high ozone. However, a few relatively minor concerns were found, such as:

- A tendency to underestimate concentrations in the North and overestimate concentrations in the South;
- Concentrations at night are somewhat underestimated relative to daytime predictions;
- Low observed concentrations tend to be overestimated and higher observed values tend to be underestimated; and
- Concentrations at the start of the episode tend to be underestimated with a tendency for concentrations at the end of the episode to be overestimated.

The success of the model for predicting pollutant concentrations aloft is also important from a transport perspective. During the day, when the atmosphere is ''well mixed,'' ground-level ozone values can serve as a good measure of both local formation and transport. However, at night, ozone is depleted in a very shallow layer near the ground due to deposition and nighttime chemical reactions. Thus, during the overnight and early morning, ground-level measurements and predictions do not adequately reflect pollutant transport. Aircraft-measured pollutant data and model predictions during these periods indicate moderate to high levels of ozone aloft which can then mix down during the day and further elevate ground-level concentrations. A limited amount of measured data aloft are available from non-OTAG field studies for several of the days in the 1991 and 1995 episodes. An initial comparison of these data to the model predictions (6) indicates that model performance aloft is not as good as for ground-level ozone. In general, the model tends to underestimate ozone aloft. This suggests that the model may somewhat underestimate the amount of ozone transport aloft, especially overnight into the early morning hours. Thus, the contribution of upwind source regions to ozone levels in downwind areas may actually be greater than estimated by the model.

2. OTAG Strategy Modeling

The OTAG strategy modeling was conducted in several phases. In each phase, the effects on ozone[5] of various changes in emissions were examined relative to a future-year baseline. This baseline reflects the projection of emissions from 1990 to 2007. Included in the 2007 baseline are the net effects of growth and specific control programs prescribed in the 1990 Amendments. The control measures included in the 2007 baseline are listed in Table II–3. Overall, domainwide emissions of $NO_X$ in the 2007 baseline are approximately 12 percent lower than 1990 while emissions of VOC are approximately 20 percent lower. The procedures for developing the 1990 base inventory and the 2007 baseline are described by Pechan (8). The key findings (6) from comparing the model predictions for the 2007 baseline to the 1990 base case scenario are:

- Ozone levels are generally reduced across most of the region, including nonattainment areas;
- Some increases in ozone are predicted in areas where higher economic growth is expected to occur, especially in the South;
- Ozone levels aloft along regional ''boundaries'' are reduced, but average concentrations above 100 ppb and peak concentrations above 120 ppb are still predicted on several days; and
- Ozone concentrations above the 1-hr and/or 8-hr NAAQS may still occur in the future under similar meteorological conditions in many of the counties currently violating either or both of these NAAQS.

The 2007 baseline emissions were reduced in an initial set of sensitivity modeling performed to assess several broad strategy-relevant issues. All of these model runs involved ''across-the-board'' emissions reductions (i.e., no source category-specific reductions). The results (6) of these simulations are as follows:

- Regional reductions in $NO_X$ emissions decrease ozone across broad portions of the region including ozone in areas violating the NAAQS;
- Regional reductions in VOC emissions decrease ozone in and near the core portions of urban areas with relatively small regional benefits;
- Both elevated and low-level $NO_X$ reductions decrease ozone concentrations;
- $NO_X$ reductions can produce localized, transient increases in ozone (mostly due to low-level, urban $NO_X$ reductions) in some areas on some days; most increases occur on days and in areas where ozone is low (i.e., below the NAAQS);
- $NO_X$ plus VOC reductions lessen ozone increases in urban areas, but provide little additional regional benefits compared to $NO_X$-only reductions; and
- The magnitude and spatial extent of changes in 8-hour ozone concentrations are consistent with the changes predicted in 1-hour concentrations.

Based upon the findings of the sensitivity runs, OTAG subsequently developed and simulated source-specific regionwide control strategies in two rounds of modeling. These strategies were derived from a range of control measures applied to individual source categories of VOC and $NO_X$ (8). The controls were grouped into various levels of relative ''stringency'' as listed in Tables II–4a and II–4b. The round-1 and round-2 modeling consisted of strategies that contained various combinations of controls from the least (level ''0'') to most stringent (level ''3'') for each source category. The control levels and domainwide emissions associated with these strategies are given in Tables II–5a and II–5b.

The round-1 modeling was a ''bounding analysis'' with runs that ranged from the lowest level of control on all source categories (Run 1) to the highest level of control on all sources (Run 2). Runs 3 and 4b were included to isolate the effects of the most stringent OTAG controls on utilities only, versus this level of control on the other source categories. In the round-2 modeling, eight runs were simulated to examine the relative benefits of progressively increasing the level of control on utilities, under two alternative levels of control applied to area, nonroad and mobile sources. The results (6) of the round-1 and round-2 modeling are given in Table II–6.

The findings from the round-1 and round-2 OTAG strategy modeling which are particularly relevant to this analysis are:

- Clean Air Act programs will likely provide a reduction in ozone concentrations in many nonattainment areas; however, some areas currently in nonattainment will likely remain nonattainment in the future and new 8-hr nonattainment and/or maintenance problem areas may develop as a result of economic growth in some areas;
- $NO_X$ reductions from elevated and low-level sources are both beneficial when considered on a regional basis; and
- Further mitigation of the ozone problem will require regional $NO_X$-oriented control strategies in addition to local VOC and/or $NO_X$ controls necessary for attainment in individual areas.

3. OTAG Geographic Modeling

In the round-1 and round-2 strategy modeling, controls were applied across the entire domain. In round-3, controls were applied on a geographic basis in order to assess the relative effects of different strategies in various portions of the region. Prior to developing these strategies, a series of sensitivity tests was conducted by OTAG to provide information on the spatial scales of transport in order to help determine where to apply various levels of control. The most relevant tests are the ''subregional'' modeling and the ''rollout'' modeling. The base case for these tests was the 2007 baseline scenario. In the subregional modeling, the domain was divided into the 12 subregions shown in Figure II–2. For one set of subregional modeling, all anthropogenic emissions were eliminated from each subregion, individually in separate model runs. These runs, called the ''zero-out'' subregional scenarios, were performed for the 1988 and 1995 episodes. In a second set of subregional modeling, emissions were reduced, but not eliminated in each subregion. The level of reductions were 60 percent for elevated point-source $NO_X$ emissions, 30 percent from all other sources of $NO_X$, and 30 percent from all sources of VOC. These runs are referred to as the ''5c'' subregional scenarios. The ''5c'' scenarios were run for most, but not all, subregions for the 1988, 1991 and 1995 episodes. In addition to looking at individual subregions, there were runs for 1988 and 1991 which applied the ''5c'' reductions in subregions 5, 6, and 9 (Figure II–2) combined in order to determine the relative impacts of expanding the size of the area of emissions reductions.

In the rollout modeling, the ''5c'' emissions reductions were applied first within selected areas and, then, outward

[5] Although the OTAG assessments focussed on 1-hour concentrations, the impacts on 8-hr average concentrations were found to be similar to these for 1-hour values.

in incremental steps (rollouts) of approximately 200 km from these areas, in subsequent runs. Three major nonattainment areas in the region (Atlanta, the Lake Michigan Area, and New York City) were selected by OTAG for this type of modeling.

The results (6) of the OTAG geographic modeling indicate the following:

- Emissions reductions in a given multistate region/subregion have the most effect on ozone in that same region/subregion;
- Emission reductions in a given multistate region/subregion also affect ozone in downwind multistate regions/subregions;
- Downwind ozone benefits decrease with distance from the source region/subregion (i.e., farther away, less effect);
- Downwind ozone benefits increase as the size of the upwind area being controlled increases, indicating that there is a cumulative benefit to extending controls over a larger area; and
- Downwind ozone benefits increase as upwind emission reductions increase (the larger the upwind reduction, the greater the downwind benefits).

The round-3 strategies were based in large part on the results of the geographical sensitivity runs. The cornerstone of round-3 was a set of geographic ''zones'' (see Figure II–3) which was used to vary the level of control across the OTAG region. For the most part, OTAG focussed the round-3 controls on zones in the ''Fine Grid.'' This was based upon an analysis indicating that, in general, the greatest potential for regional transport leading to inter-state impacts of concern occurs within the ''Fine Grid'' portion of the OTAG region. The individual zones were used to differentiate the impacts of controls in and close to the three major 1-hour nonattainment areas of the ''Fine Grid'' (i.e., the Northeast Corridor, Atlanta, and Chicago/Milwaukee) versus controls in zones farther upwind of these areas. Specifically, in round-3 various levels of utility and nonutility controls were applied by zone in different runs. The level of control for each strategy is given in Table II–7. In general (except for Run F), the round-3 runs progressively increase the level and spatial extent of utility and nonutility controls starting with the reference run (Run A) through the most stringent run (Run I). In addition, there were a number of supplemental round-3 runs (6) performed using a modified version of the zones. The most relevant of these were Runs CA and CB which altered the configuration of zones II, III, and IV to correspond more closely to the borders of the OTR.

The results (6) of the OTAG round-3 runs indicate the following:

- The greater the emissions reductions the greater the ozone benefits (Run I was the most effective strategy and Run A the least);
- There was no bright-line between the incremental application of controls nor any leveling off of benefits with the more stringent controls;
- Increasing the spatial extent of emissions reductions increases the amount and spatial extent of ozone benefits downwind; areas farther upwind may need a higher level of control to have a given effect in a particular downwind area;
- In general, emissions reductions in a given zone have the greatest effects within that zone; but there are also impacts on high ozone concentrations in other zones downwind;
- Emissions reductions in zones I, III, and V are ''effective and necessary'' (6) to reduce ozone in the Lake Michigan area, the Northeast Corridor, and Atlanta, respectively which are the closest downwind areas to each of these zones;
- Emissions reductions in more distant zones also help reduce ozone in these three major nonattainment areas; emissions reductions in zone II benefit the Northeast Corridor and the Lake Michigan area; emissions reductions in zone IV benefit Atlanta and the Lake Michigan area;
- Emissions reductions in zones II and IV are also ''effective and necessary'' (6) to reduce ozone in ''problem areas'' within these zones (e.g., Birmingham, Nashville, Charlotte, Richmond, Louisville, and Cincinnati);
- When viewed on a regional basis, it may be ''difficult to geographically distinguish between control levels'' (6) because there are ozone problem areas in every zone within the ''Fine Grid'' and there are clearly interzonal impacts;
- Additional emissions reductions in ''Coarse Grid'' States ''are not very effective'' (6) in reducing high ozone levels downwind in problem areas of the ''Fine Grid''; and
- Although the OTAG assessments focused on 1-hour concentrations, the impacts on 8-hour average concentrations were found to be similar to those for 1-hour peak values, suggesting that ''a regional strategy designed to help meet'' the 1-hour NAAQS ''will also help meet'' the 8-hour NAAQS (6).

Overall, the findings from the OTAG sensitivity and strategy modeling indicate that:

- Areas of high ozone, both measured and predicted for the future, occur, or will occur, in most portions of the modeling domain;
- Several different scales of transport (i.e., inter-city, intra-state, inter-state, and inter-regional) are important to the formation of high ozone in many areas of the East;
- The greatest potential for inter-state and inter-regional impacts associated with transport occurs between States within the multistate ''Fine Grid'' area;
- A regional strategy focussing on $NO_X$ reductions across a broad portion of the region will help mitigate the ozone problem in many areas of the East;
- There are ozone benefits across the range of controls considered by OTAG; the greatest benefits occur with the most emissions reductions; there was no ''bright line'' beyond which the benefits of emissions reductions diminish significantly;
- Even with the large ozone reductions that would occur if the most stringent controls considered by OTAG were implemented, there may still remain high concentrations in some portions of the OTAG region;
- A regional $NO_X$ emissions reduction strategy coupled with local $NO_X$ and/or VOC reductions may be needed to enable attainment and maintenance of the NAAQS in this region.

It should be noted that urban-scale analyses will be necessary in order for States to develop local attainment plans. These analyses will take into account more geographically refined emissions and local meteorological factors, such as lake and sea breezes and/or topography. Urban-scale modeling is also necessary to more precisely evaluate the degree and extent of any $NO_X$ disbenefit.

4. Other Relevant Analyses

In addition to the OTAG modeling described above, the potential for regional ozone transport has been examined by the OTAG Air Quality Assessment Work Group using trajectory analyses, wind vector characterization, and statistical analyses of ozone measurements. The trajectory analyses (9) were used to identify a ''distance scale'' indicative of the 1- to 2-day transport distance of ozone and precursors. The results suggest that ozone-laden air may travel distances of 150 miles to 500 miles or more into and across the Midwest and Northeast. Analyses, as part of the Southern Oxidants Study (10), indicate that most southern episodes may be more closely linked to near-stagnation conditions and thus, shorter transport distances might be expected within the Southeast. Additional information on regional transport patterns comes from an analysis conducted by OTAG to characterize the regional wind flow patterns typically associated with high ozone in the Northeast, Southeast, and Midwest (9). These wind vectors (Figure II–4) indicate that regional episodes are typically associated with broad-scale anticyclonic (i.e., clockwise) flow regimes centered over the Ohio-Tennessee Valley area. Under these conditions, there are typically lighter winds and weaker transport within the South compared to other regions. However, the information also indicates the potential for transport from the South to other portions of the region. For example, in the Midwest, high ozone is generally associated with wind flows from States located to the south and southwest. For the Northeast, the data suggest a strong westerly flow favoring transport from States farther to the west.

Another method for estimating the potential range of transport was developed by Rao (11) based on correlating daily ambient ozone measurements between monitoring sites for the period 1985 through 1994 for several nonattainment areas (i.e., Atlanta, Washington DC, Cincinnati, Pittsburgh and Chicago). The analysis indicates the presence of ''ozone clouds'' surrounding these areas which are likely the result of pollutant transport, spatial patterns in emissions, and weather conditions conducive to ozone formation. The spatial extent of these ''ozone clouds'' is on the order of 300 miles or more, extending from the central portion of the nonattainment area along the axis of the major transport direction.

The importance of mitigating transported ozone for solving the nonattainment problem for many cities in the East has been examined as part of ongoing urban scale modeling analyses by various State agencies. In urban scale modeling, transport into the nonattainment area is represented by specifying pollutant concentrations along the sides and top of the modeling domain. These ''boundary condition'' concentrations reflect ozone transport into the urban area at the surface and aloft. As such, incoming ozone (as well as precursor chemical species) moves into the urban area and mixes with local emissions to increase the formation of ozone. The available urban scale modeling work is summarized in a report commissioned by OTAG (12). It should be noted that these modeling analyses were conducted to address 1-hour attainment problems. Still, the information is expected to be generally applicable to 8-hour ozone concentrations as well. The findings from this report which are relevant include:

- New York City—a reduction in transport into the New York area associated with upwind emissions reductions on the order of 75 percent for $NO_X$ and 25 percent for VOC along with local VOC and $NO_X$ reductions may be needed for attainment in New York;
- Philadelphia—transport appears to be a major component in peak ozone concentrations in the Philadelphia domain, contributing 90 percent to the peak in one of the scenarios modeled;
- Lake Michigan—transported ozone levels coming into the Lake Michigan area contribute 40–60 percent to the peak concentration downwind of urban centers in this area; background concentrations in the range of 80–100 ppb may need to be reduced to around 60 ppb for attainment in this region;
- Southeast Michigan—ozone transport into this area ''contributed significantly to the simulated peak ozone concentrations on many of the episode days;
- St. Louis—predicted ozone concentrations in this area are sensitive to incoming levels of ozone/precursor transport;
- Atlanta—the amount of ozone transported into the area was found to be one of the factors contributing to the difficulty for this area to demonstrate attainment;
- Richmond—transported ozone contributes to predicted high ozone on certain episode days, and regional controls on upwind sources may be necessary to reduce ozone in this area during some of the episode days modeled;
- Charlotte—transported ozone appears to be a ''significant component'' of ozone in the area during some episodes, particularly with winds from a northerly direction; and
- Nashville—transported ozone was predicted to be a major contributor to ozone in this area on 1 of the 2 high ozone days modeled.

In addition to the preceding qualitative analyses, there are several non-OTAG regional modeling analyses which provide information on interstate contributions due to transport. First, modeling by EPA for the OTC, using the Regional Oxidant Model (ROM), examined the impact of controls outside the OTR on ozone within this region (13). The results indicate that a 0.15 lb/MMBtu $NO_X$ emissions limit on certain stationary sources outside the OTR, together with other controls, would likely have the following effects within the OTR:

- Reductions of up to 15–18 ppb in daily maximum 1-hour ozone in the western part of the OTR, and
- Reductions of up to 6–9 ppb along the Northeast Corridor from Washington, DC to northern New Jersey.

Second, a new modeling technique, the ''Comprehensive Air-quality Model with extensions'' (CAMx), has been developed (14) in an attempt to identify the contribution of upwind source areas to specific downwind locations. The Ozone Source Apportionment Technology (OSAT) in CAMx was used by the Midwest Ozone Group (MOG) to quantify the contributions of emissions from upwind sources on high ozone concentrations in the Northeast Corridor and the Lake Michigan area. The CAMx analysis modeled the OTAG July 1991 episode only and considered 1-hour ozone predictions above two cut-points: 100 ppb and 120 ppb. Also, the MOG CAMx report (14) did not examine the contributions from emissions in individual upwind States, but rather, the analysis examined the impacts of emissions from concentric geographic ''rings'' upwind of the Northeast Corridor and Lake Michigan areas. In general, the results are consistent with the OTAG geographic sensitivity modeling in that much of the contribution to ozone in a particular multistate area comes from sources within that same multistate area, considerable contributions also come from sources outside the multistate area, and anthropogenic $NO_X$ emissions in upwind areas contribute much more to transport than upwind VOC emissions. Some of the findings from the CAMx analysis relative to the contributions to high ozone in the Northeast Corridor and Lake Michigan area are as follows:

- On average, nearly 50 percent of the high ozone levels in these two areas come from upwind (mostly NOx) sources;
- On average, for the Northeast Corridor a large portion (90 percent) of the contribution from upwind sources comes from States to the west and south within approximately 390 km of the Corridor (this may include all or portions of States as far upwind as Ohio, North Carolina, and West Virginia); nearly all (95 percent) of the contribution comes from upwind sources within approximately 570 km of the Corridor (this may add portions of Kentucky, Tennessee, and South Carolina as potential upwind contributors);
- On average, for the Lake Michigan area a large portion (90 percent) of the contribution from upwind sources

comes from States to the west and southwest within approximately 650 km of this area (this may include all or portions of States as far as Iowa, Minnesota, Missouri, and Tennessee); nearly all (95 percent) of the contribution comes from upwind sources within approximately 770 km of the Lake Michigan area (this adds portions of Arkansas, Kansas, Nebraska, North Dakota, and South Dakota); and

- Transport distances for individual high ozone days are even longer, in some cases, than the episode averages indicated above.

A third non-OTAG modeling study that is relevant to this assessment was performed by a group of northwest OTAG States (Iowa, Minnesota, Nebraska, North Dakota, and South Dakota) (15). One part of this study included modeling similar to the OTAG subregional modeling, except that ''zero-out'' and ''5c'' emissions reductions were applied in various combinations in these States only, using the OTAG July 1995 episode. In these runs, emissions in all other States in the OTAG region were simulated with the 2007 baseline emissions. The modeling results were analyzed in terms of the contributions of emissions in these five States to daily maximum 1-hour ozone above 100 ppb in downwind areas. The results indicate the following:

- Emissions in Minnesota, Nebraska, North Dakota, South Dakota, and the ''Coarse Grid'' portion of Iowa (see Figure II–1) collectively contribute less than 2 ppb to downwind ozone above 100 ppb; and
- Emissions from these States including the ''Fine Grid'' portion of Iowa, contribute in the range of 2 to 6 ppb to ozone above 100 ppb in grid cells downwind near Lake Michigan, Detroit, and Cincinnati.

Collectively, the studies cited here indicate that:

- The meteorological conditions and air trajectories during regional-scale, high ozone episodes provide the potential for multistate ozone transport;
- Ambient measurements indicate that ozone episodes can have a large multistate spatial extent within which 1-to 2-day transport may occur;
- Examination of emissions data indicates that numerous sources of $NO_X$ may be contributing to high regional background ozone concentrations;
- State urban-scale modeling analyses for areas in various portions of the OTAG region indicate that transport from upwind areas is an impediment to attainment of the NAAQS;
- Regional modeling studies indicate contributions to high ozone in the Northeast Corridor and the Lake Michigan area may come from States as far away as 570 km and 770 km, respectively; and
- Non-OTAG multistate modeling indicates that emissions from States in the northwest portion of the ''Coarse Grid'' may not make large contributions to high ozone in downwind States elsewhere in the OTAG region.

*C. Technical Analysis of Significant Contribution*

1. Criteria for Determining Significant Contribution

Whether a contribution is ''significant'' depends on the overall context. There may be no single amount of contribution which could be considered as a bright line indicator of ''significant'' that would be applicable and appropriate in all circumstances. As described above, under one interpretation of the CAA's section 110(a)(2)(D), factors to be considered in determining whether a contribution is significant include:

- The level of emissions in the area upwind of a nonattainment area;
- The amount of the contribution (ppb above the level of the standard) made to the downwind nonattainment area;
- The transport distance between the upwind source area and the downwind problem area; and
- The geographic extent of the contribution downwind. For example, ozone is generally the result of emissions of $NO_X$ and VOC from hundreds of stationary sources and millions of vehicles, each of which is likely to be responsible for much less than 1 percent of the overall inventory of precursor emissions. A source or group of sources should not be exempted from treatment as a significant contributor merely because it may be a small part, in terms of total emissions, of the overall problem when all or most other contributors, individually, are also relatively small parts of the overall problem. This situation, in which a number of individual (and sometimes small) sources collectively cause a significant impact, is a major aspect of the contribution issue. The moderate-to-high ozone levels which cover broad regions are the result of emissions from millions of individual sources interacting over multiple days. The contribution to downwind nonattainment results from the cumulative contribution from all sources involved in this process. Given these issues, it is not appropriate to define a bright line test for ''significant contribution.'' Rather, EPA is using a ''weight of evidence'' approach, based on a range of information, for determining whether a State makes a significant contribution to downwind nonattainment. The EPA is also proposing a second, alternative interpretation to section 110(a)(2)(D), under which the weight of evidence approach incorporates other factors, including the relative costs of controlling downwind emissions, as described in section I.D.2.b., Significant Contribution to Nonattainment.

2. Overview of Technical Approach

The findings from the relevant background studies and the OTAG modeling results provide a basis for concluding that ozone transport results in interstate contributions to high ozone levels during multiday episodic conditions within portions of the OTAG region. An overview of the approach for analyzing this information in an assessment of States that make a significant contribution to downwind nonattainment is as follows:

- The air quality and modeling analyses cited in section B.4, Other Relevant Analyses, were considered in a qualitative manner to identify, from a regional perspective, States which may contribute to multistate transport;
- The results of the OTAG subregional modeling runs were used to quantify the extent that each subregion contributes to downwind nonattainment for the 1-hour and/or 8-hour NAAQS; and
- State $NO_X$ emissions data were used to translate the findings from the subregional modeling to a State-by-State basis.

The specific model runs used in this analysis include the ''zero-out'' runs in which all anthropogenic emissions from individual subregions (comprised of portions of small groups of States) are removed, and the contributions to downwind ozone are predicted. This set of model runs was chosen since it provides an appropriate way to quantify the contribution of the full set of anthropogenic emissions in one area to ozone concentrations in another. As described in section B.2, OTAG Strategy Modeling, zero-out runs were made for the 1988 and 1995 episodes only. The results for both episodes were combined in this assessment. Also, the analysis of emissions data focussed on $NO_X$ since the OTAG and non-OTAG modeling results indicate that $NO_X$ emissions reductions lower ozone transport across broad portions of the OTAG region, whereas, VOC emissions reductions have primarily local benefits.

The air quality, modeling, and emissions information was used collectively to determine, based on the weight of evidence, which States make a significant contribution to downwind nonattainment.

3. Identification of Ozone ''Problem Areas''

As described above, in order to quantify the contribution from upwind States to nonattainment downwind, EPA identified areas which currently have a 1-hour and/or 8-hour ozone nonattainment problem and are expected to continue to have a nonattainment problem in the future, based on modeling. In addition, EPA considered areas which may have a future maintenance problem for the 8-hour NAAQS. For current nonattainment areas, EPA used air quality data for the period 1993 through 1995 to determine which counties are violating the 1-hour and/or 8-hour NAAQS. These are the most recent 3 years of fully quality-assured data which were available in time for this assessment. A list of these counties is provided in Tables II–8a and II–8b. The EPA is reviewing more recent air quality data for 1996 and 1997. In the event that these data alter the results of this assessment in any meaningful way, EPA will make the appropriate adjustments to the findings. Concerning projected future nonattainment areas, EPA used the OTAG model predictions for the 2007 baseline, as described in section II.C.5, Approaches for Analyzing Subregional Modeling Data. For ease of communication, the technical discussions frequently use the term ''nonattainment'' to refer to these areas. It should be noted that this use of the term ''nonattainment'' in reference to a specific area is not meant as an official designation or determination as to the attainment status of the area.

4. Analysis of Air Quality, Trajectory, and Non-OTAG Modeling Information

The EPA examined the findings from the air quality, trajectory, and non-OTAG modeling analyses in section B.4. to identify certain States which may potentially contribute to nonattainment in downwind areas. First, EPA applied both the lower and upper ends of the OTAG transport distance scale (i.e., 150 miles and 500 miles (9)) to 1-hour nonattainment areas in the northern half of the OTAG region. Using the lower end of the transport scale indicates that the following States and Washington DC may potentially contribute to ozone in downwind nonattainment areas: Connecticut, Delaware, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Tennessee, Virginia, West Virginia, Wisconsin and Vermont. Using the upper limit of transport distance indicates that the following additional States may potentially contribute to downwind nonattainment areas: Alabama, Arkansas, Georgia, Iowa, Kansas, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Oklahoma and South Carolina. Also, examining the findings from the non-OTAG regional modeling results (13, 14, 15) indicates that collectively, a large portion of the contributions to high ozone in the Northeast Corridor and/or the Lake Michigan area may come from States as far upwind as: Missouri, North Carolina, Ohio, Tennessee and West Virginia.

5. Approaches for Analyzing Subregional Modeling Data

The subregional modeling runs provide a method to quantify the amount of contribution by upwind States to downwind nonattainment. Four approaches were included in the analysis of subregional modeling results. Approaches 1 and 2 were designed to address the contribution to 1-hour nonattainment and Approaches 3 and 4 the contribution to 8-hour nonattainment. Approaches 1 and 3 examine the contributions in areas which have both monitored and modeled nonattainment. Approaches 2 and 4 examine the contributions in areas with modeled nonattainment. The rationale for each approach is described below.

*a. Approaches for 1-Hour Nonattainment.* Approach 1 was designed to focus on contributions to areas that have an observed 1-hour ozone problem and in which the model predicts an ozone problem. In this regard, the analysis was restricted to those grid cells in the domain that had 1-hour daily maximum ozone predictions ≥125 ppb [6] in the 2007 baseline, and were within one of the counties currently violating the 1-hour NAAQS. However, the requirement that high ozone predictions spatially coincide with violating counties may be overly restrictive given the uncertainties in the modeled wind regimes associated with the regional nature of the meteorological inputs. Also, the analysis was limited to only two episodes, only one of which, July 1995, actually occurred during the 3-year period used to identify the violating counties. Another limitation of Approach 1 was that it excludes all grid cells that are over water and not touching any State land areas. This may be too restrictive since, in the real atmosphere, sea breeze and lake breeze wind flows can transport high ozone levels that occur over water back on-shore to affect coastal land areas. This meteorological process, often associated with high ozone along the shoreline of Lake Michigan and along the New England coast, is not adequately treated by the regional scale meteorological inputs used in OTAG. Thus, high concentrations predicted just offshore may be inappropriately excluded from the analysis. Approach 2 was designed to address these concerns. In this approach, all grid cells over land that had a 1-hour daily maximum ozone prediction ≥125 ppb in the baseline were included. Also included were grid cells with predictions ≥125 ppb over each of the Great Lakes and in a band 60 km (5 grid cells) wide along the East Coast.

*b. Approaches for 8-Hour Nonattainment.* The two approaches for assessing contribution for 8-hour nonattainment were similar in design to those used for 1-hour nonattainment. However, the inconsistency between the form of the 8-hour NAAQS, which considers 3 years of data, and the limited predictions available from the OTAG episodes introduced a complication to the analysis. Basically, it was not possible to use the model predictions in a way that explicitly matches the 3-year average of the 4th highest 8-hour form of the NAAQS. Instead, an analysis was performed to link the model predictions to the NAAQS as closely as possible. This analysis consisted of comparing the average 4th highest 8-hour concentrations, based on 3 years of ambient data, to the average 1st, 2nd, 3rd, and 4th highest 8-hour values using ambient data limited to the three most recent OTAG episodes (i.e., 1991, 1993, and 1995). The results of this analysis indicate that the average of the episodic 2nd highest 8-hour ozone concentration corresponds best, overall, to the average of the 4th highest 8-hour NAAQS.

Approach 3 is intended to focus on the contributions to areas that have an observed 8-hour ozone problem and where the model predicts an 8-hour ozone problem. The analysis for this approach was restricted to those grid cells in the domain that had an average (over the 1988 and 1995 episodes) 2nd high 8-hour ozone prediction ≥85 ppb in the 2007 baseline, and were within one of the counties currently violating the 8-

[6] Values above 124 ppb are considered to be exceedances of the 0.12 ppm 1-hour ozone NAAQS in view of the rounding convention established for monitoring data whereby ozone concentrations between 125 ppb and 129 ppb are rounded up to 0.13 ppm.

hour NAAQS. The same technical concerns and limitations discussed above for Approach 1 are also applicable to Approach 3. To address these concerns for the 8-hour analysis, Approach 4 was constructed to include all grid cells that had an average 2nd high 8-hour ozone prediction ≥85 ppb over land areas, the Great Lakes, and in the offshore waters, as in Approach 2 for the 1-hour NAAQS. In addition, by including all grid cells with predicted nonattainment in 2007, Approach 4 provides a way to consider areas which are currently measuring attainment, but which may become nonattainment for the 8-hour NAAQS in the future.

*c. Methods for Presenting 1-Hour and 8-Hour Assessments.* All of the approaches for both 1-hour and 8-hour nonattainment quantify the impacts of emissions in each subregion on ozone concentrations in downwind States (*i.e.*, States outside the particular subregion). It should be noted that the calculated contributions represent the impacts from individual upwind subregions and not the cumulative impacts from multiple subregions, which would be even greater in magnitude. In Approaches 2 (1-hour) and 4 (8-hour), grid cells off the East Coast were added to the totals of the adjacent States, whereas the impacts for areas over each of the Great Lakes were tabulated separately. In all cases, the ozone impacts were quantified by calculating the difference in predicted ozone between each subregional zero-out run and the 2007 baseline scenario. The contributions from emissions in each subregion to nonattainment in downwind States are summarized for all approaches in Tables II–9a and II–9b. This summary shows the contributions in terms of both the frequency of impacts and the number of downwind States impacted for specific concentration ranges, as described below. More detailed information including the contributions to individual States is provided in Tables II–10 through II–13, for Approaches 1 through 4, respectively. The contributions are grouped into one of six ranges: >2 to 5 ppb, >5 to 10, >10 to 15, >15 to 20, >20 to 25, and >25 ppb. A value of 2 ppb was chosen as the minimum level for this analysis following the convention generally used by OTAG for evaluating the impacts of emissions changes. As an example, Table II–10 shows the frequency of contributions from each subregion to nonattainment in downwind States for Approach 1. Note that the frequency of contributions for the 1-hour NAAQS is determined by tallying the total ''number of days and grid cells'' with impacts within the specified range. However, the frequency of contributions for the 8-hour NAAQS includes the total ''number of grid cells'' only. That is, the averaging procedure used to reflect the form of the 8-hour NAAQS results in a single ''average'' value for each grid cell, instead of values for each day modeled. In the following sections, Approach 1 and Approach 3 are referred to as the ''violating-county'' approaches, whereas Approach 2 and Approach 4 are referred to as the ''all grid-cell'' approaches for the 1-hour and 8-hour NAAQS, respectively. Also, as mentioned previously, the term ''nonattainment'' is used to refer to those areas (grid cells) which meet the criteria for a given approach. For example, in the analysis of Approach 1, ''nonattainment'' refers to those areas which have both measured violations and model predictions of 1-hour ozone ≥125 ppb.

6. Contributions to 1-Hour Nonattainment

The information from the subregional modeling analyses provided in Tables II–10 and II–11 were examined from both a ''receptor'' and ''source'' perspective. The results for the ''county-violation'' approach (Approach 1—Table II–10) and the ''all grid-cell'' approach (Approach 2—Table II–11) are both considered. Examining the data in Table II–10 indicates that many nonattainment areas are affected by multiple source areas. Considering the impacts on violating counties indicates, for example, that:

- Nonattainment areas in Pennsylvania receive contributions of more than 2 ppb from Midwest and Southeast States located in five subregions (2, 5, 6, 7, and 8) with contributions over 25 ppb from States in subregions 6 and 7;
- Nonattainment areas in New Jersey receive contributions of more than 2 ppb from Midwest States as well as adjacent States in six subregions (1, 2, 3, 5, 6, and 7) with contributions over 25 ppb from subregions 3 and 7;
- Nonattainment areas in Maryland receive contributions of more than 2 ppb from Midwest States and adjacent States in six subregions (1, 2, 3, 4, 5, and 6) with contributions in the range of 15 to 20 ppb from subregions 3 and 6;
- Nonattainment areas in Illinois receive contributions of 5 to 10 ppb from Southeast States in subregion 9; and
- Nonattainment areas in Georgia and Alabama receive contributions of 15 to 20 ppb from Midwest States in subregion 5 as well as from adjacent Southeast States in subregion 8.

Considering the ''all grid cell'' approach increases the frequency and magnitude of impacts, as would be expected. For example, the contributions from States in subregion 2 to nonattainment in Pennsylvania increase to the range of 10 to 15 ppb; contributions from Southeast States in subregion 9 in the range of 2 to 5 ppb are evident in nonattainment in Maryland; and Midwest States in subregions 1 and 5 contribute 5 to 10 ppb to nonattainment in Ohio.

As indicated above, the subregional modeling results were also examined in terms of the impact of each subregion on ozone in downwind States outside the particular subregion. The following results highlight the contributions of each subregion to downwind nonattainment (see Tables II–10 and II–11). Results are presented for the ''violating county'' approach (Approach 1) and supplemented with results from the ''all grid-cell'' approach (Approach 2) to the extent that this later approach adds key information to the findings.

*Subregion 1* (portions of Illinois, Wisconsin, Indiana, and Iowa): emissions in this subregion contribute 2 to 5 ppb on numerous occasions to nonattainment in violating counties in four States along the Northeast Corridor having serious or severe nonattainment (i.e., Connecticut, Maryland, New Jersey, and New York); downwind contributions as high as 5 to 10 ppb are evident near Detroit over Lake St. Clair, as well as over Lakes Erie and Ontario based on the ''all grid-cell'' approach.

*Subregion 2* (portions of Michigan, Indiana, and Ohio): emissions in this subregion contribute 5 to 10 ppb to nonattainment in violating counties in five downwind States; contributions over 10 ppb are evident in seven downwind States from the ''all grid-cell approach.''

*Subregion 3* (portions of Pennsylvania, New York and Delaware): emissions in this subregion contribute over 2 ppb to violating counties in nine downwind States with contributions of 15 ppb or more in three States.

*Subregion 4* (New Jersey, Connecticut and portions of New York, Pennsylvania and Delaware): emissions from this subregion contribute more than 25 ppb on numerous occasions to three downwind States along the Northeast Corridor.

*Subregion 5* (portions of Illinois, Indiana, Kentucky, Missouri, and Tennessee): emissions from this subregion contribute 2 to 5 ppb to violating counties in three downwind States along the Northeast Corridor with contributions of over 10 ppb in three other downwind States in the region;

considering the ''all grid-cell'' approach shows contributions of over 20 ppb to the south in Alabama and 5 to 10 ppb over Lakes Erie and St. Clair.

*Subregion 6* (portions of Ohio, Indiana, Kentucky, Tennessee, West Virginia and Virginia): emissions in this subregion contribute over 5 ppb to violations in eight States (and as far downwind as Massachusetts with the ''all grid-cell'' approach); contributions over 15 ppb are predicted in two of the eight States.

*Subregion 7* (Maryland, Washington, DC, and portions of Delaware, North Carolina, Virginia and West Virginia): emissions in this subregion contribute more than 15 ppb to violating counties in downwind States along the Northeast Corridor with over 25 ppb contribution on numerous occasions to two of these States; the ''all grid-cell'' approach indicates contributions from this subregion to South Carolina as well as to Kentucky and Ohio.

*Subregion 8* (portions of North Carolina, South Carolina and Georgia): emissions in this subregion contribute 2 to 5 ppb to violating counties in four States including several which are relatively far downwind (i.e., Missouri and Illinois) with contributions over 15 ppb to one other State; considering the ''all grid-cell'' approach indicates contributions of over 10 ppb to two States along the Northeast Corridor.

*Subregion 9* (portions of Tennessee, Georgia, Alabama, Mississippi, North and South Carolina and Arkansas): emissions in this subregion contribute over 2 ppb to violating counties in four downwind States with contributions over 10 ppb in Indiana; contributions over 10 ppb are evident in three downwind States and far away as Lakes Michigan from the ''all grid-cell'' approach.

*Subregion 10* (Florida and portions of Mississippi, Alabama, Georgia and Louisiana): emissions in this subregion do not contribute above 2 ppb to violating counties in any other States; considering the ''all grid-cell'' approach indicates one occurrence of a contribution in the range of 2–5 ppb.

*Subregion 11* (portions of Texas, Louisiana, Arkansas and Oklahoma): emissions in this subregion contribute 2 to 5 ppb to violating counties in two downwind States.

*Subregion 12* (portions of Missouri, Iowa, Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Kansas and Oklahoma): emissions in this subregion contribute 2 to 5 ppb in violating counties in two downwind States with 5 to 10 ppb contributions also evident in one of these States (i.e., Michigan, including Lake Michigan).

The results presented in Tables II–10 and II–11, and discussed above, indicate that in general, large contributions to downwind nonattainment occur on numerous occasions even though the analysis was limited to only two episodes. Although the level of contribution varies from subregion to subregion, a consistent pattern is apparent. In view of the relatively high magnitude of the contributions, and/or the relatively high frequency of the contributions, and/or the distance downwind to which the contributions occur, and/or the geographic extent of the downwind contributions, EPA believes that emissions from subregions 1 through 9 make a marked contribution to 1-hour nonattainment in numerous downwind States. Contributions to downwind nonattainment were also evident from subregions 10, 11, and 12, although to a lesser magnitude and extent.

7. Contributions to 8-Hour Nonattainment

In general, the downwind contributions to 8-hour nonattainment are more geographically extensive than those for 1-hour nonattainment. This is not unexpected because there are many more violating counties for the 8-hour NAAQS and, likewise, the model predicts ''nonattainment'' over a much broader portion of the region. The following examples illustrate the extent and magnitude of contributions to violating counties (Approach 3—Table II–12) that are beyond what was found for the 1-hour assessment:

- Contributions to nonattainment areas in Pennsylvania from States in subregion 2 are over 25 ppb rather than 2 to 5 ppb;
- In addition to the contributions from States in subregions 1, 2, 3, 5, 6, and 7 (ranging up to 15 to 20 ppb from subregion 3), nonattainment areas in New Jersey also receive a 2 to 5 ppb impact from southeastern States in subregion 8;
- Nonattainment areas in Illinois receive contributions of 5 to 10 ppb from States to the east in subregion 6 and south in subregion 9;
- Nonattainment areas in Ohio receive contributions of 5 to 10 ppb from States in five subregions in the Midwest, Northeast, and Southeast (1, 3, 5, 7, 8, 9) with contributions over 10 ppb from States in subregion 5;
- Nonattainment areas in North Carolina receive contributions of 5 to 10 ppb from two subregions (7 and 9) with contributions of over 25 ppb from Midwest States in subregion 6; and
- Nonattainment areas in Tennessee receive contributions of 10 to 15 ppb from three subregions (5, 6, and 8) with 15 to 20 ppb contributed by Midwest States in subregion 6.

Highlights of the 8-hour contributions from a ''source'' perspective are given below based on the information in Tables II–12 and II–13. The following discussion is structured similar to that for the 1-hour nonattainment analysis in that results are presented for the ''violating county'' approach and supplemented with results from the ''all grid-cell'' approach.

*Subregion 1* (portions of Illinois, Wisconsin, Indiana, and Iowa): emissions in this subregion contribute over 25 ppb to nonattainment in Michigan with contributions of 5 to 10 ppb in Ohio as well as contributions of 2 to 5 ppb to six other States.

*Subregion 2* (portions of Michigan, Indiana, and Ohio): emissions in this subregion contribute 2 to 5 ppb to 16 States as far downwind as New Hampshire and Maine with contributions of 5 to 10 ppb or more in five States.

*Subregion 3* (portions of Pennsylvania, New York and Delaware): emissions in this subregion contribute 10 to 15 ppb to three States along the Northeast Corridor with contributions of 5 to 10 ppb in Massachusetts and New Hampshire.

*Subregion 4* (New Jersey, Connecticut and portions of New York, Pennsylvania and Delaware): emissions from this subregion contribute over 25 ppb to Rhode Island and Massachusetts with contributions of 15 to 20 ppb in Maine.

*Subregion 5* (portions of Illinois, Indiana, Kentucky, Missouri, and Tennessee): emissions from this subregion contribute 2 ppb or more to 13 States with contributions of 10 to 15 ppb in two States.

*Subregion 6* (portions of Ohio, Indiana, Kentucky, Tennessee, West Virginia and Virginia): emissions in this subregion contribute 5 to 10 ppb or more to 10 States with contributions of 15 ppb or more in two States.

*Subregion 7* (Maryland, Washington, DC, and portions of Delaware, North Carolina, Virginia and West Virginia): emissions in this subregion contribute 10 to 15 ppb or more to four States with contributions of 5 to 10 ppb as far downwind as Rhode Island and Massachusetts and 2 to 5 ppb in Maine.

*Subregion 8* (portions of North Carolina, South Carolina and Georgia): emissions in this subregion contribute 10 to 15 ppb to three States and 15 to 20 ppb to one of these States; multiple contributions of 2 to 5 ppb are predicted as far downwind as New Jersey.

*Subregion 9* (portions of Tennessee, Georgia, Alabama, Mississippi, North and South Carolina and Arkansas): emissions in this subregion contribute 5 to 10 ppb to six States with contributions of 10 to 15 ppb in two States.

*Subregion 10* (Florida and portions of Mississippi, Alabama, Georgia and Louisiana): emissions in this subregion contribute 2 to 5 ppb in two States and 5 to 10 ppb in one State.

*Subregion 11* (portions of Texas, Louisiana, Arkansas and Oklahoma): emissions in this subregion contribute 2 to 5 ppb in six States.

*Subregion 12* (portions of Missouri, Iowa, Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Kansas and Oklahoma): emissions in this subregion contribute 2 to 5 ppb in three States; considering the ''all grid-cell'' approach indicates multiple contributions of 2 to 5 ppb downwind over Lake Michigan and Lake Erie.

The results indicate that the contributions to 8-hour nonattainment are very consistent with those for 1-hour nonattainment. Subregions 1 through 9 have a much greater magnitude, frequency, and geographic extent of contribution compared to the other subregions. Thus, based on this assessment, EPA believes that emissions from subregions 1 through 9 make a marked contribution to downwind nonattainment for the 8-hour NAAQS. In fact, the extent of contributions from most of these subregions (i.e., 1 through 9) is even larger for 8-hour nonattainment while the contribution from the other subregions (i.e., 10, 11, and 12) still remains relatively low by comparison.

8. Assessment of State Contributions

The preceding air quality, trajectory, emissions, and modeling analyses provide a number of pieces of information for determining, based on the weight of evidence, which States make a significant contribution to downwind nonattainment. The assessment of the State contributions is divided into three parts. States which are wholly or partially contained within subregions 1–9 are considered first since emissions from these States make a marked contribution to downwind nonattainment for both the 1-hour and 8-hour NAAQS, based upon the subregional modeling. States which were not included in any of the OTAG subregions (i.e., some of the New England States) are considered second. States located in subregions 10, 11 and 12, which did not have a marked contribution to downwind nonattainment for either the 1-hour or 8-hour NAAQS, are discussed last.

The subregional modeling results indicate that emissions from States in subregions 1 through 9 produce large downwind contributions in terms of the magnitude, frequency, and geographic extent of the downwind impacts. In addition, nonattainment areas within many States in the OTAG region receive large and/or frequent contributions from emissions in these subregions. The EPA believes that the following States whose emissions are wholly or partially contained within one or more of these subregions (i.e., Alabama, Connecticut, Delaware, Washington DC, Georgia, Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin) is making a significant contribution to downwind nonattainment. In addition to the marked levels of contributions described above, this finding is based on:

- OTAG strategy modeling and non-OTAG modeling indicates that $NO_X$ emissions reductions across these States would produce large reductions in 1-hour and 8-hour ozone concentrations across broad portions of the region including 1-hour and 8-hour nonattainment areas;
- The air quality, trajectory, and wind vector analyses indicate that these States are upwind from nonattainment areas within the 1- to 2-day distance scale of transport;
- These States form a contiguous area of manmade emissions covering most of the core portion of the OTAG region;
- 11 of the States that are wholly within these nine subregions (i.e., Illinois, Indiana, Kentucky, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia) have a relatively high level of $NO_X$ emissions from sources in their States; these States are ranked in the top 50 percent of all States in the region in terms of total $NO_X$ emissions and/or have $NO_X$ emissions exceeding 1000 tons per day, as indicated in Table II–1;
- States wholly within subregions 1 through 9 with lesser emissions (i.e., Connecticut, Delaware, Maryland) and Washington, DC have a relatively high density of $NO_X$ emissions, as indicated in Table II–2;
- For the nine States that are only partially contained in one of subregions 1 through 9 (i.e., Arkansas, Iowa, Michigan, Mississippi, Missouri, Alabama, Georgia, Wisconsin, and New York) the State total $NO_X$ emissions in Table II–1 as well as each State's contribution to $NO_X$ emissions in the subregions (see Tables II–14a and II–14b) indicate that six of these States (i.e., Michigan, Missouri, Alabama, Georgia, Wisconsin, and New York) each have: $NO_X$ emissions that are generally more than 10 percent of the total $NO_X$ emissions in one of these subregions, and either $NO_X$ emissions in the top 50 percent among all States, and/or a majority of the State's $NO_X$ emissions are within one of these subregions.

For the New England States that were not included in any of the OTAG zero-out subregions (i.e., Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont), State emissions data indicate that both Massachusetts and Rhode Island have a high density of $NO_X$ emissions (see Table II–2). Also, the trajectory and wind vector analyses indicate that these States are immediately upwind of nonattainment areas in Maine and New Hampshire. Thus, EPA believes that these two States (i.e., Massachusetts and Rhode Island) also make a significant contribution to downwind nonattainment for both the 1-hour and 8-hour NAAQS.

In summary, based on the weight of evidence, EPA believes that the 22 States plus the District of Columbia's consolidated metropolitan statistical area which make a significant contribution to downwind nonattainment for both the 1-hour and 8-hour NAAQS are:

Alabama,
Connecticut,
Delaware,
District of Columbia,
Georgia,
Illinois,
Indiana,
Kentucky,
Maryland,
Massachusetts,
Michigan,
Missouri,
New Jersey,
New York,
North Carolina,
Ohio,
Pennsylvania,
Rhode Island,
South Carolina,
Tennessee,
Virginia,
West Virginia,
Wisconsin.

It should be noted that under EPA's alternative interpretation of section 110(a)(2)(D), these areas would be determined to significantly contribute to nonattainment problems downwind only after consideration of additional factors, including the respective costs of controls on emissions in upwind and downwind areas, to the extent this information is at least qualitatively available. Those additional factors, discussed in section II.D. below, leads EPA to propose to conclude that these areas contribute significantly under this interpretation as well.

For the nine States in the OTAG region which are wholly within subregions 10, 11, and 12 (i.e., Florida, Kansas, Louisiana, Minnesota, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas), the OTAG and non-OTAG modeling information indicates that emissions from these States make at most a relatively small contribution to downwind nonattainment. Also, most of these States are relatively distant from many of the downwind nonattainment areas in the OTAG region and have a relatively low amount of manmade $NO_X$ emissions and/or $NO_X$ emissions density. Thus, as discussed in section VI, States Not Covered By This Rulemaking, the weight of evidence available does not support a finding that these States make a significant contribution to downwind nonattainment.

*D. Comparison of Upwind and Downwind Contributions to Nonattainment and Costs of Controls*

Important parts of EPA's determination of whether, and to what extent, to require controls on upwind $NO_X$ emissions that are linked to regional transport are comparing the contribution to downwind nonattainment problems of upwind $NO_X$ emissions as opposed to local, downwind $NO_X$ or VOC emissions; as well as comparing the costs of achieving downwind ozone reductions through upwind emissions reductions, as opposed to through downwind emissions reductions. Depending on the interpretation for section 110(a)(2)(D), the relative downwind contribution and the respective costs are either a factor in the determination of what emissions limitations constitute adequate mitigation of that contribution, or they are a factor in the significant contribution test.

Under the CAA requirements, downwind nonattainment areas are already obligated to implement significant controls. The provisions for classified areas mandate cascading control requirements so that higher classified areas must implement the same controls as lower classified areas, plus additional controls. These mandated controls generally are assumed in the OTAG/EPA modeling for the 2007 base case, as described above. These mandated controls may be viewed as the first increment of required controls that will bring the nonattainment areas into attainment. Today's proposal indicates that the next increment of controls should be the regional controls, for the reasons described below.

The EPA has developed preliminary data indicating that regional $NO_X$ emissions reductions in the OTAG region are a cost-effective means for reducing ozone levels in nonattainment areas downwind, compared to the costs of further reductions in local VOC and $NO_X$ emissions in those nonattainment areas. The EPA developed this information based on data from the recent regulatory impact analysis (RIA) for the new ozone standard. The EPA estimated the amount of VOC and/or $NO_X$ emissions reductions which would be needed for areas to attain the new standard as well as the air quality improvement resulting from a regional $NO_X$ strategy. The EPA then compared the potential cost of achieving attainment through a strictly local emission reduction approach alone to the cost of a regional $NO_X$ strategy.

The preliminary cost comparison was based on a simplified analysis that illustrates the potential control cost difference between a regionally-coordinated $NO_X$ strategy and a collection of local control strategies in projected ozone nonattainment areas. The analysis estimates that the existence of a 22-States and the District of Columbia (''23 jurisdiction'') regional $NO_X$ strategy has the potential to avoid from $2.9 to $12.8 billion dollars of the total annual cost that would be incurred under the alternative local control strategy. This ''cost avoided'' can be compared to the estimated annual cost of $2.8 billion for the regional $NO_X$ strategy assumed in the RIA to evaluate the relative efficiency of a regional strategy.

The EPA's analysis is based on two runs of the ROM. The first run, called the local control strategy (LCS) run, estimates ozone air quality based on a 2007 emissions projection assuming CAA-mandated controls, but not including a regional $NO_X$ strategy. The second run, called the regional control strategy (RCS) run, estimates ozone air quality based on a 2007 emissions projection with a regional $NO_X$ strategy. This strategy includes a regionwide emissions cap based on a 0.15 lb/MMBtu $NO_X$ limit on utilities and large industrial boilers, and the National Low Emission Vehicle (NLEV) program. While not identical to the regional control assumptions in this rulemaking, the RCS run is similar enough to offer insights for this cost comparison.

Using the LCS ROM runs, EPA estimated the potential local $NO_X$ and/or VOC emission reductions needed in 17 projected ozone nonattainment areas to attain the new 8-hour ozone standard. An additional 13 areas are also projected to be nonattainment under the LCS scenario, but emission reduction targets were not established for these areas. These additional areas are not included in this analysis; thus, the estimates presented in this analysis of the potential local control cost avoided due to the regional $NO_X$ strategy are likely underestimated.

Based on the ROM run for the RCS scenario, EPA estimated the effect of the regional $NO_X$ strategy on future ozone concentrations for the 17 areas. Seven of these 17 areas are projected to attain the new ozone standard as a result of controls in the RCS scenario. These 7 areas are given a 2007 RCS reduction target credit of 100 percent (i.e., further local reductions may not be needed for attainment). For the 10 remaining nonattainment areas, the RCS is estimated to be 32 percent effective [7] toward achieving the air quality attainment target relative to the LCS. This is based on a comparison of ROM predictions for the LCS and RCS scenarios versus the air quality target (0.08 ppm/8-hour/4th max ozone standard). Therefore, all remaining areas are given a 32 percent credit toward their respective VOC and/or $NO_X$ emission reduction targets. For the regional $NO_X$ strategy, the total avoided local VOC reductions are over 513,000 tons, and the total avoided local $NO_X$ reductions are nearly 767,000 tons. This analysis indicates that the regional $NO_X$ emissions reductions provide equivalent air quality benefits to a large portion of the local VOC and/or $NO_X$ emissions reductions which may be needed to attain in these areas. This finding weighs in favor of concluding that the regional $NO_X$ reductions are appropriate to mitigate the upwind contribution or, under the second interpretation of section 110(a)(2)(D), that the relevant upwind areas significantly contribute to nonattainment problems downwind.

As discussed in the next section, EPA has identified a set of regional $NO_X$ controls in a cost range of $1,650 to $1,700 per ton. These regional upwind and downwind control costs appear to compare favorably to the potential control costs associated with the downwind local controls, as indicated in Table II–15. The avoided cost of local VOC control is assumed to range from

[7] 32 percent is the median effectiveness of the RCS considering all nonattainment areas in the OTAG region.

a low-end cost of $2,400 per ton to a high-end cost of $10,000 per ton. The avoided cost of local $NO_X$ control is assumed to range from a low-end cost of $2,200 per ton to a high-end cost of $10,000 per ton. The low-end costs are derived from the nationwide average incremental costs of VOC- and $NO_X$-related control measures selected in the RIA for the new ozone standard. The high-end cost of $10,000 per ton is assumed based on the Presidential Directive for the Administrator of EPA regarding ''Implementation of Revised Air Quality Standards for Ozone and Particulate Matter'' issued by President Clinton.

The foregoing analysis suggests, at least directionally, that the regional $NO_X$ reductions that would result from today's proposal may have the same ambient impact, but at lower cost, than available local VOC and $NO_X$ reductions. Thus, this analysis is another factor supporting EPA's proposed conclusion that the SIPs for States in this region are required, under section 110(a)(2)(D), to reduce $NO_X$ emissions.

## III. Statewide Emissions Budgets

### *A. General Approach for Calculating Budgets*

This section describes the general approach EPA is proposing to use to develop emission budgets under today's action and the rationale for that approach. In addition to a description of how control measures were selected, this section addresses other issues related to calculating budgets, including: relationship to OTAG recommendations, uniform application of controls, seasonal versus annual controls, and treatment of areas with $NO_X$ waivers.

#### 1. Overview

In earlier parts of today's action, EPA proposed to determine that $NO_X$ emissions from 23 jurisdictions contribute significantly to nonattainment problems in downwind areas in the OTAG region. In this and subsequent parts, EPA proposes to require a $NO_X$ budget for each of these jurisdictions for those emissions that will result in sufficient reductions to adequately mitigate the contribution. The EPA proposes as the criteria for establishing the budget the relative cost effectiveness of the emissions reductions associated with the available controls, combined with reference to the ambient impact of the emissions reductions. The EPA solicits comment on alternative approaches for establishing State emissions budgets that factor in the differential effects of $NO_X$ reductions in different geographic locations on downwind air quality.

Specifically, for the proposed approach, EPA employed the following steps in determining the budget levels that EPA proposes constitute adequate mitigation under the first interpretation of significant contribution. First, EPA compiled a list of available $NO_X$ control measures for the various emissions sectors in the upwind areas. For the control measures on this list, EPA estimated the average cost effectiveness of those controls. The average cost effectiveness is defined as the cost of a ton of reductions from the source category based on full implementation of the proposed controls, as compared to the pre-existing level of controls.

Second, EPA developed a rationale for determining which of the $NO_X$ control measures should form the basis of the budget. The EPA focused on average cost effectiveness of the controls. As a point of comparison, EPA determined the average cost effectiveness of a representative sample of recent current and planned State and Federal controls. The EPA believes that the average cost effectiveness for the measures proposed today to form the basis for the budgets should be comparable to the average cost effectiveness of those recently undertaken and planned controls.

Third, EPA evaluated control measures to determine whether they should be assumed in the budget calculation based on this rationale. The EPA proposes that when controls on utilities in the 23 jurisdictions are extended to the level proposed today, and when controls on nonutility point sources are similarly extended, then the average cost effectiveness of the utility controls and of the nonutility point source controls are both comparable to the average cost effectiveness of recently undertaken and planned controls.

At the same time, EPA analyzed the average cost effectiveness for $NO_X$ reductions from source categories other than utilities or other point sources. The EPA is today proposing that additional controls (beyond the current and planned measures described in section III.B.2.b) from those categories should not form the basis for any of the budgets because their costs, for the purpose of reducing only $NO_X$ emissions, are significantly higher than those of the utilities and other point sources and/or additional feasible controls have either not been identified or are more appropriate for local, not regional, implementation.

Fourth, EPA determined the state-by-state budgets for $NO_X$ emissions based on the selected controls.

Fifth, EPA determined that these budget levels—or generally comparable levels—result in an adequate level of ambient reductions downwind. The EPA did not conduct ambient air quality modeling for the level of emissions contained in the budgets proposed today. However, OTAG conducted air quality modeling for a set of controls that, although somewhat different from the utility and point source controls EPA is today proposing to rely on, yielded comparable emission levels, on a regionwide basis, to those proposed today. This modeling indicated a noticeable improvement in ozone concentrations due to implementation of the required emissions budget. The Agency intends to include air quality analyses of the proposed $NO_X$ emissions budgets in the SNPR. Although EPA is proposing that States be required to achieve the emissions budgets specified and has based those budgets on a particular set of cost-effective controls, States may select their own mix of controls that meet this budget.

Sixth, EPA determined that, based on current information, requiring upwind $NO_X$ emissions reductions, based on an assessment of their costs and ambient impact, is more appropriate than requiring downwind VOC emissions reductions, based on an assessment of their costs and ambient impacts. The EPA's current information is limited for this aspect of today's rulemaking, but generally consists of the analyses performed for the RIA for the revised ozone and particulate matter NAAQS.

The alternative interpretation for section 110(a)(2)(D) of the CAA, which EPA is also proposing today, should also be noted. Under this interpretation, the various factors included in the weight of evidence approach discussed above concerning the upwind emissions and ambient contributions, therefore, would be part of the determination as to whether the emissions contribute significantly to nonattainment problems (or interfere with maintenance downwind). The EPA would then undertake the same cost analysis as described above as an additional factor in the weight of evidence test. If EPA concluded that the regional $NO_X$ emissions controls are appropriately cost effective, EPA would conclude, on the basis of all the factors, that the emissions subject to those controls are considered to contribute significantly to nonattainment. Under this interpretation of section 110(a)(2)(D), the State budget levels, which are based on the cost-effective control measures, are necessary to prohibit the amount of the State's emissions determined to contribute significantly to nonattainment.

2. Relationship of Proposed Budget Approach to the OTAG Recommendations

In selecting those control measures determined to be the most reasonable and cost effective for the purpose of achieving regional $NO_X$ reductions, EPA carefully considered the recommendations made by OTAG on July 8, 1997 (Appendix B). The OTAG process is described in section I.F, OTAG Process, of this rulemaking. The control measures assumed in the proposed budget calculations described below generally fall within the range of OTAG's recommendations.

The OTAG recommendations call for implementation of several Federal measures to achieve $NO_X$ emissions decreases through a NLEV program, inspection and maintenance (I/M) programs (where required by the CAA), and reformulated gasoline (RFG) in mandated and current opt-in areas. Emissions reductions following these recommendations are included in EPA's calculation of the highway vehicle budget component as part of the 2007 Clean Air Act base.

The OTAG recommendations endorse the development and implementation of ozone action-day programs. The recommendations also encourage EPA to evaluate emission benefits of cetane adjustments with respect to diesel fuel. While EPA supports these recommendations, it should be noted that they do not translate into specific emissions reductions at this time and, thus, EPA did not calculate emissions reductions from these programs as part of the proposed budget calculation.

The OTAG recommendations also cover electric utilities and other large- and medium-sized point sources. Specifically, OTAG recommended controls discussed below in all of the "fine grid" areas. The OTAG recommended that emissions from sources in the portion of States that are in the "coarse grid" be exempted from the budget calculation. The EPA is proposing to include entire States rather than exempting portions based on the division between coarse and fine grid. This affects New York, Michigan, Wisconsin, Missouri, Alabama and Georgia. The EPA proposes to take this approach because the division between fine and coarse grid areas was based, in part, on technical modeling limitations; because the additional emissions decreases will help the downwind nonattainment areas; and because a statewide budget creates fewer administrative difficulties than a partial-state budget. The OTAG fine grid States are the same as the 23 jurisdictions proposed in this rulemaking as having a significant contribution, with the exception of the States of Maine, New Hampshire and Vermont. The portion of these three States in the OTAG fine grid are included in the OTAG recommendation for additional controls, but are not included in today's proposal for the reasons described in section II, Weight of Evidence Determination of Significant Contribution, of this rulemaking. The EPA is soliciting comments on this approach; specifically, whether partial States should be included, which States or parts of States should be excluded, the appropriate rationale for excluding States or parts of States, and how to address administrative difficulties associated with excluding parts of a State.

For electric utilities, OTAG recommended that the range of utility $NO_X$ controls in the fine grid fall between CAA controls (about a 30 percent reduction from 1990 levels) and the less stringent of 85 percent reduction from the 1990 rate or 0.15 lb/MMBtu. As discussed below, EPA's proposed utility budget component calculation is based on the 0.15 lb/MMBtu emission rate without the 85 percent reduction option. Thus, EPA's proposed utility budget component calculation is similar to the upper bound recommended by OTAG, but with a slightly lower overall emission rate (since it excludes the 85 percent reduction criterion) and slightly different total area (since whole States—not just the fine grid portion—but fewer States are included). The alternatives considered and explanation of the methodology proposed to make these calculations are more fully discussed below and in the technical support document (TSD) which is included in the Docket to this rulemaking.

For nonutility point sources, OTAG recommended that the stringency of controls for large sources be established in a manner equitable with utility controls. The OTAG recommendation includes a definition of large sources (e.g., industrial boilers with a heat input greater than 250 MMBtu) and recommends control levels ranging from 55–70 percent reduction. The OTAG Policy Group further recommended that RACT should be considered for individual medium-sized nonutility point sources (e.g., industrial boilers with a heat input between 100 and 250 MMBtu). The EPA-proposed nonutility budget component calculations generally follow the OTAG recommendations. Missing data in the OTAG emissions inventories, however, preclude EPA from precisely following the recommended definitions of large- and medium-sized sources. The alternatives considered and explanation of the methodology proposed to make these calculations are more fully discussed below.

3. Uniform Application of Control Measures

The EPA is proposing that the budget for each State that has been determined to contribute significantly to nonattainment in a downwind State be calculated using the same control measure assumptions. This is true under either interpretation, described above, of section 110(a)(2)(D). An alternative approach would be for EPA to attempt to identify for each State or a group of adjacent States (e.g., Ohio Valley, Great Lakes, Southern, or Northeastern States) a unique set of control levels on which to base emissions budgets that, together with other States' emission budgets, would eliminate significant contribution to downwind nonattainment areas. The EPA is soliciting comment on methodologies that might be used to implement such an approach. The decision to propose to calculate budgets based on uniform control measures is based primarily on cost effectiveness (cost per ton removed) and also in consideration of the OTAG recommendations, collective contribution, equity concerns, modeling assumptions and concerns over emissions shifting. These are discussed further below.

*a. OTAG.* Although OTAG did note that the range of transport is generally longer in the North than in the South, the OTAG recommendations did not specifically indicate whether controls should be applied at differing levels over the fine grid.

*b. Collective Contribution and Equity Considerations.* The EPA believes that certain downwind States receive amounts of transported ozone and ozone precursors that significantly contribute to their nonattainment. The EPA further believes that it is the "collective" emissions of "several" upwind States that result in significant contributions. All States included within a group of States whose collective emissions significantly contribute to nonattainment may be assumed to contribute significantly. Because each State's contribution is viewed with reference to other States' contributions, EPA believes it is appropriate to require the same type of remedial action for each State.

The proposed approach results in the calculation of statewide emissions budgets based on the consistent application of potential controls across the States determined to contribute significantly. This approach treats the 23 jurisdictions in a like manner for the purpose of calculating the proposed statewide emissions budgets.

*c. Modeling Assumptions and Potential Synergistic Effects.* In theory, it would be possible to derive more precise contributions made by individual States to collective transport of ozone and precursors to downwind States. In practice, however, this is a more challenging analysis. First, the relative impact of individual States, within a collective group of States, on transport varies as a function of meteorology. For example, the impact of more distant States may be relatively greater when there is a well defined windfield. In contrast, effects of nearby States may be most pronounced under stagnant or semi-stagnant conditions. Modeling may therefore not sufficiently characterize the relative importance of emissions in individual States to regional transport, unless many days reflecting a variety of meteorological conditions are modeled.

Second, the impact of an individual State on downwind transport of ozone and precursors depends on what is assumed about emissions in other States in the collective group shown to result in significant transport. This is exacerbated by the fact that ozone formation and transport is not a linear function of precursor emissions. Rather, there is likely to be a synergistic effect which arises from reducing emissions in several neighboring States. Thus, the predicted relative importance of emissions from a single State might change substantially if emissions from other States in the group were reduced. There is a myriad of assumptions which can be made about emission controls in neighboring States. It is not feasible to model them all. Thus, a definitive, precise estimate of the relative importance of a single State's contribution to transport is unlikely. On the other hand, OTAG has performed modeling showing the air quality impacts of applying differential levels of controls in different zones of the OTAG domain (see section II.B.3, OTAG Geographic Modeling). In section III.A.3.e below, EPA is requesting comment on the possibility of using this or some other analysis as a means for considering an alternative approach to developing $NO_X$ budgets.

*d. Electrical Generation and Emissions Shifting.* Among many factors that EPA considered in weighing whether to propose uniform or variable emissions limits in calculating States' emission budgets was the concern that different controls in one part of the OTAG fine grid region in combination with an interstate emissions trading program may lead to increases in pollution within areas having more restrictive controls. That is, if unrestricted interstate emissions trading were allowed, emissions reductions might be expected to shift away from States assigned more restrictive controls to States which received less restrictive control requirements due to the lower control costs likely to exist in States with less restrictive controls. This may result in emissions above the budget level in areas with more restrictive controls. Such shifts are an important concern and may be most significant for large combustion sources because they emit a large portion of the total regional $NO_X$ emissions and dominate point source emissions.

On the other hand, having the interstate trading program incorporate control levels that vary from State to State by varying the value of an emission credit or allowance would complicate administration of the trading program. Such complexity would increase transaction costs and could discourage emissions trading which may result in higher regionwide control costs. Alternatively, the scope of the trading program could be confined to those States with similar control levels. However, each subregional trading program would have fewer participants. A trading program that covers a smaller market area will provide less flexibility and reduce the possible savings for the affected sources as compared with larger trading programs.

*e. Alternative Approaches Based on Non-Uniform Application of Control Measures.* The EPA is proposing to derive State $NO_X$ emissions budgets using uniform control measures. As discussed earlier in this section, EPA believes it is appropriate to require comparable levels of control of $NO_X$ emissions throughout the 23 jurisdictions covered by today's action. The EPA selected these proposed levels primarily by considering the cost effectiveness of control at the source (*i.e.*, the control cost per ton of $NO_X$ reduced for each type of source). Although not all such emissions reductions are equally effective in reducing ozone concentrations in target nonattainment areas, EPA believes that other benefits of $NO_X$ reductions and equity considerations are also important and support this type of approach.

In a July 1997 Memorandum to the EPA Administrator, the President directed the Agency to maximize common sense, flexibility, and cost effectiveness in implementing the revised ozone and particulate matter standards. Fulfilling this mandate by developing the least burdensome strategy for achieving air quality improvements, and ultimately attainment in nonattainment areas, requires technically complex analysis of regional transport, similar to that undertaken as part of the OTAG process. As noted elsewhere in this package, a number of other factors, including distance and meteorology, influence how effective different tons of emissions reductions are in reducing ambient ozone concentrations in nonattainment areas.

The EPA recognizes that analytic approaches other than one based on using uniform control measures might be useful in deriving State $NO_X$ emissions budgets. For example, one approach would be to attempt to quantify more explicitly the cost effectiveness in terms of the ambient ozone improvement in nonattainment areas (measured, for example, as cost per population weighted changes in parts per billion of peak ozone concentrations) taking into account the location of control measures through regional modeling. This alternative, if feasible, would clarify the linkage between the budget calculation and ambient ozone improvement in nonattainment areas and, depending on its effect on interstate emissions trading, could thereby lower the overall cost of achieving comparable ambient ozone improvements in nonattainment areas. Alternative approaches to measuring cost effectiveness that would more directly link cost effectiveness to improvements of air quality in nonattainment areas could also be adopted.

The EPA solicits comment on alternative approaches for establishing State emissions budgets that factor in the differential effects of $NO_X$ reductions in different geographic locations on downwind air quality. Comments advocating alternative approaches would be most helpful if they set forth concrete proposals on what analysis should form the basis for budget calculations. The EPA plans to review alternative approaches and perform additional air quality and economic analysis in developing the final rule. If, after review of alternative approaches, EPA concludes that a new basis for the State emissions budgets is appropriate, EPA would issue a SNPR.

4. Seasonal vs Annual Controls

Today's proposal is for the purpose of helping attain and maintain the NAAQS for ozone. High ambient concentrations of ozone are associated with periods of elevated temperature and solar radiation. Thus, in most parts of the country, high ozone episodes occur only during summer months. Accordingly, the control of $NO_X$ emissions primarily on a summer season basis may be part of some areas' strategies to attain the ozone standard at least cost. The OTAG analyses have assumed that the control requirements flowing from this process would be required only over the ozone season, which OTAG considered to be May 1 through September 30. For the purpose of decreasing the regional transport of ozone and ozone precursors, EPA agrees that control measures that focus over the ozone season may be appropriate and is proposing seasonal $NO_X$ budgets.

Because $NO_X$ emissions have adverse impacts on the environment in several ways (as described in section IX., Nonozone Benefits of $NO_X$ Reductions), it should be noted that the timing of the $NO_X$ emissions can be important to the subsequent environmental impacts. For example, year-round reductions in $NO_X$ emissions are more helpful than seasonal approaches at minimizing the impacts of acid deposition and eutrophication, although summertime $NO_X$ emissions reductions are most helpful in attaining the ozone standard. Application of $NO_X$ emissions controls that focus emissions reductions in the summer will, in many cases, also achieve significant emission reductions on a year-round basis. For example, efforts to decrease emissions from large boilers will usually include installation of low $NO_X$ burners—which will achieve year-round moderate amounts of emission reductions—and may include, in addition, some type of summer season control, such as switching to a cleaner fuel or post-combustion technology. Therefore, while the purpose of this rulemaking is to address ozone transport that significantly contributes to downwind nonattainment, which is primarily a concern during the ozone season, States may wish to consider the total environmental impacts when adopting measures to achieve the $NO_X$ emissions decreases.

The OTAG modeling used emissions inventory information that represented typical summer day emissions. In this rulemaking, EPA is proposing seasonal emission budgets for each of the 23 affected jurisdictions. Thus, in developing the budget, a conversion is needed to arrive at a seasonal budget. As in the OTAG process, EPA is proposing to use May 1 through September 30 as the ozone season. The detailed procedures for converting the daily emissions into the seasonal budgets are described below for each source sector. The proposed budgets are in units of tons of anthropogenic $NO_X$ for the season May 1 to September 30. Since States will generally only be able to affect anthropogenic sources, the proposed budget does not include biogenic or geogenic sources.

5. Consideration of Areas With CAA Section 182(f) $NO_X$ Waivers

The OTAG process included lengthy discussions on the potential increase in local ozone concentrations in some urban areas that might be associated with a decrease in local $NO_X$ emissions. The OTAG modeling results indicate that urban $NO_X$ emissions decreases produce increases in ozone concentrations locally, but the magnitude, time, and location of these increases generally do not cause or contribute to high ozone concentrations. That is, $NO_X$ reductions can produce localized, transient increases in ozone (mostly due to low-level, urban $NO_X$ reductions) in some areas on some days, but most increases occur on days and in areas where ozone is low. The OTAG recommended that the States work together and with EPA toward completing local SIPs, including evaluation of possible local $NO_X$ disbenefits. The EPA agrees that further analysis of this effect is needed as part of the development of local attainment plans. With respect to regional ozone transport and today's proposed action, EPA believes it is not appropriate to give special treatment to areas with $NO_X$ waivers as discussed below.

In calculating the proposed statewide $NO_X$ emissions budget, EPA considered the options of: (1) requiring less reductions from a State that had been granted a $NO_X$ waiver under section 182(f) of the CAA, or (2) ignoring the $NO_X$ waiver for purposes of calculating the transport budget. As described below, EPA believes it is inappropriate to give special treatment to areas with $NO_X$ waivers when considering measures to reduce the regional transport of ozone and ozone precursors. Therefore, EPA is proposing to calculate the statewide emissions budget without special consideration for areas with $NO_X$ waivers. The EPA views the effect of $NO_X$ waivers on air quality as appropriate for further analysis by each State as part of its local attainment planning process, and EPA will consider such results when working with each State's attainment plan.

In option (1), the upwind States with $NO_X$ waivers would achieve only a portion of the emissions decreases otherwise required under the statewide emissions budget. Thus, the downwind nonattainment areas would receive less improvement in air quality and would need to adopt additional control measures in their States. To some degree this approach defeats the purpose of today's action because fewer emissions reductions in the upwind areas would lead to higher ozone concentrations in the downwind areas.

In option (2), the upwind States may be able to achieve the $NO_X$ emissions decreases needed to meet their budgets in those portions of the State where $NO_X$ emissions decreases are not a problem. On the other hand, the State may need to implement some $NO_X$ emissions decreases in areas where such decreases may lead to increases in ozone concentrations on some days. Thus, additional VOC control measures may be needed to offset associated ozone increases due to $NO_X$ emissions decreases in the sensitive areas. This approach is more consistent with the purpose of today's action and may or may not result in additional VOC controls being needed.

In proposing option (2), it is helpful to look more closely at why the $NO_X$ waivers were initially granted and the manner in which they were granted. Most of the $NO_X$ waivers granted were not supported by local or regional scale air quality modeling analyses indicating that $NO_X$ emissions decreases would result in ozone increases. In fact, most of the waivers were granted based solely on local air quality data indicating the areas were already attaining the ozone standard. Thus, technical support for option (1) is substantially incomplete. In addition, relevant modeling analyses completed by OTAG and others regarding the issue of $NO_X$ waiver areas need to be considered as described below.

The CAA requires EPA to view $NO_X$ waivers in a narrow manner. In general, section 182(f) provides that waivers must be granted if states show that reducing $NO_X$ within a nonattainment area would not contribute to attainment of the ozone NAAQS within the same nonattainment area. Only the role of local $NO_X$ emissions on local attainment of the ozone standard is considered in nonattainment areas outside an ozone transport region. The role of $NO_X$ in regional attainment is addressed separately under section 110(a)(2)(D) of the Act, which prohibits one State from significantly polluting another State's downwind areas.

In response to State $NO_X$ waiver petitions submitted between 1992–1995, EPA granted $NO_X$ waivers under section 182. Most waivers were granted on the basis that the area had already attained the ozone standard and, thus, additional $NO_X$ (or VOC) reductions ''would not contribute to ozone attainment in the area.'' In some cases, the waivers were granted based on dispersion modeling which showed that the area would attain just as expeditiously based solely on additional VOC reductions or that local $NO_X$ reductions increased local peak ozone concentrations; this also meets the above test that additional $NO_X$ reductions would not contribute to ozone attainment in the area.

Specifically, the EPA received petitions for a $NO_X$ waiver for 51 ozone nonattainment areas. Of these petitions, EPA has approved waivers for 48 nonattainment areas and 3 are pending. Most of the waivers granted (28 of 48) were simply based on air quality monitoring data over a period of 3 or more years indicating the area had attained the ozone standard (and, thus, additional $NO_X$ reductions were not needed for attainment). Several States submitted $NO_X$ waiver petitions (7 of 48) accompanied by an attainment plan showing achievement of the ozone standard by the statutory deadline through additional VOC controls only. None of these 35 nonattainment areas with approved $NO_X$ waivers have demonstrated or even sought to demonstrate that $NO_X$ reductions might increase ozone concentrations in specific areas. Only in the cases of the Lake Michigan (9 nonattainment areas), Phoenix AZ, Baton Rouge LA and the Houston/Beaumont TX areas was information submitted to show that, in some episodes, $NO_X$ emissions decreases lead to increases in peak ozone concentrations (13 of 48). Thus, the technical support for option (1) is substantially incomplete. Even for the few areas which had modeling information, those analyses were generally considered preliminary analyses that would be replaced with more complete modeling associated with attainment plans.

In the **Federal Register** notices approving individual waiver petitions, EPA gave notice that approval of the local petition, under section 182(f) of the CAA, is on a contingent or temporary basis because subsequent modeling or monitoring data for an area may show attainment benefits from $NO_X$ reductions, and stated that additional local and regional $NO_X$ emissions reductions may be needed to reduce the long range transport of ozone. Where such additional $NO_X$ reductions are necessary to reduce the long range transport of ozone, EPA stated that authority provided under section 110(a)(2)(D) of the CAA would be used and that a section 182(f) $NO_X$ waiver would, in effect, be superseded for those control requirements needed to meet the section 110(a)(2)(D) action. Further, EPA noted that States may require additional $NO_X$ reductions in these nonattainment areas for nonozone purposes, such as attainment of the PM–10 standard or achieving acid rain reduction goals.

The OTAG addressed the complex issue of regional impacts due to transport of $NO_X$ and VOC emissions. The OTAG modeling results indicate that urban $NO_X$ reductions produce widespread decreases in ozone concentrations on high ozone days. In addition, urban $NO_X$ reductions also produce limited increases in ozone concentrations locally, but the magnitude, time, and location of these increases generally do not cause or contribute to high ozone concentrations. Most urban ozone increases modeled in OTAG occur in areas already below the ozone standard and, thus, in most cases, urban ozone increases resulting from $NO_X$ reductions do not cause exceedance of the ozone standard. There are a few days in a few urban areas where $NO_X$ reductions are predicted to produce ozone increases in portions of an urban area with high ozone concentrations.

In other words, modeling analyses conducted as part of the OTAG process indicated that, in general, $NO_X$ reduction disbenefits are inversely related to ozone concentration. On the low ozone days leading up to an ozone episode (and sometimes the last day or so), the increases are greatest, and on the high ozone days, the increases are least (or nonexistent); the ozone increases occur on days when ozone is low and the ozone decreases occur on days when ozone is high. This indicates that, in most cases, urban ozone increases may not contribute to exceedances of the ozone standards. Overall, OTAG modeling thus suggests that the ozone reduction benefits of $NO_X$ control may outweigh the disbenefits of urban ozone increases in both magnitude of ozone reduction and geographic scope.

It should be noted that the modeling analyses completed within the OTAG process necessarily utilized a larger grid size than States are likely to use in their attainment plans. That is, future analyses by States will likely use smaller grid sizes. The smaller grid sizes may provide additional information on effects such as local $NO_X$ emissions reacting with local ozone. The additional information will be important as States develop their attainment plans.

In summary, the EPA views ozone pollution as a regional problem as well as a local problem. Thus, achieving ozone attainment for an area, and thereby protecting its citizens from ozone-related health effects, often depends on the ozone and precursor emission levels of upwind areas. In order to achieve the needed upwind $NO_X$ emissions decreases, areas that were granted $NO_X$ waivers may need to control $NO_X$ emissions for transport purposes, even if the waivers remain in place. Today's action is part of the process that is leading to additional $NO_X$ reductions requirements in attainment and nonattainment areas across broad parts of the Nation to reduce interstate transport of ozone. The requirements of today's action apply both to areas with approved $NO_X$ waiver petitions and areas without such petitions. That is, any nonattainment areas with $NO_X$ waiver petitions approved by EPA in the past or in the future are not proposed to be exempt from today's action.

At the same time, EPA is sensitive to the concerns of those areas (primarily in the Lake Michigan area) that may be required to achieve $NO_X$ reductions that produce local increases in ozone concentrations in order to reduce concentrations in downwind areas. The EPA is, thus, taking comments on approaches that might be used to address such concerns on a case-by-case basis. The EPA wishes to stress that it would only consider an approach that targets areas with concrete modeling results documenting a likelihood of local disbenefits from $NO_X$ reductions at locations and on days with high ozone concentrations. As already discussed, EPA does not believe adjustments to $NO_X$ budgets are appropriate for areas with waivers based solely on their ability to attain the NAAQS without further reductions.

6. Relation of OTC $NO_X$ MOU to Budgets in the Ozone Transport SIP Rulemaking

The 2007 Budgets for the electric utilities and the nonutilities were developed independently of the OTC $NO_X$ MOU. The Ozone Transport SIP Rulemaking allows States flexibility to achieve reductions from any source category; however, implementation of these requirements could be coordinated. The MOU covers large boilers, both utility and nonutility boilers. The Ozone Transport SIP Rulemaking covers these sources as well as other categories of major $NO_X$ stationary sources. Although the OTC $NO_X$ MOU does not cover these other categories, the OTC States regulated emissions from these categories through implementation of the RACT program, beginning in 1995.

The EPA believes that implementation of Phase II of the MOU should proceed as scheduled, with achievement of the reductions by May 1999. These emissions reductions are needed to help reduce ozone transport and make progress toward attainment. Further, these reductions do not conflict with the requirements imposed by the Ozone Transport SIP Rulemaking because they do not exceed the required reductions. In Phase III of the MOU, however, the timing and the amount of the reductions required by the OTC's MOU and RACT provisions are much closer to the timing and reductions from the Ozone Transport SIP Rulemaking. The emissions reductions required by the Ozone Transport SIP Rulemaking are likely to be somewhat more stringent overall than the OTC's Phase III requirements, and Phase III implementation could occur about the same time as the Ozone Transport SIP Rulemaking reductions. Therefore, EPA intends to work with the OTC States to coordinate Phase III implementation with implementation of the emissions reductions required by the Ozone Transport SIP Rulemaking.

The States in the OTC not covered by the Ozone Transport SIP Rulemaking should continue to develop, adopt and implement Phases II and III of the MOU. Such reductions may be necessary to provide for attainment of the ozone NAAQS in those areas, although they may not be significant with respect to long distance transport. Further, such reductions may help to attain and/or maintain the new 8-hour ozone standard.

*B. Budget Development Process*

1. Overview

The EPA is proposing to develop seasonal budgets for each State by determining the amount of emissions that would remain in each State after application of reasonable, cost-effective control measures. For all sectors except electric utilities and nonutility point sources, EPA proposes using the 2007 Clean Air Act inventory developed by OTAG as the starting point for this calculation. This inventory reflects implementation of all mandatory national and nonattainment area Clean Air Act controls, plus any additional regional and State-specific controls. It also includes growth assumptions between 1990 and 2007. The specific assumptions on which this inventory is based are documented in a June 1997 draft Emissions Inventory Development Report (8). To determine the overall State budgets, EPA proposes applying controls to various source sectors, as discussed below, calculating budget components based on these controls, and summing the budget components for each sector to get the total budget.

In the case of electric utilities, EPA proposes using a slightly different approach. Instead of using the OTAG 2007 emissions and applying controls, EPA proposes to calculate the utility component of the budget using data provided by utilities to EPA for 1995 and 1996 and increasing the emissions to reflect activity growth projected for 2007. This is discussed in more detail below in section III.B.3.

In the case of nonutility point sources, EPA proposes using the OTAG 2007 emissions with one adjustment. The inventory needs to be adjusted to represent uncontrolled levels, rather than CAA control levels, because the OTAG recommendation is based on uncontrolled levels. This is discussed in section III.B.4, Proposed Assumptions for Area and Nonutility Point Sources.

2. Description of and Rationale for Proposed Control Assumptions

An important issue to be addressed in today's action is the reasonableness of the cost of control of emissions in States that significantly contribute to another State's ozone nonattainment. The EPA proposes to address this issue by examining the cost effectiveness of various regionwide ozone season control measures and determining what measures can be considered the most reasonable in light of other actions taken by EPA and States to control $NO_X$.

*a. Considering the Cost Effectiveness of Other Actions.* The EPA is proposing to base the budget component levels on $NO_X$ emissions controls that are available and the most cost effective in relation to other recently undertaken or planned $NO_X$ measures. Table III–1 provides a reference list of measures that EPA and States have undertaken to reduce $NO_X$ and their average annual costs per ton of $NO_X$ reduced. Most of these measures fall in the $1,000 to $2,000 per ton range. With few exceptions, the average cost effectiveness of these measures is representative of the average cost effectiveness of the types of controls EPA and States have needed to adopt most recently, since their previous planning efforts have already taken advantage of opportunities for even cheaper controls. The measures listed in Table III–1 represent costs that the Nation has been willing to bear to date to reduce $NO_X$. The EPA believes that the cost effectiveness of measures that it or States have adopted, or proposed to adopt, forms a good reference point for determining which of the available additional $NO_X$ control measures can most reasonably be implemented by upwind States that significantly contribute to nonattainment.

TABLE III–1.—AVERAGE COST EFFECTIVENESS OF $NO_X$ Control Measures Recently Undertaken

[In 1990 dollars]

| Control measure | Cost per ton of $NO_X$ removed |
|---|---|
| $NO_X$ RACT | 150–1,300 |
| Phase II Reformulated Gasoline | [1] 3,400 |
| State Implementation of the Ozone Transport Commission Memorandum of Understanding | 950–1,600 |
| Proposed New Source Performance Standards for Fossil Steam Electric Generation Units | 1,290 |
| Proposed New Source Performance Standards for Industrial Boilers | 1,790 |

[1] Average cost representing the midpoint of $1,500 to $5,300 per ton. This cost represents the projected additional cost of complying with the Phase II RFG $NO_X$ standards, beyond the cost of complying with the other standards for Phase II RFG.

The Federal Phase II RFG costs presented in Table III–1 are not strictly comparable to the other costs cited in the table. Federal Phase II RFG will provide large VOC reductions in addition to $NO_X$ reductions. Federal RFG is required in nine cities with the Nation's worst ozone nonattainment problems; other nonattainment areas have chosen to opt into the program as part of their attainment strategy. The mandated areas and those areas in the OTAG region that have chosen to opt into the program are areas where significant local reductions in ozone precursors are needed; such areas may value RFG's $NO_X$ and VOC reductions differently for their local ozone benefits than they would value $NO_X$ reductions from RFG or other programs for ozone transport benefits.

The EPA notes that there are also a number of less expensive measures recently undertaken by the Agency to reduce $NO_X$ emission levels that do not appear in Table III–1. These actions include: (1) The Title IV $NO_X$ reduction program, (2) the Federal locomotive standards, (3) the 1997 proposed Federal nonroad diesel engine standards, (4) the Federal heavy duty highway engine 2g/bhp-hour standards, and (5) the Federal marine engine standards. These lower cost actions do not represent a useful measure of the willingness to make reasonable expenditures to reduce $NO_X$ emissions in order to achieve air quality goals. Decisions to undertake these measures are low cost steps toward $NO_X$ reduction. Though these actions are very cost effective, the Agency must now focus on what other measures exist, at a potentially higher cost-effectiveness value, that can further reduce $NO_X$ emissions. The Agency is focusing on these other actions because they may also be of reasonable cost effectiveness and obtaining these reductions are less costly than further local reductions of VOC and $NO_X$ in nonattainment areas. Table III–1 is thereby useful as a reference of the next higher level of $NO_X$ reduction cost effectiveness that the Agency considers reasonable to undertake.

The Agency is also aware that to come into attainment with the new ozone NAAQS, many localities will spend several thousand dollars per ton of $NO_X$ or VOC reduction.

*b. Determining the Cost Effectiveness of $NO_X$* Controls. In an effort to consider a cost-effective mix of controls on which to base each component of the proposed budget (i.e., electricity generating sources, nonutility point sources, area sources, and mobile sources) the Agency considered the average cost effectiveness of alternative levels of controls for each source. Among the plausible levels of control are the controls included in OTAG's recommendations.

The average cost effectiveness of the controls assumed in calculating each sector's budget component was calculated from a baseline level that included all currently applicable Federal or State $NO_X$ control measures. The baseline did not include Phase 2 and Phase 3 of the OTC $NO_X$ MOU since they have not yet been adopted by all the involved States [8]; if the MOU were included in the baseline, the overall costs would be lower. The costs and emissions reductions for point sources are determined using an emissions cap-and-trade approach since EPA believes that this approach is the most cost-effective way for point sources to meet an emissions budget, and EPA expects that States are also interested in employing the most cost-effective approach. Table III–2 shows in the first column of numbers the average cost per ton of $NO_X$ removed during the ozone season of various potential EPA actions, arranged by source sector. The action is presented in the form of a regionwide budget for each source sector (i.e., the electric power industry and other stationary sources), and the cost-effectiveness values are for the ozone season. The Agency used its estimates of the average cost effectiveness of reducing $NO_X$ emissions during the ozone season to develop the budget components for the electric power industry and other stationary sources.

The next three columns in the Table contain the average cost per ton of $NO_X$ annually reduced, the incremental cost per ton of $NO_X$ reduced during the ozone season, and the incremental cost per ton of $NO_X$ annually reduced. The average cost per ton of $NO_X$ reduced annually is the annual costs of a source category complying with a $NO_X$ budget component option divided by the $NO_X$ emissions reductions that occur throughout the entire year. The incremental cost per ton of $NO_X$ reduced during the ozone season is the difference in the annual cost of the option examined and the next cheapest option divided by the difference in seasonal $NO_X$ reduction in these two options. The incremental cost per ton of $NO_X$ reduced annually is the difference in the annual cost of the option examined and the next cheapest option divided by the difference in the annual $NO_X$ reduction in these two options. For the option with the lowest annual cost for each source category's $NO_X$ budget component, the average and incremental costs are the same, which assumes that ultimately the cheapest option is no additional controls, or the baseline.

The EPA has provided these other measures of cost effectiveness to provide additional perspective on the decision that the Agency made for the level of each source category budget component. Each of these cost-effectiveness measures has advantages in being used in conjunction with other factors to make a decision on environmental controls under certain circumstances. They each also have limitations. The annual measures are valuable since there are $NO_X$ reduction benefits that the public will gain throughout the year from controls on the sources covered in this rulemaking. They do not, however, focus as well on the primary objectives of the ozone transport rule of providing reductions of ozone during the time of year when it does the most harm and in which exceedances of the ozone standards are likely to occur. The incremental measures are valuable since they show the additional costs of the additional reductions from increasing the stringency of pollution controls. However, for this rulemaking, it is difficult to compare the incremental costs of increasing levels of stringency for large stationary sources with other Agency and State analyses that have been developed in the past. For instance, because incremental cost comparisons will differ depending on the size of the increment in stringency being considered, care must be used in using incremental cost estimates from earlier rulemakings.

The Agency solicits comments on its use of average seasonal cost effectiveness as the measure it wants to rely on to judge the cost effectiveness of the $NO_X$ reductions that will occur from the $NO_X$ budget components that EPA has chosen for the electric power industry and other stationary sources. Commenters offering other measures, or combinations of cost-effectiveness measures, that EPA needs to consider, should provide their rationale for their views.

The EPA is not choosing to base its proposed budgets on an expansion of I/M programs beyond the extent required by the CAA or otherwise reflected in existing SIPs in its calculation of State $NO_X$ budgets. The cost effectiveness of I/M programs in reducing ozone precursors (including both $NO_X$ and VOC) can vary widely due to differences in the design and operation of individual I/M programs. The EPA's current estimate of the cost effectiveness of I/M programs ranges from $500 to $3,000 per ton of ozone precursor, on an annualized summer ton basis.[9] Although this range suggests that the cost effectiveness of I/M programs in reducing ozone precursors (including both $NO_X$ and VOC) may be comparable to the cost of the utility $NO_X$ reductions proposed in today's rulemaking, the cost effectiveness of I/M programs in reducing $NO_X$ alone would be significantly higher since most of the ozone precursor reductions from enhanced I/M programs are VOC reductions. Both VOC and $NO_X$ reductions are valuable for achieving local attainment, but as discussed in section II, Weight of Evidence Determination of Significant Contribution, today's rulemaking

[8] However, in the Regulatory Analysis of this action, EPA evaluates the economic impact of including the MOU in the baseline for the electric power industry.

[9] All estimates of I/M program cost effectiveness in this rulemaking are presented in terms of the cost per annualized summer ton of ozone precursor, i.e., the cost per ton of VOC or $NO_X$. Cost per annualized summer ton is calculated as the total cost of the program divided by the number of tons that would be reduced annually if the level of reduction achieved during the summer were achieved year round. It thus understates the cost per actual ton of reduction of ozone precursors. The EPA believes this procedure is appropriate because I/M programs reduce other pollutants beside ozone precursors (e.g., air toxics and carbon monoxide (CO)).

focuses on reducing $NO_X$ emissions since such reductions offer greater potential for reducing regional transport than would VOC reductions.

Similarly, EPA is not choosing to base its proposed budgets on an expansion of Federal Phase II RFG beyond its current extent in its calculation of State $NO_X$ budgets. The EPA's current estimate of the cost effectiveness of Federal Phase II RFG ranges from $2,600 to $3,500 per ton of ozone precursor, on an annualized summer ton.[10] This cost exceeds the cost of the utility $NO_X$ reductions proposed in today's rulemaking. Furthermore, the cost effectiveness of Federal Phase II RFG programs in reducing $NO_X$ alone would be significantly higher since most of the ozone precursor reductions from RFG would be in the form of VOC reductions which, while valuable for achieving local attainment, are not the focus of today's action since $NO_X$ reductions offer greater potential for reducing regional transport.

TABLE III–2.—COST EFFECTIVENESS OF OPTIONS FOR THE OZONE SEASON $NO_X$ BUDGET COMPONENTS FOR SELECTED SOURCE CATEGORIES

[In 1990 dollars per ton of $NO_X$ reduced]

| Source category: Options for ozone season $NO_X$ budget components | Average cost per ton of $NO_X$ reduced during the ozone season | Average cost per ton of $NO_X$ reduced annually | Incremental cost per ton of $NO_X$ reduced during the ozone season | Incremental cost per ton of $NO_X$ reduced annually |
|---|---|---|---|---|
| Electric Power Industry: | | | | |
| 815 thousand tons | $1,100 | $850 | $1,100 | $850 |
| 652 thousand tons | 1,300 | 1,050 | 2,100 | 2,100 |
| 489 thousand tons | 1,700 | 1,400 | 3,600 | 3,400 |
| 391 thousand tons | 2,100 | 1,750 | 6,350 | 5,200 |
| 326 thousand tons | 2,450 | 2,000 | 8,700 | 6,850 |
| Other Stationary Sources | | | | |
| 484 thousand tons [1] | 1,450 | 750 | 1,450 | 750 |
| 466 thousand tons [2] | 1,650 | 900 | 4,400 | 2,150 |
| 380 thousand tons [3] | 2,750 | 1,400 | 6,300 | 3,050 |

[1] This measure approximates the emission reductions that would be obtained if Level 1 controls were placed on medium sized sources and Level 2 controls were placed on large sized sources. The calculation process used to calculate cost for nonutility units selects control measures (at a State level) so that the cost minimizing set of controls that meet the required emissions reductions are chosen. This approach provides a downward bias to the costs and cost-effectiveness values compared to any way the States might obtain the emission reductions, including consideration of other factors (e.g., administrative costs that are not included in this analysis). While a least-cost approach simulates either costless emissions trading or a cost minimizing command and control approach with perfect information, either approach is unlikely to include the smaller sources used in this analysis.

[2] This option considers a 70 percent reduction of summer $NO_X$ emissions from large sources and RACT controls on medium size sources. This approach is what OTAG recommended occur, if EPA considered reductions of electric power industry emissions of equivalent to .15 pounds of $NO_X$ per MMBtus, or an 85 percent reduction of uncontrolled levels, whichever is less stringent. The EPA's proposal for the $NO_X$ budget component for the electric power industry is based on a comparable level of controls to the .15/85 percent reduction.

[3] This measure approximates budgets of an 80 percent control of baseline emissions for large sized sources and Level 1 control on the medium sources. The calculation process used to calculate cost effectiveness on nonutility units provides a downward bias for the reasons explained in the above footnote.

NOTE: The options for electric power industry $NO_X$ budget component are based on pollution controls on electric generation units meeting summer season $NO_X$ emission limitations in pounds of $NO_X$ per million Btus of heat input of .25, .20, .15, .12, and .10, respectively. The cost-effectiveness calculations are based on implementing these controls through a cap-and-trade program. The controls on which the options for the $NO_X$ budget component for Other Stationary Sources are based are provided in the footnotes. The cost-effectiveness calculations are based on each State implementing a least-cost approach to compliance.

Considering the $1,000 to $2,000 per ton average cost-effectiveness range from Table III–1, and the level of control achievable with each sector's $NO_X$ control technologies, EPA believes that it is reasonable to require the following levels of reductions: (1) For the electric power industry, a budget component of 489 thousand tons (which is equivalent to an average $NO_X$ emission rate of 0.15 lb/MMBtu) since it is both cost effective and achievable, on average, by the affected sector sources; and (2) for other stationary sources, a budget component of 466 thousand tons, which is consistent with OTAG's recommendation that nonutility point source controls be comparable in stringency to the selected level of electric power industry controls, which for .15 lbs/MMBtus would be 70 percent control on large-sized sources (e.g., boilers greater than 250 MMBtu/hour) and RACT controls on medium-sized sources (e.g., sources emitting between 1 and 2 tons per day). The RACT controls result in $NO_X$ reductions generally in the range of 25–50 percent. This corresponds closely with the OTAG recommendation given the proposed level of electric power industry controls, and EPA believes it is a reasonable level of control based on average cost effectiveness as discussed above.

For mobile sources, EPA proposes constructing the budget component by including: (1) those controls that would be implemented federally or by States in the absence of today's action, and (2) those controls that are viewed today as being feasible in the 2007 time frame and that meet EPA's proposed $NO_X$ cost-effectiveness criterion. The EPA did not include in the proposed mobile source

[10] This cost represents the midpoint of the expected range of $2,600 to $3,500 per ton (depending on the degree of expansion of the program), on an annualized summer ton basis, for both VOC and $NO_X$. All estimates of RFG cost effectiveness in this rulemaking are presented in terms of the cost per annualized summer ton of ozone precursor, i.e., the cost per ton of VOC or $NO_X$. Cost per annualized summer ton is calculated as the total cost of the programs divided by the number of tons that would be reduced annually if the level of reduction achieved during the summer were achieved year round. It thus understates the cost per actual ton of reduction of ozone precursors. The EPA believes this procedure is appropriate because the use of RFG reduces other pollutants besides ozone precursors (e.g., air toxics and CO).

budget component a number of control measures that offer multipollutant benefits and hence may be attractive control measures for local attainment and maintenance. These measures include Tier 2 light-duty vehicle and light-duty truck standards and more extensive implementation of I/M and Federal Phase II RFG. When compared with other available options, these measures are reasonable control measures when these measures' full range of benefits are considered, including CO, toxic air pollutants, and VOC benefits in addition to their $NO_X$ benefits. Some of these measures, such as I/M, RFG and Clean Fuel Fleets, can be implemented in specific areas seeking to meet local air quality objectives rather than region or nationwide. While EPA did not choose to assume their regionwide implementation in calculating $NO_X$ budgets because their cost effectiveness for $NO_X$ reductions alone did not justify including them in the set of assumed controls, EPA continues to believe that these measures' nonozone benefits and VOC benefits (which provide local ozone reductions but tend not to provide significant reductions in regional ozone transport) make them attractive for areas seeking to meet local ozone attainment, or maintenance objectives, or other air quality goals. Although these strategies were not included in the budget calculation, States can opt to implement these measures as part of their SIP revision in response to today's proposal. Each of these programs is discussed in more detail below.

The EPA's approach to the $NO_X$ budget component for the electric power industry relies on the consideration of the States using a cap-and-trade program to reduce emissions from this source category. The Agency's analysis shows that this type of approach is 25 percent more cost effective (lower in cost per ton reduced) than the use of a comparable traditional command-and-control approach, such as setting rate-based $NO_X$ emissions limitations at .15 lbs of $NO_X$ per million Btus of heat input at every source.

The EPA did not examine the implications of each State setting up its own trading programs for the electric power industry, which could occur if the Agency is unable to work with the States to put together a viable trading program across the 23 jurisdictions covered in this rulemaking. Based on analysis done for OTAG in the past, the Agency believes this type of approach would lead to somewhat higher costs, but would still be less expensive than a command-and-control program in every State. This conclusion is based on work that EPA did for OTAG, where it divided a similar area to the one covered in this rule into five trading zones versus a single trading zone.[11] Although the costs did increase, they were not dramatically higher. Further support for this conclusion results from the examination of EPA's Regulatory Analysis supporting this proposed rulemaking. The Agency found that in the vast majority of States, electric generation units would make significant $NO_X$ emissions reductions under a cap-and-trade system that allowed trading between all the States covered. This means that the electric power generation units that can reduce $NO_X$ emissions most cost-effectively are spread throughout the region covered by the Ozone Transport SIP Rulemaking.

In calculating States' budgets, EPA assumed implementation of the following mobile source control measures in addition to those measures already implemented or otherwise promulgated in final form:

*Nonroad*

- Federal Small Engine Standards, Phase II
- Federal Marine Engine Standards
- Federal Heavy-Duty (≥50 hp) Nonroad Standards, Phase I
- Federal Reformulated Gasoline, Phase II (in statutory and current opt-in areas)
- Federal Locomotive Standards
- 1997 Proposed Nonroad Diesel Engine Standards

*Highway*

- Tier 1 Light-Duty and Heavy-Duty Vehicle Standards
- Enhanced I/M (serious and above areas)
- Low Enhanced I/M (rest of OTR)
- Basic I/M (mandated areas)
- Clean Fuel Fleets (mandated areas)
- Federal Reformulated Gasoline, Phase II (in statutory and current opt-in areas)
- National Low Emission Vehicle Standards
- Heavy-Duty Engine 2 g/bhp-hour standard
- Revisions to Emissions Test Procedure

With the exception of the Clean Fuel Fleets, I/M, and RFG programs, all of these control measures are or will be implemented nationally (or in the 49 States outside of California). The EPA assumed that the Clean Fuel Fleets, I/M, and RFG programs would be implemented to the extent required by the CAA or existing SIPs, or as reflected in current levels of State opt-in to these programs. The reader is referred to sections III.B.5 and III.B.6 for a more extensive discussion of the development of the highway vehicles and nonroad budget components, respectively.

At the current time, the standards presumed for locomotives, marine engines, small gasoline engine, nonroad diesel engines, and heavy-duty highway engines in calculating State $NO_X$ budgets represent the most technically feasible emissions performance levels achievable in the 2007 time frame. For this reason, the Agency did not evaluate any more stringent standards for these sources in its calculation of State $NO_X$ budgets.

*c. Summary of Measures Assumed in Proposed Budget Calculation.* The EPA is proposing to calculate the budgets described in this section by assuming the application of the most reasonable, cost-effective controls for the purpose of achieving regional $NO_X$ reductions. Table III–3 summarizes the controls that were assumed for each source sector. More detailed discussions of the controls assumed are contained in the sections that describe each sector.

TABLE III–3.—SUMMARY OF $NO_X$ CONTROL MEASURES APPLIED IN THE DEVELOPMENT OF PROPOSED STATEWIDE SEASONAL $NO_X$ EMISSIONS BUDGETS*

| Emissions Source Sector | Controls Applied in Developing Proposed Statewide $NO_X$ Emissions Budgets for 2007 |
|---|---|
| Large Electricity Generating Devices (fossil-fuel burning electric utility units and nonutility units serving electricity generators 25MWe or greater). | Statewide seasonal tonnage budget based on applying a $NO_X$ emission rate of 0.15 lb/MMBtu on all applicable sources. |

[11] U.S. Environmental protection Agency, "Round 3 Analysis of Cap-and-Trade Strategies to Lower $NO_X$ Emissions from Electric Power Generation in OTAG", March 25, 1997.

TABLE III–3.—SUMMARY OF $NO_X$ CONTROL MEASURES APPLIED IN THE DEVELOPMENT OF PROPOSED STATEWIDE SEASONAL $NO_X$ EMISSIONS BUDGETS *—Continued

| Emissions Source Sector | Controls Applied in Developing Proposed Statewide $NO_X$ Emissions Budgets for 2007 |
|---|---|
| Nonutility point sources (boilers, reciprocating internal combustion engines, turbines, cement kilns, etc.). | 70 percent controls on large-sized sources (e.g., >250 MMBtu/hour)<br>RACT controls on medium-sized sources (e.g., 100–250 MMBtu/hour). |
| Nonroad Sources (commercial marine engines, small engines such as lawn and garden equipment, and larger engines such as construction equipment and locomotives). | Federal small engine standards (Phase II)<br>Federal marine engine standards (diesel >50 horsepower)<br>Federal locomotive standards 1997 proposed nonroad diesel engine standards. |
| Highway Vehicle Sources (cars, trucks, buses, motorcycles—gas and diesel highway engines). | National Low Emission Vehicle Program<br>2004 Heavy-Duty Vehicle Standards.<br>Revisions to Emissions Test Procedure ** |
| Area (Small Stationary) Sources (open burning, small commercial, industrial and residential fuel combustion devices). | Full implementation of programs required by the CAA and outlined in existing State implementation plans. |

* Controls already required under the 1990 Amendments to the CAA and those applied through existing SIPs were assumed in the development of the statewide $NO_X$ budgets but are not explicitly listed in this table.

** Other measures used in developing some state budgets include I/M programs (where mandated), Federal Phase II RFG (where mandated or in areas which have already opted into the program as of the date of today's rulemaking ), and clean fuel fleet programs. Potential reductions from Tier 2 light-duty vehicle standards were not incorporated since they are still under review.

In determining what controls to assume in calculation of the proposed budgets, EPA considered the conclusions that were reached in the OTAG process as well as the cost-effectiveness rationale described above. Any special effort to address ozone transport, such as today's action, must be part of an integrated regulatory solution developed by EPA and States to provide national compliance with the current (1-hour) and new (8-hour) NAAQS. The OTAG's air quality modeling showed that even with the most stringent control measures that were evaluated for $NO_X$ and VOC, not all areas would come into attainment with the current ozone NAAQS. It is also evident that with no actions to address ozone transport, some areas will have ''background levels'' that will not allow even aggressive local controls to bring them into compliance, and others will face severe measures in an effort to do so. Therefore, today's action complements local programs to address attainment with the ozone NAAQS. The EPA recognizes the need to provide pollutant reductions where it would be more cost effective to do so rather than place all of the burden on localities. The recent RIA in support of the new ozone standard shows that the last tons of localized $NO_X$ and VOC reduction needed for meeting that standard in some areas can easily cost from $5,000 to $10,000 a ton to achieve. Avoiding such expenditures is a major objective of today's action.

3. Proposed Assumptions for Electric Utilities

This section presents the rationale and resulting proposed State-by-State $NO_X$ budget components for fossil fuel-burning electric utility units under today's action. Three different proposed $NO_X$ emission scenarios and their resulting State-by-State emission allocations are presented.

*a. Affected Entities.* The sources of information used in this section are: (1) for electric utility units submitted by utilities to EPA under the requirements of 40 CFR part 75 (emissions monitoring provisions of title IV, section 412; and (2) for nonutility units (e.g., units owned by Independent Power Producers), projected by EPA using the Integrated Planning Model (IPM) from base year information supplied to the North-American Electricity Reliability Council (NERC), Energy Information Agency (EIA), and trade sources.

Utility emissions represent approximately 36 percent of the total anthropogenic $NO_X$ emissions after application of current CAA controls in the States covered by today's action. The calculations described below apply to large sources that have generators greater than 25 MWe. The EPA believes that it is reasonable to assume no further control of emissions from smaller sources based on the current availability of emissions and utilization data for these sources. While EPA has quality-assured $NO_X$ emissions and utilization data for electric utility units larger than 25 MWe, such data are not currently available for smaller units. Therefore, the contribution of the smaller sources to the utility component of each State's budget cannot currently be assessed with certainty. The EPA solicits comment on: (1) whether sources equal to or smaller than 25 MWe should be included in the utility component of each State's budget, and (2) sources of emissions and utilization data for sources equal to or smaller than 25 MWe.

Larger sources were found to be large contributors to $NO_X$ emissions and, with the application of $NO_X$ controls, were found to be able to achieve reductions cost-effectively. Specifically, EPA performed an analysis to determine the cost effectiveness of $NO_X$ controls applied to large utility boilers and how it compared to other sector $NO_X$ controls. The results indicate that controlling emissions to an average level of 0.15 lb/MMBtu was cost effective for large utility boilers (see section III.B.2.).

This section does not include combustion units which generate electricity for purposes internal to a plant. These units, for the purposes of the overall State budget, are considered industrial units and are included in the corresponding section. Some of these units (e.g., units with capacity greater than 25 MWe or the equivalent in thermal output, measured in MMBtu) may more appropriately be included with the utility sector emissions, with similar required levels of control, since controls for these units may be as cost effective as utility unit controls. Additionally, certain large industrial combustion sources (e.g., boilers with a heat input larger than about 250 MMBtu/hour, used only for steam, not electricity generation) may be able to achieve levels of control equal to that of the electric utility units with comparable cost effectiveness. The EPA solicits comment on the appropriateness of including such units in the utility emissions by assuming the same level of control from these units as from utility units.

*b. Methodology Used to Determine the Proposed Electric Utility Budget Component.* The proposed emissions budget component for electric utilities (in tons) is calculated as the product of two separate components: (1) source activity level, measured in MMBtu; and (2) pollutant emission rate, measured in pounds of pollutant per MMBtu. Since both components influence the emissions, it is important to use the most accurate information when calculating each component.

i. Proposed Utility Budget Component Calculation and Alternatives. Four alternatives were considered for calculating the utility budget component (Table III–4).

TABLE III–4.—SUMMARY OF ALTERNATIVES

| Alternative | Activity level (heat input) | $NO_X$ rate (lb/MMBtu) |
|---|---|---|
| 1 | Future Activity (current with estimated growth to 2007) | Higher of:<br>(1) 0.15 or<br>(2) an 85% reduction of historic emission rate. |
| 2 | Current Activity | Higher of:<br>(1) 0.15 or<br>(2) an 85% reduction of current emission rate. |
| 3 | Future Activity (current with estimated growth to 2007) | 0.15. |
| 4 | Current Activity | 0.15. |

After evaluating each alternative, EPA is proposing to base the electric utility emissions on a projected future activity level and a desired emission rate (scenario 3). The following subsections discuss each technique separately. Detailed results of each alternative are available in the TSD.

Alternative 1: Future Activity With Historic (or Desired) Emission Rates

This technique involves calculating the emissions based on a projected future activity level (e.g., using an electric utility generation forecasting model such as IPM) and the higher of: (1) a desired emission rate, or (2) a rate resulting from a percent reduction from some past baseline year emission rate (e.g., 1990). This was the technique used in many OTAG analyses. On its face, this approach may appear to equitably determine an emissions budget. However, this requires the determination of the $NO_X$ emission rates from 1990 for every unit in a State's inventory. In addition to the accuracy problems encountered in determining an historic emissions rate, this approach relies on a percent reduction from an historic rate, which benefits States that were higher emitters over States that had cleaner fuels. Thus, EPA believes that this approach is neither the most technically accurate nor the most equitable.

Alternative 2: Current Activity With Current (or Desired) Emission Rates

This technique involves calculating emissions based on a current activity level (e.g., 1995 or 1996) and the higher of: (1) a desired emission rate, or (2) a rate resulting from a percent reduction from a current year (e.g., 1996) for which accurate emission rates per unit exist. The benefit of this approach is that both activity and emission rates are available for all utility units included in the emissions budget. This approach requires that all changes in the utilization of utility units be accommodated within the utility budget component. However, to the extent this approach relies on percent reduction, it would benefit currently high emitters and disadvantage units that installed controls in order to comply with other provisions of the Act. Thus, though simpler (because it relies on current actual data without projections), this approach may not be viewed as equitable.

Alternative 3: Future Activity With Desired Emission Rate

This technique involves calculating the utility budget component based on a future activity level (i.e., inflating the current measured utilization by an estimated growth factor) and a desired emission rate. The benefit of this approach is that it acknowledges the inherent inequity of using any past or current emission rates and treats all units equally based on a future standard emission rate (e.g., 0.15 lb/MMBtu). Further, by projecting future changes in utilization, this approach more directly accommodates changes in unit utilization to the extent such future utilization can be reasonably projected. The potential for error in making such projections is minimized when starting with actual unit-specific utilizations. Thus, though more complicated than the previous technique (because of its reliance on a projection of industry growth), this approach is viewed as more equitable, particularly since other source categories included in the overall State-specific budget reflect growth.

Alternative 4: Current Activity With Desired Emission Rate

This technique involves calculating emissions based on a current activity level (e.g., 1995 or 1996) and a desired future emission rate. Similar to the above approach, this approach acknowledges the inherent inequity of using any past or current emission rates and treats all units equally based on a desired standard emission rate (e.g., 0.15 lb/MMBtu). Unlike the above approach, however, it uses current activity to determine the utility budget component, providing for the highest degree of accuracy. Changes in the utilization of utility units must be accommodated within the utility budget component. This approach is simple (because it relies on current actual data without projections), but it may be viewed as less equitable for States with significantly higher projected utilization.

ii. Seasonal Utilization. The proposed utility budget component is based on utilization over the course of a summer season (i.e., May 1 to September 30). Utilization can be significantly different from season to season and the degree of this difference can vary from State to State (e.g., some States can have much higher utilization in the summer due, for example, to high usage of air conditioning or shifting load to another State). Thus, it is important to accurately characterize the summer usage of every State separately. Because of the high seasonal variability, it is less accurate to simply take total annual utilization and divide by the number of summer months. Similarly, because of the geographic variation, it is less accurate to take regionwide summer utilization and equally apportion the utilization to all States.

There are currently only two sources of information that provide actual data and take account for seasonal and State variations in utilization: (1) the EIA's Form 767, and (2) EPA's Emission Tracking System containing data reported by utilities in accordance with 40 CFR part 75. Both sources contain unit-by-unit utilization; EIA on a monthly basis and EPA on an hourly basis. There is, however, one important difference: while the method used to determine and report utilization to EIA can differ significantly from utility to utility, the information submitted to EPA is determined and reported using consistent techniques as required by 40 CFR part 75.

Thus, EPA is proposing to use its information to determine each unit's (and thereby each State's) utilization for the period beginning May 1 and ending September 30. It should be noted that in the case of units owned by nonutility sources (e.g., Independent Power Producers), EPA does not have current utilization information available. For the purpose of estimating the emissions for these units, EPA is proposing to use the IPM-predicted utilization for the year 2007. The predicted utilizations are projected from base year information supplied to the NERC, EIA and trade sources.

One way of accounting for State-by-State shifts in electricity generation, from 1 year to the next, during the period beginning May 1 and ending September 30, is to calculate the utility budget component based on a composite utilization: using the State-by-State utilization for the higher of 1995 or 1996 (i.e., for each State, using the higher of its overall 1995 or 1996 summer utilization). This is the approach proposed by EPA. Though this approach results in a slightly exaggerated baseline utilization, the inflation to emissions is moderate and the equity that it provides is potentially significant for some situations. Table III–5 [12] compares the State-by-State utilizations using the composite method versus using 1996 only. The impact is most evident on the District of Columbia (which has a 1995 utilization substantially greater than its 1996 utilization) for which 1996 may have been an unrepresentative summer. Another option would be to use the annual average of the highest 2 out of 3 recent years (e.g., 1995, 1996, and 1997) when data for 1997 becomes available. The EPA solicits comment on both approaches.

TABLE III–5.—COMPARISON OF STATE-BY-STATE 1995, 1996 AND "COMPOSITE" UTILITY UNIT SUMMER UTILIZATIONS

| State | 1995 Utilization (MMBtu) | 1996 Utilization (MMBtu) | State-by-State higher of 1995 or 1996 utilization |
|---|---|---|---|
| Alabama | 342,060,000 | 349,950,000 | 349,950,000 |
| Connecticut | 26,500,000 | 40,890,000 | 40,890,000 |
| Delaware | 30,890,000 | 33,830,000 | 33,830,000 |
| District of Columbia | 2,030,000 | 130,000 | 2,030,000 |
| Georgia | 349,310,000 | 335,330,000 | 349,310,000 |
| Illinois | 331,120,000 | 344,470,000 | 344,470,000 |
| Indiana | 511,420,000 | 512,420,000 | 512,420,000 |
| Kentucky | 397,540,000 | 395,800,000 | 397,540,000 |
| Maryland | 130,530,000 | 123,060,000 | 130,530,000 |
| Massachusetts | 96,290,000 | 100,150,000 | 100,150,000 |
| Michigan | 280,730,000 | 287,790,000 | 287,790,000 |
| Missouri | 267,710,000 | 270,240,000 | 270,240,000 |
| New Jersey | 44,140,000 | 43,310,000 | 44,140,000 |
| New York | 249,260,000 | 223,360,000 | 249,260,000 |
| North Carolina | 286,710,000 | 310,600,000 | 310,600,000 |
| Ohio | 549,050,000 | 565,990,000 | 565,990,000 |
| Pennsylvania | 445,030,000 | 481,950,000 | 481,950,000 |
| Rhode Island | 320,000 | 11,940,000 | 11,940,000 |
| South Carolina | 130,150,000 | 150,370,000 | 150,370,000 |
| Tennessee | 279,730,000 | 268,880,000 | 279,730,000 |
| Virginia | 150,870,000 | 136,740,000 | 150,870,000 |
| West Virginia | 269,840,000 | 302,850,000 | 302,850,000 |
| Wisconsin | 196,840,000 | 191,730,000 | 196,840,000 |

iii. Growth Considerations. In general, new units built to meet economic growth are lower emitting than the older units they augment or replace. Thus, though the industry's fuel utilization may increase over time, the industry's average $NO_X$ rate may decrease as newer, cleaner units are built and operated, and total emissions may or may not increase.

Two approaches were considered for accommodating potential emissions growth under an emissions budget. One approach was to calculate emissions based on recent historic utilization, as was done in the sulfur dioxide program under title IV of the Act. Under this approach, States with significant projected increases in utilization would be required to either: (1) reduce their $NO_X$ rates further, or (2) burn fuel more efficiently in order to compensate. For such States, the ability to trade emissions regionwide is particularly attractive because States with low increases or decreases in utilization can trade emissions with States having significantly increased utilization.

An alternative approach was to project each State's change in utilization from current levels to some future year and set a budget based on that future year's utilization. This approach directly addresses industry growth. Additionally, this was the type of approach taken by OTAG in investigating various State budgets. Thus, EPA is proposing to use this type of approach for addressing activity growth and, as described below, using the IPM growth projections. However, there are several other ways in which growth can be reflected in budget allocations. For example, recognizing that several utility companies span more than one State and that electricity is dispatched across State boundaries, an average regional growth rate could be

[12] It should be noted that units owned by Independent Power Producers were not included in Table III–5 since neither their 1995 nor their 1996 utilizations are known. The projected 2007 utilization for these units is, however, included in the utility portion of each State's budget.

applied to each State's current utilization. The EPA solicits comment on these and other approaches addressing activity growth in establishing a statewide utility budget component.

*c. Summary and Proposed Utility Budget Components.* For reasons discussed in the previous section, EPA is proposing to calculate each State's summer season electric utility emissions using a specific $NO_X$ emission rate and the projected summer season utilization of the year 2007. Specifically, EPA proposes calculating each State's utility $NO_X$ budget component by multiplying: (1) each State's summer activity level, measured in MMBtu, (EPA selected the higher of each State's overall 1995 or 1996 summer utilization), by (2) each State's projected growth between 1996 and 2007 (using the IPM model), by (3) a $NO_X$ rate of 0.15 lb/MMBtu. The resulting figure, in lbs, was divided by 2000 (lbs per ton) to determine tons. For electricity-generating units owned by nonutilities (e.g., Independent Power Producers), EPA used their IPM-predicted utilization for 2007 in place of steps (1) and (2). The EPA compared the IPM-generated growth factors of each State to those developed by OTAG for the electric utility sector in every State. In general, the IPM-predicted growth was about 60 percent higher than the growth projected by OTAG. Regionwide, the OTAG-predicted growth was about 6 percent from 1996 to 2007, and the IPM-generated growth was about 15 percent for the same period. However, for some States such as Alabama and New Jersey, the IPM growth factor was lower than the OTAG growth factor. The TSD describes in detail how the IPM and OTAG growth factors were calculated.

For the proposed rule, EPA selected the IPM's State-by-State growth factors over the growth factors developed by OTAG. Unlike the OTAG electric utility growth projections, the IPM's were not developed separately for each State, but were developed by analyzing performance of utilities as a regionwide system. Therefore, the IPM growth factors are considered to be more consistent than the OTAG growth factors. The EPA solicits comment on the appropriateness of using the IPM model to determine State-specific growth factors for the period between 1996 and 2007. Further, EPA solicits comment on what other reasonable regionwide approaches can be used to develop growth factors.

Table III–6 presents the resulting proposed utility (and electricity-generating nonutility) budget components per State along with the 2007 CAA base.

TABLE III–6.—STATE-BY-STATE BUDGET COMPONENT FOR ELECTRICITY-GENERATING UNITS

| State | 2007 CAA base (tons) | Proposed budget component (tons) | Percent reduction |
|---|---|---|---|
| Alabama | 81,704 | 26,946 | 67 |
| Connecticut | 5,715 | 3,409 | 40 |
| Delaware | 10,901 | 4,390 | 60 |
| District of Columbia | 385 | 152 | 61 |
| Georgia | 92,946 | 30,158 | 68 |
| Illinois | 115,053 | 31,833 | 72 |
| Indiana | 177,888 | 48,791 | 73 |
| Kentucky | 128,688 | 35,820 | 72 |
| Maryland | 35,332 | 11,364 | 68 |
| Massachusetts | 28,284 | 12,956 | 54 |
| Michigan | 82,057 | 25,402 | 69 |
| Missouri | 92,313 | 22,932 | 75 |
| New Jersey | 14,553 | 5,041 | 65 |
| New York | 39,639 | 24,653 | 38 |
| North Carolina | 83,273 | 27,543 | 67 |
| Ohio | 185,757 | 46,758 | 75 |
| Pennsylvania | 125,195 | 39,594 | 68 |
| Rhode Island | 773 | 905 | −17 |
| South Carolina | 43,363 | 15,090 | 65 |
| Tennessee | 71,994 | 19,318 | 73 |
| Virginia | 45,719 | 16,884 | 63 |
| West Virginia | 83,719 | 23,306 | 72 |
| Wisconsin | 51,004 | 15,755 | 69 |
| Total | 1,596,255 | 489,000 | 69 |

4. Proposed Assumptions for Other Stationary Sources

*a. Affected Entities.* This section presents the rationale and resulting proposed State-by-State $NO_X$ budget components for other stationary sources, specifically, the area and nonutility point source sectors. Area sources of $NO_X$ emissions include, for example, emissions from wildfires, open burning, and residential water heaters. Emissions from area sources represent only 7 percent of total anthropogenic $NO_X$ emissions in the States covered by today's action (based on OTAG 2007 CAA emissions). The highest percentage in any one State is 18 percent. Nonutility point sources include boilers, process heaters, reciprocating internal combustion engines, turbines, cement kilns and other categories. Emissions from sources in this sector represent 14 percent of the total anthropogenic $NO_X$ emissions in the States covered by today's action, with a range of 3–22 percent.

*b. Methodology Used to Determine the Proposed Area and Nonutility Point Source Budget Components.* The proposed State-by-State seasonal (May 1–September 30) budget components for the area and nonutility point sectors generally reflect the OTAG recommendations. For area sources, EPA proposes applying OTAG Level 0 (i.e., no new controls). The EPA is proposing this level of control because EPA and OTAG were not able to identify any reasonable control measures for sources in this sector. Controls for wildfires, feasible alternatives for open burning, and reasonable cost-effectiveness levels for control of existing residential water heaters have not yet been identified for these States. Therefore, EPA believes that application of Level 0 controls for this sector is appropriate.

The OTAG recommendations for the nonutility point sector are to reduce emissions from medium- and large-sized units in a manner equitable with utility controls. Specifically, OTAG recommended that large nonutility sources should meet approximately 70 percent reduction and medium-sized sources should meet RACT if utilities are subject to the 0.15 lb/MMBtu utility limit.

As discussed in section III.B.2., EPA is proposing to apply the OTAG recommendations. The EPA believes that these are reasonable levels of controls for these sources for the reasons outlined in section III.B.2.

For purposes of the budget calculation, EPA believes that it is reasonable to not calculate reductions from sources with emissions less than 1 ton per day. The OTAG's recommendation to focus controls on the large sources rather than all sources for purposes of establishing the budget is a reasonable approach from an administrative and data availability perspective and does not preclude States from eventually adopting controls on other sizes or categories of sources as an alternative way of meeting their budgets.[13] In addition, emissions data for the smaller nonutility sources have more uncertainty, especially source size and utilization data which are important in making a budget calculation. As described in section III.B.2, EPA's cost analysis does not key on source sizes; rather, it is a least cost approach that considers small, medium and large sources in determining the overall cost of the sector budget. Further, controls on smaller sources are frequently less cost effective than the same controls on larger sources. It should also be noted that the 1 ton per day cutoff for nonutility sources approximately corresponds to the 25 MWe cutoff for utility sources. The EPA solicits comment on: (1) whether sources with $NO_X$ emissions less than 1 ton per day should be included in the nonutility component of each State's budget, and (2) sources of emissions and utilization data for sources with $NO_X$ emissions less than 1 ton per day.

Other approaches to calculating the nonutility point source budget component were considered, including a combined Level 2 for large sources and Level 1 for smaller sources, an 80 percent reduction from large sources with Level 1 for the smaller sources (see Table III–2), and Level 1 or Level 2 applied across the entire sector. A Level 1 approach across the entire sector has a relatively low cost effectiveness (less than $1000 per ton) and is not as equitable as the OTAG recommendations, considering the reductions calculated for the electric utility sector and the importance of the nonutility point source sector from a total emissions standpoint. On the other hand, EPA considered a Level 2 approach across the entire sector to be less cost effective and administratively more difficult than the OTAG recommendations. That is, Level 2 nonutility costs for some of the smaller sources are likely to be higher in some cases than the Level 3 utility costs and the number of units included in the nonutility point source category is large, creating an administrative burden. As discussed in section II.B.3, another alternative approach would be to assume a higher level of control for combustion units which generate electricity for purposes internal to a plant. Some of these units may more appropriately be included with the utility sector emissions, with similar required levels of control, since controls for these units may be as cost effective as utility unit controls. Additionally, certain large industrial combustion sources (e.g., boilers with a heat input larger than about 250 MMBtu/hour, used only for steam, not electricity generation) may be able to achieve levels of control equal to that of the electric utility units with comparable cost effectiveness. The EPA solicits comment on these and other approaches for calculating the nonutility point source budget component.

In applying the proposed controls, the EPA closely approximated but could not precisely calculate emissions based on the size of nonutility point sources as defined by OTAG because the emissions inventories available do not have the level of detail specified in the OTAG recommendation.

For example:

- The OTAG recommendation separates boilers by size (i.e., less than 100 MMBtu, between 100 and 250 MMBtu and greater than 250 MMBtu). Available emissions inventory data are incomplete especially for the smaller size boilers.
- The OTAG recommendation separates stationary reciprocating internal combustion engines by size (i.e., less than 4000 horsepower (hp), between 4000 and 8000 hp, and greater than 8000 hp). Available emissions inventory data generally does not include hp capacities.
- The OTAG recommendation separates gas turbines by less than 10,000 hp, between 10,000 and 20,000 hp, and greater than 20,000 hp. Available emissions inventory data generally do not include hp capacities.
- The OTAG recommendations also include application of RACT on medium-sized sources; RACT is generally considered equal to Level 1 OTAG measures. However, since RACT may be a case-by-case decision, a precise forecast of emissions decreases cannot be made.

In order to calculate the proposed budget components based on application to the controls discussed above, EPA applied 70 percent reduction controls for boilers greater than 250 MMBtu/hour and other large sources (see TSD for details). Boiler size was determined on an SCC basis (i.e., the same level of control was applied to all boilers within a specific SCC regardless of the size of individual boilers). In addition, EPA applied RACT controls for sources not classed ''large'' and emitting between 1–2 tons per day; these reductions are generally in the range of 25–50 percent emissions decrease. Where information on boiler size was not available, EPA assumed that the source was medium-sized and applied RACT controls. For other medium- and large-sized nonutility sources, EPA applied 70 percent reduction controls where information on size of sources was available, and RACT controls for the remaining sources (see Budget TSD for details). Due to the lack of data in the inventories, especially for internal combustion engines and turbines, EPA could not base a budget calculation precisely on OTAG's recommendation of 70 percent reduction for large sources.

The proposed procedures for calculating seasonal emissions for these sectors differs from that used for utilities because, unlike utilities, day specific emissions are not available for each day of the season. In general, a three-step process is proposed to obtain summer season emission totals for the area and nonutility sectors. First, OTAG emissions reflecting the above controls are obtained for ''typical'' summer weekday, Saturday, and Sunday operating conditions for each sector for each State. The underlying procedures and assumptions used for deriving these emissions are described in the OTAG Emissions Inventory Development Reports (8). Second, the weekday

[13] If States chose to not seek reductions from some smaller sources, then the overall costs estimated for this sector would be expected to increase.

emissions are multiplied by 109 (the total number of weekdays in the period May 1 through September 30), and the Saturday and Sunday emissions are each multiplied by 22 (the total number of weekends in the 5-month season). In the third step, these estimates are summed for each day-type to get the summer season total emissions by sector by State.

*c. Summary and Proposed Area and Nonutility Point Source Budget Components.* The resulting proposed nonutility point and area budget components are contained in Table III–7 below along with a comparison for nonutility point sources to the 2007 CAA base. The area budget components are not compared to the 2007 base because no reductions were calculated for this budget sector. For the nonutility point sources, EPA applied controls that approximate the OTAG recommendations. For the area and nonutility sectors, we used the summer weekday, Saturday, and Sunday emissions that were available in the OTAG data base for these control levels. The OTAG growth assumptions were used for area and nonutility point source sectors.

TABLE III–7.—PROPOSED BUDGET COMPONENTS FOR NONUTILITY POINT AND AREA SECTORS

[Tons of $NO_X$ per Ozone Season]

| State | 2007 CAA base | 2007 Budget components | | Percent reduction |
|---|---|---|---|---|
| | Nonutility point | Nonutility point | Area | Nonutility point |
| Alabama | 47,182 | 25,131 | 25,229 | 47 |
| Connecticut | 4,732 | 4,475 | 4,587 | 5 |
| Delaware | 5,205 | 3,206 | 1,035 | 38 |
| District of Columbia | 312 | 312 | 741 | 0 |
| Georgia | 34,012 | 20,472 | 11,901 | 40 |
| Illinois | 63,642 | 39,855 | 7,270 | 37 |
| Indiana | 51,432 | 35,603 | 25,545 | 30 |
| Kentucky | 18,817 | 12,258 | 38,801 | 35 |
| Maryland | 6,729 | 4,825 | 8,123 | 28 |
| Massachusetts | 10,683 | 7,590 | 10,297 | 29 |
| Michigan | 57,190 | 35,317 | 28,126 | 38 |
| Missouri | 12,248 | 8,174 | 6,626 | 33 |
| New Jersey | 32,663 | 26,741 | 11,388 | 18 |
| New York | 19,889 | 16,930 | 15,585 | 15 |
| North Carolina | 32,107 | 21,113 | 9,193 | 34 |
| Ohio | 50,946 | 32,799 | 19,446 | 36 |
| Pennsylvania | 64,224 | 59,622 | 17,103 | 7 |
| Rhode Island | 328 | 328 | 420 | 0 |
| South Carolina | 34,791 | 20,097 | 8,420 | 42 |
| Tennessee | 65,051 | 32,138 | 11,991 | 51 |
| Virginia | 23,333 | 15,529 | 25,261 | 33 |
| West Virginia | 41,510 | 31,377 | 4,901 | 24 |
| Wisconsin | 21,209 | 12,269 | 10,361 | 42 |
| Total | 698,235 | 466,158 | 302,350 | 33 |

5. Proposed Assumptions for Highway Vehicles

*a. Affected Entities.* The highway vehicle sector encompasses those sources that normally operate on roads and highways. All light-duty cars and trucks, medium-duty trucks, heavy-duty trucks, motorcycles, and buses are included in this category. $NO_X$ emissions from these sources, including the effects of the fuel used to power these sources, are included in the estimate of emissions from the highway vehicle sector. These estimates also incorporate the effects of emission control programs which are intended to reduce emissions from these sources.

*b. Methodology Used to Develop the Proposed Highway Vehicle Budget Component*

i. Budget Component Determination Method and Alternatives Considered. The EPA proposes to derive States' highway vehicle budget component by estimating the State-by-State $NO_X$ emissions from highway vehicles in 2007. These estimates were developed by modeling the emissions expected in 2007 from all highway vehicles. The estimates are based on: (1) a projection for each State's number of vehicle-miles-traveled (VMT) by vehicle category in 2007, as described in section III.B.5.b.iii; and (2) the estimated emission rate for each vehicle category in 2007, assuming implementation of those measures incorporated in existing SIPs, measures already implemented federally, and those additional measures expected to be implemented federally. The additional Federal measures include:

- National Low Emission Vehicle Standards
- 2004 Heavy-Duty Engine Standards
- Revisions to Emissions Test Procedure.

These measures either have been promulgated in final form or are expected to have been promulgated by the time today's proposal is made final. All of these measures are expected to be implemented nationwide or in the 49 States other than California and hence would be in effect in those States required to submit a transport SIP under this proposal. Since these measures would be in effect as of 2007, EPA believes it is appropriate to reflect the impact of these measures in 2007 in calculating States' highway vehicle budget components and proposes to do so. However, it should be noted that the NLEV program is a voluntary program that will not take effect until the Northeastern States and the auto manufacturers agree to participate. While EPA expects such an agreement to be reached, the Agency acknowledges that such an agreement is not certain at the current time. Should the

Northeastern States and the auto manufacturers fail to agree to implement NLEV, EPA proposes to revise States' highway vehicle budget components and overall $NO_X$ budgets accordingly. This revision would increase States' $NO_X$ budgets. The EPA requests comment on this proposal.

The EPA proposes not to incorporate in its calculation of the highway vehicle budget component any benefits from Tier 2 light-duty vehicle standards. The Agency's decision to go forward with such standards is contingent on the determination that such standards are necessary to achieve air quality objectives and can be done so in a cost-effective manner. The EPA is currently engaged in an investigation of these and other issues related to Tier 2 standards, and it is premature to assume that such standards will be implemented prior to 2007. Therefore, EPA cannot at this time model the impact of a potential set of Tier 2 standards on emissions from affected States in 2007. If such standards are promulgated and implemented prior to 2007, EPA proposes to adjust States' highway vehicle budget components and overall $NO_X$ budgets accordingly to reflect implementation of these standards. The EPA requests comment on this approach for Tier 2 emission standards.

The EPA proposes to assume full implementation of other highway vehicle emission control programs as required by the CAA or contained in existing SIPs and maintenance plans in calculating each State's highway vehicle budget component for the purpose of establishing a statewide $NO_X$ emission budget. This proposal would encompass I/M programs, Federal Phase II RFG, Clean Fuel Fleet programs, and other programs intended to reduce $NO_X$ emissions from highway vehicles. The EPA further proposes to assume continued participation in the RFG program by the mandatory RFG areas and by those areas which have opted into the program. The EPA requests comment on the appropriateness of these proposals. In particular, EPA requests comment on whether the extent of the RFG coverage area chosen in calculating the highway vehicle budget component is appropriate, and on whether the normally-required $NO_X$ reductions from I/M programs in those areas whose section 182 waivers currently exempt them from the I/M $NO_X$ performance standard should be assumed when calculating State highway vehicle budget components and overall $NO_X$ budgets.

States have the discretion to adopt additional mobile source control measures as part of their transport SIP revision in order to meet their $NO_X$ budget or to meet other air quality obligations. The EPA agrees with OTAG that States should consider such control measures as RFG, I/M programs, and transportation control measures beyond those already included in State SIPs. These measures are applied and implemented locally rather than nationally, and in some cases their specific features are designed locally as well. The EPA recognizes that States and localities have more detailed information on which to base any decision to expand these programs beyond their current extent than does EPA. State and local decisions to expand these programs can be based on the unique characteristics of local areas and the nature of the ozone challenges they face. In particular, these programs provide VOC reductions larger than the $NO_X$ reductions they provide, and the OTAG modeling suggests that VOC reductions affect local ozone levels but have limited impact on downwind ozone levels. The EPA believes these programs may be attractive to many States and localities because they can offer large reductions in VOC, CO, and toxics emissions, in addition to reductions in $NO_X$ emissions, at a relatively modest cost. Hence States may want to adopt these or other local measures to achieve or maintain local ozone or CO attainment or to reduce exposure to toxic air pollutants, as well as to meet their obligations for $NO_X$ reductions to meet their statewide $NO_X$ budget. States which choose to do so may be able to adopt less-stringent controls on other sectors while still meeting their obligations to reduce $NO_X$ emissions as described in this rulemaking. For the reasons discussed above, EPA is not proposing to reduce the budgets to assume further controls from Federal or State motor vehicle measures. The $NO_X$ reductions alone from those measures do not appear sufficiently cost effective in all of the areas that would be subject to reduced budgets, since for some areas there is no need for local ozone or CO reductions.

ii. Activity Level Projections and Growth Considerations. The EPA proposes to use the best available projections of State VMT levels in 2007 in calculating States' budget components for the highway vehicle sector. For the purposes of providing estimates in today's action, EPA has used the 2007 projections developed by OTAG. The OTAG projections were based on actual 1990 VMT levels for each State, based on State submittals to OTAG where available or on estimates generated by the Highway Performance Monitoring System (HPMS) otherwise. These base year VMT levels were then projected to 2007, using growth rates agreed to or in some cases supplied by the State. The EPA proposes to use the state-specific estimates of VMT growth by vehicle category through 2007, as developed in the OTAG process, in calculating States' highway vehicle budget components and overall $NO_X$ budgets. In most cases, States accepted OTAG-proposed growth estimates equal to those used by the Agency in the October 1995 edition of its annual report, ''National Air Pollutant Emission Trends'' (16), although several States submitted (and the OTAG inventory incorporated) growth estimates that were significantly lower than the growth estimates used by the Agency in its 1995 Trends report. One State submitted growth estimates that were higher than the 1995 Trends report growth estimates.

The EPA has considered a number of options to forecast highway VMT levels in 2007. For today's proposal, EPA has chosen to use the projected VMT levels used by OTAG. As discussed above, most of those growth rate estimates were consistent with EPA's estimates in its Trends report.[14] Furthermore, the open, collaborative OTAG process allowed interested parties to review VMT and VMT growth estimates when constructing future year emission estimates. The EPA encourages each State subject to today's action to review the OTAG 1990 VMT levels and VMT growth projections again; EPA also requests each affected State to review these projections for consistency with other State projections, including projections used in SIPs for nonattainment areas. The EPA expects that all involved State and local agencies will coordinate and concur on any new VMT growth rate submissions, as should be the case when growth rates are developed for use in SIP revisions containing VMT and emissions projections. The EPA proposes to incorporate revised VMT growth projections received from States during the comment period of today's action into its final rule, if appropriately explained and documented.

The EPA further proposes to use actual 1995 VMT levels as the base year for the 2007 inventory projections in the final rule, rather than continuing to rely on the 1990 VMT levels. The Agency believes that the accuracy of projected 2007 VMT levels would be improved by

[14] The Trends report method projects national VMT based on a growth rate of about 2% per year and allocates VMT to States based on Census Bureau forecasts of population levels in each State.

using a more recent base year, since the impact of any deviation between projected and actual growth rates through 2007 would be reduced. For this reason, EPA proposes to use and requests States to submit VMT data for 1995. The EPA requests comment on this proposal to use actual 1995 VMT levels as the base year for projecting 2007 VMT levels and on the use of 1990 VMT levels as the base year in today's action.

iii. Seasonal/Weekday/Weekend Adjustment. The EPA proposes to project States' highway vehicle budget components during the 2007 ozone season based on the actual number of weekday and weekend days during the 2007 ozone season. The OTAG inventory projections, by contrast, were based on the actual number of weekend and weekday days during the specific ozone episodes modeled by OTAG. The VMT levels on weekdays differ from VMT levels on weekend days, all other things being equal, so it is important to use the proper proportion of weekdays and weekend days when developing highway vehicle budget components and overall State $NO_X$ budgets. Since States must demonstrate compliance with their $NO_X$ budgets over the entire ozone season in 2007, EPA believes that the actual number of weekdays and weekend days during the 2007 ozone season should be used to calculate highway vehicle budget components and overall State $NO_X$ budgets. The EPA requests comment on this proposal.

The EPA also proposes to base its calculation of State highway vehicle budget components and overall $NO_X$ budgets on the average temperatures for the affected months. The OTAG projections are based on the actual daily temperature ranges experienced during the episodes modeled by OTAG. These temperature ranges may not be representative of the typical temperatures experienced during the whole ozone season as defined in today's action, since ozone episodes tend to occur during periods of above-average temperature. The estimated highway vehicle budget components presented in Table III–8 are based on the OTAG temperature ranges and hence are based on temperatures that may be higher than the average temperatures experienced during the 5 ozone season months. In its final rulemaking, EPA will revise its highway vehicle budget components to reflect the average temperatures for the affected months. The impact of these temperature differences on highway vehicle budget components is expected to be modest, because even large differences in summer temperatures have only a modest effect on estimated $NO_X$ emissions from highway vehicles. For example, as temperature goes from 75 to 95 degrees Fahrenheit, $NO_X$ emissions increase by approximately 4 percent. The actual difference between summer average and ozone-episode temperature ranges is considerably smaller than 20 degrees Fahrenheit, so the size of the temperature adjustment described above would be correspondingly smaller. The EPA requests comment on the appropriateness of this adjustment and on its proposed use of ozone season average temperatures instead of ozone-episode temperatures in developing States' highway vehicle budget components and overall $NO_X$ budget.

iv. Comparison to OTAG Recommendations. The set of presumptive controls modeled by EPA to develop the highway vehicle budget components and overall $NO_X$ budgets is consistent with the OTAG recommendations. The OTAG supported expeditious implementation of Federal measures, including those listed above. The OTAG also recommended the continued use of RFG in the mandated and current opt-in areas, as reflected in EPA's proposed method for calculating highway vehicle budget components. The OTAG supported State flexibility to opt into the RFG program and encouraged areas which face local nonattainment, maintenance, or downwind transport challenges to opt into the RFG program. The EPA proposes to provide States with such flexibility in devising strategies to meet the $NO_X$ budgets outlined in section III.C. The EPA believes that Federal Phase II RFG can provide cost-effective reductions in ozone precursors, since it will reduce emissions of both VOC and $NO_X$. Phase II RFG can provide VOC and $NO_X$ reductions at a cost of $2600–3500 per ton, depending on the amount of fuel affected by any expansion of the program offer. Hence EPA encourages States to consider adopting Federal Phase II RFG in areas eligible to opt into the program as part of their revised SIP.

The OTAG further recommended that "The USEPA should adopt and implement by rule an appropriate sulfur standard to further reduce emissions and assist the vehicle technology/fuel system [to] achieve maximum long term performance." The EPA is engaged in an extensive evaluation of gasoline-based emission controls as part of its work to evaluate the need for and benefits and costs of Tier 2 vehicle emission standards. This evaluation includes an examination of the costs and benefits of gasoline sulfur control. At this time, however, EPA has not yet defined, quantified, or evaluated the impact of sulfur control. Furthermore, EPA has not at this time decided whether to require sulfur reductions. Therefore, EPA believes it is not appropriate to assume such reductions when calculating highway vehicle budget components or overall $NO_X$ budgets. If the Agency does establish gasoline sulfur standards, EPA proposes to adjust State highway vehicle budget components and overall State $NO_X$ budgets to reflect the emissions impact of such standards on $NO_X$ emissions from highway vehicles in 2007. The EPA requests comment on this proposal.

The OTAG also recommended that EPA should evaluate the potential for reformulation of diesel fuel for reducing $NO_X$ emissions from highway and nonroad diesel engines. The EPA is engaged in an examination of the need for and potential benefits of diesel fuel reformulation as part of its assessment of the feasibility of its proposed 2004 heavy-duty highway vehicle standards. At the present time, however, EPA does not have sufficient information to adequately quantify the potential of diesel fuel reformulation to reduce $NO_X$ emissions or to determine the costs of various reformulation strategies. Hence EPA has not incorporated any emission reductions from diesel fuel reformulation in its calculation of highway vehicle budget components or overall $NO_X$ budgets. The EPA will continue to evaluate the potential of diesel fuel reformulation to reduce $NO_X$ emissions and enable the proper functioning of engine-based emission controls through the collaborative process developed as a result of the 1995 Statement of Principles. If EPA does promulgate requirements to reformulate diesel fuel, EPA proposes to revise at that time States' highway vehicle budget components and overall $NO_X$ budgets to reflect the projected impact of the required diesel fuel reformulation on $NO_X$ emission from highway vehicles.

The OTAG called on the States to adopt inspection and maintenance programs where required by the CAA. This recommendation is reflected in EPA's proposed method of calculating the highway vehicle emissions, as discussed above. The OTAG also called on the States to consider expanding I/M programs to urbanized areas of greater than 500,000 population in the "fine grid" portion of the OTAG region. The EPA believes that properly designed and operated I/M programs are a practicable and cost-effective means of reducing ozone precursors. These programs provide VOC reductions as large or larger than the $NO_X$ reductions they provide, while the OTAG modeling suggests that VOC reductions affect local ozone levels but have limited impact on downwind ozone levels. Therefore, while EPA recognizes that many of the States subject to today's proposal have already implemented or plan to implement I/M programs, and while EPA encourages the States to consider extending I/M programs in other areas to reduce ozone precursors as part of their attainment and maintenance strategy, EPA proposes not to assume expansion of currently-required I/M programs in calculating States' highway vehicle budget components or overall $NO_X$ budgets. The EPA requests comment on this proposal. Notwithstanding this proposal, because I/M programs cause reductions in $NO_X$ emissions implicated in ozone transport, EPA encourages the States to consider implementing effective I/M programs in other areas as part of their transport SIP.

*c. Summary and Proposed Highway Vehicle Budget Components.* The highway vehicle budget components presented in Table III–8 were developed by evaluating the emissions that would result in 2007 when existing CAA requirements are met and additional Federal measures are implemented. These estimates are based on the 1990 VMT levels and growth rates supplied to OTAG by the States.

TABLE III–8. BUDGET COMPONENTS FOR HIGHWAY VEHICLES

[Tons of $NO_X$ per Ozone Season]

| State | 2007 CAA base | Proposed budget component | Percent reduction |
|---|---|---|---|
| Alabama | 61,205 | 56,601 | 8 |
| Connecticut | 23,446 | 17,392 | 26 |
| Delaware | 8,867 | 8,449 | 5 |
| District of Columbia | 3,081 | 2,267 | 26 |
| Georgia | 88,363 | 77,660 | 12 |
| Illinois | 91,656 | 77,690 | 15 |
| Indiana | 72,294 | 66,684 | 8 |
| Kentucky | 49,789 | 46,258 | 7 |
| Maryland | 39,941 | 28,620 | 28 |
| Massachusetts | 35,308 | 23,116 | 35 |
| Michigan | 91,449 | 81,453 | 11 |
| Missouri | 61,778 | 55,056 | 11 |
| New Jersey | 55,783 | 39,376 | 29 |
| New York | 114,234 | 94,068 | 18 |
| North Carolina | 80,955 | 73,056 | 10 |
| Ohio | 104,422 | 92,549 | 11 |
| Pennsylvania | 81,805 | 73,176 | 11 |
| Rhode Island | 7,566 | 5,701 | 25 |
| South Carolina | 53,566 | 49,503 | 8 |
| Tennessee | 72,907 | 67,662 | 7 |
| Virginia | 88,792 | 79,848 | 10 |
| West Virginia | 23,267 | 21,641 | 7 |
| Wisconsin | 46,390 | 41,651 | 10 |
| Total | 1,356,864 | 1,179,477 | 13 |

*d. Conformity.* The CAA section 176 (c) requires federally supported activities to conform to the purpose of the SIP. Specifically, the Federal government cannot support an activity that causes or worsens air quality violations or delays attainment. Conformity applies to nonattainment and maintenance areas.

The CAA establishes several more specific requirements regarding how conformity of Federal highway and transit activities must be determined. For example, the emissions expected from the implementation of transportation plans and programs must be consistent with estimates of emissions from highway vehicles and necessary emissions reductions contained in the SIP. The EPA has promulgated regulations (40 CFR parts 51 and 93) to implement the general and transportation-related conformity requirements.

The EPA proposes that neither the highway vehicle budget components nor the overall $NO_X$ budgets proposed in this rulemaking change the existing conformity process or existing SIPs' motor vehicle emissions budgets under the conformity rule. The EPA does not believe that Federal agencies or Metropolitan Planning Organizations (MPOs) operating in States subject to today's proposal must demonstrate conformity to the proposed budgets or the highway vehicle budget component levels used to calculate the budgets. Whereas the conformity provisions in section 176(c) of the CAA apply to nonattainment and maintenance areas, the States' emission budgets apply statewide. Without greater geographic disaggregation in the SIP, Federal agencies and MPOs will not be able to determine consistency with the emission estimates in the transport SIP revision being requested in today's proposal. Furthermore, EPA does not believe that consistency with the statewide emissions estimates in transport SIPs can be used to determine whether or not a transportation or other Federal activity will cause or worsen local air quality violations. The statewide budget does not represent the level of emissions necessary for attainment or a reasonable further progress milestone. In contrast, attainment demonstrations, 15 percent SIPs, post-1996 rate-of-progress, and maintenance plans—SIPs to which EPA requires conformity—do contain motor vehicle and other emissions estimates on which the attainment, maintenance, or progress demonstration depends.

6. Proposed Assumptions for Nonroad Sources

*a. Affected Entities.* The nonroad sector encompasses those mobile sources that normally do not operate on roads and highways. This sector includes recreational and commercial marine engines; small engines such as those used to power snowmobiles, chainsaws, or lawn and garden equipment; larger nonroad engines such as those used to power agricultural equipment, construction equipment, industrial/commercial equipment (forklifts, pumps, compressors, generator sets), and mining equipment; aircraft, and locomotives. Emissions from these sources, including the effects of the fuel used to power these sources, would be included in the estimate of emissions from the nonroad sector. These estimates would also incorporate the effect of emission control programs which are intended to reduce emissions from these sources.

*b. Methodology Used to Determine the Proposed Nonroad Budget Component.*

i. Budget Component Determination Method and Alternatives Considered. The EPA proposes that the States' nonroad budget component be derived by estimating the State-by-State $NO_X$ emissions from nonroad engines in 2007. These estimates would be developed by modeling the emissions expected in 2007 from all nonroad engines. The estimates would be based on: (1) a projection for each State's number of engines of each type and application in 2007; (2) a projection of the level of activity for each type and application of nonroad engine in 2007; and (3) the estimated emission rate for each engine type and application in 2007, assuming implementation of those measures incorporated in existing SIPs, measures already implemented federally, and those additional measures expected to be implemented federally. The additional Federal measures include:

- Federal Small Engine Standards, Phase II.
- Federal Marine Engine Standards (for diesels > 50 horsepower).
- Federal Locomotive Standards.
- 1997 Proposed Nonroad Diesel Engine Standards.

All of these measures either have been proposed or are expected to be proposed in the near future and are sufficiently well-defined to model their emission impacts in 2007. These measures are expected to be implemented nationwide and hence would be in effect in those States required to submit a SIP under this proposal. Since these measures would be in effect as of 2007, EPA believes it is appropriate to reflect the impact of these measures in 2007 in calculating States' nonroad budget components and proposes to do so.

States have the discretion to adopt additional nonroad control measures as part of their transport SIP revision in order to meet their $NO_X$ budget or to meet other air quality obligations. The EPA agrees with OTAG that States should consider such control measures as RFG, scrappage programs, and activity level control measures beyond those already included in State SIPs. These measures are applied and implemented locally rather than nationally, and in some cases their specific features are designed locally as well. The EPA recognizes that States and localities have more detailed information on which to base any decision to expand these programs beyond their current extent than does EPA. State and local decisions to expand these programs can be based on the unique characteristics of local areas and the nature of the ozone challenges they face. In particular, some of these programs tend to provide VOC reductions that are larger than the $NO_X$ reductions they provide, along with significant CO, toxics, and particulate matter reductions. The OTAG modeling suggests that VOC reductions affect local ozone levels but have limited impact on downwind ozone levels. Hence States may want to adopt these measures to help achieve or maintain local attainment, as well as to help meet their obligation to mitigate transport. States which choose to do so may be able to adopt less-stringent controls on other sectors while still complying with their overall budget.

ii. Activity Level Projections and Growth Considerations. The EPA proposes to use the best available projections of State nonroad activity levels in 2007 in calculating States' budget components for the nonroad sector. For the purposes of providing estimates in today's action, EPA has used the 2007 projections developed by OTAG. The OTAG projections were based primarily on estimates of actual 1990 nonroad activity levels found in the October 1995 edition of EPA's annual report, ''National Air Pollutant Emission Trends.'' Several States submitted estimates of their 1990 nonroad activity levels that differed from these estimates. The OTAG growth rates were based on growth projections issued by the Bureau of Economic Affairs and hence were consistent with those used by the Agency in its October 1995 ''Trends'' report. At the present time, EPA considers the growth estimates to be reasonable; however, the Agency requests comment on its proposal to use the OTAG growth projections of nonroad activity levels in calculating the nonroad budget components and overall $NO_X$ budgets for those States subject to today's proposal. The basis of the OTAG growth projections is explained in greater detail in OTAG's Emission Inventory Development Report, Volume I, pages 11–13.

The EPA encourages each State subject to today's proposal to review the OTAG nonroad growth projections again; EPA also requests each affected State to review these projections for consistency with other State projections, including projections used in SIPs for nonattainment areas. The EPA expects that all involved State and local agencies will coordinate and concur on any new nonroad growth rate submissions, as should be the case when growth rates are developed for use in SIP revisions containing nonroad activity level and emissions projections. The EPA proposes to incorporate revised nonroad growth projections received from States during the comment period of today's proposal into its final rule, if appropriately explained and documented. The EPA requests comment on these proposals.

The EPA further proposes to use estimated historical 1995 nonroad activity levels as the base year for the 2007 inventory projections in the final rule, rather than continuing to rely on the 1990 nonroad activity levels. The Agency believes that the accuracy of projected 2007 nonroad activity levels would be improved by using a more recent base year, since the impact of any deviation between projected and actual growth rates through 2007 would be reduced. For this reason, EPA proposes to use its 1997 ''Trends'' estimate of 1995 nonroad activity levels in its final rulemaking and requests comment on this proposal. The EPA also requests comment on its proposal to use actual 1995 nonroad activity levels as the base year for projecting 2007 nonroad activity levels and on the use of 1990 nonroad activity levels as the base year in today's action.

iii. Seasonal/Weekday/Weekend Adjustment. The EPA proposes to project States' nonroad budget components during the 2007 ozone season based on the actual number of weekday and weekend days during the 2007 ozone season. The OTAG inventory projections, by contrast, were based on the actual number of weekend and weekday days during the specific ozone episodes modeled by OTAG. Nonroad activity levels on weekdays differ from levels on weekend days, all other things being equal, so it is important to use the proper proportion of weekdays and weekend days when developing nonroad budget component levels and overall State $NO_X$ budgets. Since States must demonstrate compliance with their $NO_X$ budgets over the entire ozone season in 2007, EPA believes that the actual number of weekdays and weekend days during the 2007 ozone season should be used to calculate budget components and overall State $NO_X$ budgets. The EPA requests comment on this proposal.

The EPA also proposes to base its calculation of the State nonroad budget components and overall $NO_X$ budgets on the average temperatures for the affected months. The OTAG projections are based on the actual daily temperature ranges experienced during the episodes modeled by OTAG. These temperature ranges may not be representative of the typical temperatures experienced during the whole ozone season as defined in today's proposal, since ozone episodes tend to occur during periods of above-average temperature. The estimated nonroad emissions presented in Table III–9 are based on the OTAG temperature ranges and hence are based on temperatures that may be higher than the average temperatures experienced during the five ozone season months. In its final rulemaking, EPA will revise its nonroad budget components and overall $NO_X$ budgets to reflect the average temperatures for the affected months. The impact of these temperature differences on nonroad budget components and overall $NO_X$ budgets is expected to be modest, because even large differences in summer temperatures have only a modest effect on estimated nonroad $NO_X$ emissions. The EPA requests comment on the appropriateness of this adjustment and on its proposed use of ozone season average temperatures instead of ozone-episode temperatures in developing States' nonroad budget components and overall $NO_X$ budget.

iv. Comparison to OTAG Recommendations. The set of presumptive controls modeled by EPA to develop the nonroad sector budget components for each State is consistent with the OTAG recommendations. The OTAG supported expeditious implementation of Federal measures, including those listed above. The OTAG also recommended the continued use of RFG in the mandated and current opt-in areas, as reflected in EPA's proposed method for calculating the nonroad budget components. As discussed in section III.B.5, OTAG supported State flexibility to opt into the RFG program and encouraged areas which face local nonattainment, maintenance, or downwind transport challenges to opt into the RFG program. Although current EPA guidance indicates that Phase II RFG will not reduce $NO_X$ emissions from nonroad engines, Phase II RFG will offer significant VOC emission reduction benefits from nonroad engines. As discussed in section III.B.5, EPA encourages States to consider adopting Federal Phase II RFG in areas eligible to opt into the program as part of their revised SIP.

Current EPA guidance also indicates that changes in fuel sulfur levels, including any changes that may result from EPA's Tier 2 study, would not affect $NO_X$ emissions from gasoline-powered nonroad equipment since such equipment is not equipped with catalytic converters. Hence EPA proposes not to change States' nonroad budget components if EPA should promulgate sulfur standards as a result of the Tier 2 study or any other EPA analysis, unless nonroad engines equipped with catalytic converters begin to be introduced into the U.S. marketplace. The EPA requests comment on this proposal.

As discussed in section III.B.5, OTAG recommended that EPA should evaluate the potential for reformulation of diesel fuel for reducing $NO_X$ emissions from both highway and nonroad diesel engines. The EPA is engaged in an examination of the need for and potential benefits of diesel fuel reformulation as part of its assessment of the feasibility of its proposed 2004 heavy-duty highway vehicle emission standards but has not as of this writing completed its examination. Furthermore, EPA does not have sufficient information at the present time to quantify adequately the potential of diesel fuel reformulation to reduce $NO_X$ emissions from nonroad diesel engines or to determine the costs of various reformulation strategies. For these reasons, EPA has not incorporated any emission reductions from diesel fuel reformulation in its calculation of States' nonroad budget components. If EPA does promulgate requirements to reformulate diesel fuel, EPA will evaluate whether additional research to determine the impact of diesel fuel reformulation on $NO_X$ emissions from nonroad engines is needed. The EPA proposes to defer any consideration of revisions to States' nonroad sector budget components and overall $NO_X$ budgets to reflect the impact of diesel fuel reformulation on $NO_X$ emission from nonroad engines until such time as diesel fuel reformulation standards, and the effect of those standards on nonroad engine $NO_X$ emissions, have been adequately defined. The EPA requests comment on this proposal.

c. *Summary and Proposed Nonroad Budget Components.* The nonroad mobile sources sector budget components presented in Table III–9 were developed by evaluating the emissions that would result in 2007 when existing CAA requirements are met and additional Federal measures are implemented. These estimates are based on the 1990 activity levels and growth rates supplied to OTAG by the States.

TABLE III–9.—BUDGET COMPONENTS FOR NONROAD SOURCES

[Tons of $NO_X$ per Ozone Season]

| State | 2007 CAA base | Proposed budget component | Percent reduction |
|---|---|---|---|
| Alabama | 21,742 | 18,727 | 14 |
| Connecticut | 11,679 | 9,581 | 18 |
| Delaware | 4,663 | 4,262 | 9 |
| District of Columbia | 3,609 | 3,582 | 1 |
| Georgia | 27,151 | 22,714 | 16 |
| Illinois | 66,122 | 56,429 | 15 |
| Indiana | 30,489 | 27,112 | 11 |
| Kentucky | 25,327 | 22,530 | 11 |
| Maryland | 21,717 | 18,062 | 17 |
| Massachusetts | 22,865 | 19,305 | 16 |
| Michigan | 29,005 | 24,245 | 16 |

TABLE III–9.—BUDGET COMPONENTS FOR NONROAD SOURCES—Continued

[Tons of $NO_X$ per Ozone Season]

| State | 2007 CAA base | Proposed budget component | Percent reduction |
|---|---|---|---|
| Missouri | 22,582 | 19,102 | 15 |
| New Jersey | 25,150 | 21,723 | 14 |
| New York | 35,934 | 30,018 | 16 |
| North Carolina | 22,867 | 18,898 | 17 |
| Ohio | 46,214 | 42,032 | 9 |
| Pennsylvania | 33,707 | 29,176 | 13 |
| Rhode Island | 2,511 | 2,074 | 17 |
| South Carolina | 15,446 | 12,831 | 17 |
| Tennessee | 54,710 | 47,065 | 14 |
| Virginia | 29,160 | 25,357 | 13 |
| West Virginia | 10,966 | 10,048 | 8 |
| Wisconsin | 19,208 | 15,145 | 21 |
| Total | 582,824 | 500,018 | 14 |

*C. State-by-State Emissions Budgets*

The EPA is proposing a statewide emission budget for the year 2007 for each State covered by today's action. The proposed statewide budgets were calculated by summing the budget components which were calculated as described above. Budget components were calculated for the following five sectors: electric utility, nonutility point, area, nonroad engines, and highway vehicles.

The proposed overall budgets to be achieved by 2007 include reductions from all Federal programs that would continue to result in emission reductions from the compliance date for the State-adopted rules (between September 2002 and September 2004 that EPA establishes in its final rulemaking) to 2007. In 2007, EPA plans to begin a reassessment of transport. At that time, EPA will determine how any new data and tools (such as new air quality models) should be incorporated. The portion of the budget over which States have control (i.e., the non-Federal portion) would have to be implemented between September 2002 and September 2004. These concepts are fully discussed in section V, SIP Revisions and Approvability Criteria, of this rulemaking.

The proposed State-by-State budgets are shown in Table III–10 below. This table compares the proposed budgets to the 2007 CAA emissions which were the starting point for the calculation.

TABLE III–10.—PROPOSED SEASONAL $NO_X$ EMISSIONS BUDGET FOR STATES MAKING A SIGNIFICANT CONTRIBUTION TO DOWNWIND OZONE NONATTAINMENT

[Tons of $NO_X$ per Ozone Season]

| State | 2007 CAA emissions | Proposed 2007 budget | Percent reduction |
|---|---|---|---|
| Alabama | 237,062 | 152,634 | 36 |
| Connecticut | 50,159 | 39,445 | 21 |
| Delaware | 30,671 | 21,342 | 28 |
| District of Columbia | 8,128 | 7,054 | 9 |
| Georgia | 254,373 | 162,905 | 35 |
| Illinois | 343,742 | 213,077 | 38 |
| Indiana | 357,647 | 203,734 | 100 |
| Kentucky | 261,422 | 155,667 | 40 |
| Maryland | 111,841 | 70,994 | 36 |
| Massachusetts | 107,437 | 73,263 | 32 |
| Michigan | 287,827 | 194,542 | 32 |
| Missouri | 195,547 | 111,890 | 43 |
| New Jersey | 139,537 | 104,270 | 25 |
| New York | 225,281 | 181,254 | 19 |
| North Carolina | 228,395 | 149,803 | 34 |
| Ohio | 406,785 | 233,584 | 43 |
| Pennsylvania | 322,034 | 218,671 | 32 |
| Rhode Island | 11,599 | 9,429 | 19 |
| South Carolina | 155,586 | 105,941 | 31 |
| Tennessee | 276,653 | 178,173 | 35 |
| Virginia | 212,265 | 162,879 | 21 |
| West Virginia | 164,362 | 91,273 | 44 |
| Wisconsin | 148,171 | 95,181 | 35 |
| Total | 334,266,508,374 | 2,937,005 | 35 |

*D. Recalculation of Budgets*

The EPA is proposing statewide emissions budgets calculated as described above. The EPA specifically invites public comment on the overall approach as well as the individual elements that were used in these calculations (e.g., emission factors, source-specific data, and, growth assumptions). The EPA is proposing that the same elements and assumptions used in the EPA budget calculations be used by the States as they develop revisions to their SIPs in response to today's proposal. However, EPA recognizes that changes to these individual elements may be warranted. If changes to any of these elements are appropriate, based on comments received, EPA proposes recalculating the budgets with the revised data, as described below. The intention of this procedure is to take into account new information that would replace less accurate data previously relied upon. That is, EPA intends to continue to use the best information available as well as to assure that the States carry out their plans to reduce emissions so that, in the end, the transport of ozone and ozone precursors is decreased.

For example, for nonutility point sources, OTAG recommended that RACT should be considered for individual medium sized nonutility point sources. The EPA proposed budget calculations generally follow the OTAG recommendations. Because the definition of RACT may vary from source-to-source, it is not possible to precisely forecast emissions reductions due to RACT on a source-specific basis. States, however, may have source-specific information useful in determining RACT for sources in their States and may, therefore, provide more precise information. With respect to the large nonutility point sources, missing data in the OTAG emissions inventories precludes EPA from precisely following the recommended definitions of large sources. Thus, States may provide more precise information for EPA to use in the budget calculations. In such cases, EPA is proposing to recalculate the budgets to take into account the better data. New data should be submitted by the end of the public comment period so that recalculation would occur prior to final rulemaking on this proposal; if any additional data become available after EPA's final rulemaking action, such data could be considered prior to State submittal of revised SIPs. The EPA is soliciting comment on this approach.

Similarly, with respect to growth assumptions, States should use the same growth rates EPA used to calculate the proposed budgets, unless better information indicates that the growth assumptions should be revised. New data should be submitted by the end of the public comment period so that recalculation would occur prior to final rulemaking on this proposal; if any additional data become available after EPA's final rulemaking action, such data could be considered prior to State submittal of revised SIPs. Changes in growth that are the result of clearly identified control strategies which can be shown to provide real, permanent, and quantifiable changes in growth, such as programs to reduce VMT, may also be creditable toward meeting the 2007 budget. The EPA is soliciting comment on this approach.

From time to time, EPA updates its models and inventory estimates to reflect new information. As models change, EPA recognizes that projected emission levels such as those used to develop the overall State $NO_X$ budgets and sector-specific budget components proposed in today's action may change. Furthermore, EPA recognizes that a set of control strategies which an earlier model projects to result in a given level of emissions may be estimated to result in a greater or lesser level of emissions, when evaluated using a newer model, both in terms of absolute emission levels and the level of emissions relative to some other set of control strategies. Similar to the discussion above on source-specific data and growth assumptions, States should use the same models and inventories EPA used to calculate the proposed budgets, unless better information indicates that they should be revised. Changes that are the result of changes in EPA models and/or inventories may lead to an upward or downward recalculation of the budget prior to 2007. New data should be submitted by the end of the public comment period so that recalculation would occur prior to final rulemaking on this proposal; if any additional data become available after EPA's final rulemaking action, such data could be considered prior to State submittal of revised SIPs. The EPA requests comment on whether the State $NO_X$ budgets and budget components for specific sectors should be revised when EPA emission and inventory models change and on whether States' SIP revisions in response to today's action should be revised. The EPA expects to address this issue through the process described in section V, SIP Revisions and Approvability Criteria, to define the reporting and implementation requirements for today's action.

Finally, it should be noted that it is possible that EPA may introduce additional Federal measures after State emission budgets are defined but before 2007. As discussed in this rulemaking, EPA is proposing to base State $NO_X$ budgets on a calculation of the $NO_X$ emissions that would result in each affected State in 2007 assuming the implementation of a set of reasonable control measures. Any additional Federal measures beyond those described in today's action would be implemented regardless of State action to meet its transport SIP obligations. The EPA considered two approaches in this instance: one which would, in effect, provide emissions reduction credit to the State and one that does not. In the first case, one could argue that real emissions reductions result from the new Federal measures and, therefore, the State could receive credits for these reductions and implement a smaller portion of its planned emission reductions. In the second approach, the State would be required to continue to implement the measures in its revised SIP because those measures continue to be considered reasonable control measures and all reasonable measures are needed to mitigate transport. The EPA believes the latter approach is more consistent with the framework of this proposal. However, EPA requests comment on both of these approaches.

As noted, EPA is proposing to allow recalculation of $NO_X$ budgets as new information becomes available (e.g., changes in response to the promulgation of additional Federal standards controlling $NO_X$, changes in EPA emission and inventory models, changes adopted in SIPs in any of the underlying elements or assumptions used to calculate the State $NO_X$ budget, or less than full implementation of the NLEV rule). The EPA requests comments on whether State $NO_X$ budgets and budget components for specific sectors should be revised in these cases and whether States' SIP revisions in response to today's action should be revised either at the request of EPA or upon the initiation of a State.

## IV. Implementation of Revised Air Quality Standards

*A. Introduction*

On July 16, 1997, President Clinton issued a directive to the Administrator of EPA on implementation of the revised air quality standards for ozone and particulate matter. In the directive, the President laid out a plan for how these standards are to be implemented. A central element in the directive is the incentive it provides States to act and submit control strategy SIPs early in exchange for which many areas will need little or no additional new local emission reductions beyond those reductions that will be achieved through the regional control strategy. This approach avoids additional burdens associated with respect to the beneficial ozone control measures already under way, while at the same time achieving public health protection earlier.

The Presidential directive was published in the **Federal Register** on July 18, 1997 (62 FR 38421). The parts of the directive's implementation plan relevant to the regional $NO_X$ reduction strategy proposed in this rulemaking are described here.

*B. Background*

Following promulgation of a revised NAAQS, section 107(d)(1) the CAA provides up to 3 years for State governors to recommend and the EPA to designate areas according to their most recent air quality. In addition, under section 172(b) of the CAA, the States will have up to 3 years from a nonattainment designation to develop and submit SIPs to provide for attainment of the new standard. The EPA anticipates that it will need the maximum period allowed under the CAA to designate areas for the 8-hour standard. Thus, EPA will designate areas by July of 2000. Under the Act, States, therefore, would need to submit their nonattainment SIPs by 2003. Section 172(a) of the CAA then allows up to 10 years plus two 1-year extensions from the date of designation for areas to attain the revised NAAQS.

*C. Implementation Policy*

The implementation plan in the Presidential Directive has several goals. Three of these goals are especially relevant for the $NO_X$ reduction strategy proposed in this rulemaking:

- Reward State and local governments and businesses that take early action to reduce air pollution levels through cost-effective approaches.
- Respond to the fact that pollution can travel hundreds of miles and cross many State lines.
- Minimize planning and regulatory burdens for State and local governments and businesses where air quality problems are regional in nature.

To achieve these goals, the implementation plan includes a policy for areas that attain the 1-hour standard but not the new 8-hour standard in which EPA will follow a flexible implementation approach that encourages cleaner air sooner, responds to the fact that ozone is a regional as well as local problem, and eliminates unnecessary planning and regulatory burdens for State and local governments. A primary element of the policy will be the establishment under section 172(a)(1) of the CAA of a special "transitional" classification for areas that participate in the $NO_X$ regional strategy proposed in this rulemaking and/or that opt to submit early plans addressing the new 8-hour standard. Because many areas will need little or no additional new local emission reductions to reach attainment, beyond those reductions that will be achieved through the regional control strategy, and will come into attainment earlier than otherwise required, the EPA will exercise its discretion under the law to eliminate unnecessary local planning requirements for such areas. The EPA will revise its rules for new source review (NSR) and conformity so that States will be able to comply with only minor revisions to their existing programs in areas classified as transitional. During this rulemaking, EPA will also reexamine the NSR requirements applicable to existing nonattainment areas in order to deal with issues of fairness among existing and new nonattainment areas. The transitional classification will be available for any area attaining the 1-hour standard but not attaining the 8-hour standard as of the time EPA promulgates designations for the 8-hour standard.

Based on the Agency's review of the latest OTAG modeling, a regional approach, coupled with the implementation of other already existing State and Federal CAA requirements, will allow the vast majority of areas that currently meet the 1-hour standard but would not otherwise meet the new 8-hour standard to achieve healthful air quality without additional local controls. Of the 96 new counties in the 22-State plus DC region, 92 are projected to come into attainment as result of the regional $NO_X$ reductions included in the OTAG Run 5 modeling run.[15] A new county is defined as a county that violates the 8-hour standard but not the 1-hour standard and is not located in an area for the 1-hour standard designated nonattainment as of July 1997. (In the docket to this rulemaking is a table with associated documentation in which EPA lists these 96 new counties in the 22-State plus DC region with an indication of whether the county is projected to attain the 8-hour ozone standard based on the OTAG Run 5 modeling run.)

This county information should be understood with two caveats. First, this list of counties is based on air quality data from 1993–95. The data from this period will not be the basis for nonattainment area designations for the 8-hour ozone standard. Those designations will be made in the 2000 time frame and will be based on the most recent air quality data available at that time (1997–1999). Therefore, while EPA expects that the vast majority of new counties will attain as a result of the $NO_X$ regional control strategy, the number of new counties may be more or less than the number indicated above. The EPA is also currently updating this list based on more current air quality data which will be included in the docket to the final rule.

Second, the estimate of which counties will attain the 8-hour standard is based on the specific assumptions made by the OTAG in Run 5. Because the proposed budgets are similar but not identical to those contained in Run 5, the estimate may change when this rule is final and implemented. In addition, some of the assumptions used to calculate the proposed budgets may change in response to comments EPA may receive on various portions of this rulemaking. Therefore, the estimate of which areas will attain the standards through the final regional $NO_X$ strategy may be higher or lower than the number indicated above. In addition, areas in the region covered by the proposed $NO_X$ reduction strategy in this rulemaking that would exceed the new standard after the adoption of the regional strategy, including areas that do not meet the current 1-hour standard, will benefit as well because the regional $NO_X$ program will reduce the extent of additional local measures needed to achieve the 8-hour standard. In many cases these regional reductions may be adequate to meet CAA progress requirements for a number of years, allowing areas to defer additional local controls. In the 22-State plus DC region, of the 124 counties that violate the 8-hour standard which are located in an area designated nonattainment for the 1-hour standard as of July 1997, 95 are projected to come into attainment of the 8-hour standard as a result of OTAG Run 5 regional $NO_X$ reductions.[16] The caveats noted above for new counties also apply to the information presented here. (In the docket to this rulemaking is a table with associated documentation in which EPA lists these 124 counties in the 22-State plus DC region, including an indication of whether the area is projected to attain the 8-hour ozone standard as a result of regional $NO_X$

[15] Appendix E contains a description of the controls applied in run 5.

[16] Appendix E contains a description of the controls applied in Run 5.

reductions included in the OTAG Run 5 modeling run.)

To determine eligibility for the transitional area classification, ozone areas will follow the approaches described below based on their status.

1. Areas Eligible for the Transitional Classification

*a. Areas attaining the 1-hour standard, but not attaining the 8-hour standard, that would attain the 8-hour standard through the implementation of the regional* $NO_X$ *transport strategy for the East.* Based on the OTAG analyses, areas in the region covered by this proposal that can reach attainment through implementation of the regional transport strategy outlined in this rulemaking would not be required to adopt and implement additional local measures.

When EPA designates these areas under section 107(d), it will place them in the new transitional classification if they would attain the standard through implementation of the regional transport strategy and are in a State that by 2000 submits an implementation plan that includes control measures to achieve the emission reductions required by this proposed rule for States in the region covered by this proposed rule. This is 3 years earlier than an attainment SIP would otherwise be required. The EPA anticipates that it will be able to determine whether such areas will attain based on the OTAG and other regional modeling and that no additional local modeling would be required.

In addition to areas covered by this proposed rule which could receive the transitional classification, areas in the OTAG region not required to revise their SIPs in this rulemaking because they do not significantly contribute to transport may be able to receive the transitional classification as well. An area in the State could be eligible for the transitional area classification by submitting a SIP attainment demonstration in 2000 in which the State adopts $NO_X$ emissions decreases similar to those EPA proposes to establish in this rulemaking where $NO_X$ controls are effective for a given area to demonstrate attainment. The OTAG's modeling (in particular, OTAG strategy Run 5 described in section II.B.2, OTAG Strategy Modeling) shows that such a strategy in which a State adopted $NO_X$ emission decreases similar to those EPA proposes to establish in this rulemaking would achieve attainment in most of these areas that would become nonattainment under the 8-hour standard.

*b. Areas attaining the 1-hour standard but not attaining the 8-hour standard for which a regional transport strategy is not sufficient for attainment of the 8-hour standard.* To encourage early planning and attainment for the 8-hour standard, EPA will make the transitional classification available to areas not attaining the 8-hour standard that will need additional local measures beyond the regional transport strategy, as well as to areas that are not affected by the regional transport strategy, provided they meet certain criteria. To receive the transitional classification, these areas must submit an attainment SIP prior to the designation and classification process in 2000. The SIP must demonstrate attainment of the 8-hour standard and provide for the implementation of the necessary emissions reductions on the same time schedule as the regional transport reductions. The EPA will work with affected areas to develop a streamlined attainment demonstration. By submitting these attainment plans earlier than would have otherwise been required, these areas would be eligible for the transitional classification and its benefits and would achieve cleaner air much sooner than otherwise required.

*c. Areas not attaining the 1-hour standard and not attaining the 8-hour standard.* The majority of areas not attaining the 1-hour standard have made substantial progress in evaluating their air quality problems and developing plans to reduce emissions of ozone-causing pollutants. These areas will be eligible for the transitional classification provided that they attain the 1-hour standard by the year 2000 and comply with the appropriate provisions of section (a) or (b) above depending upon which conditions they meet.

2. Areas Not Eligible for the Transitional Classification

Areas that do not attain the 1-hour standard by 2000 are not eligible for the transitional classification. For these areas, their work on planning and control programs to meet the 1-hour standard by their current attainment date (e.g., 2005 for Philadelphia and 2007 for Chicago) will take them a long way toward meeting the 8-hour standard. In addition, the regional $NO_X$ reductions proposed in this rulemaking will also help these areas meet both the 1-hour and 8-hour standards.

While the additional local reductions that these areas will need to achieve the 8-hour standard must occur prior to their 8-hour attainment date (e.g., 2010), for virtually all areas the additional reductions needed to achieve the 8-hour standard can occur after the 1-hour attainment date. This approach allows them to make continued progress toward attaining the 8-hour standard throughout the entire period without requiring new additional local controls for attaining the 8-hour standard until the 1-hour standard is attained. These areas, however, will need to submit an implementation plan within 3 years of designation as nonattainment for achieving that standard. Such a plan can rely in large part on measures needed to attain the 1-hour standard. For virtually all of these areas, no additional local control measures beyond those needed to meet the requirements of Subpart 2 of part D and needed in response to the regional transport strategy would be required to be implemented prior to their applicable attainment date for the 1-hour standard. Nonattainment areas that do not attain the 1-hour standard by their attainment date would continue to make progress in accordance with the requirements of Subpart 2; the control measures needed to meet the progress requirements under Subpart 2 would generally be sufficient for meeting the control measure and progress requirements of Subpart 1 as well.

## V. SIP Revisions and Approvability Criteria

### *A. SIP Revision Requirements and Schedule*

For the 1-hour NAAQS, under section 110(k)(5) of the CAA, EPA has the authority to establish the date by which a State must respond to a SIP call. This date can be no later than 18 months after the SIP call is issued in the final rulemaking. The EPA is proposing that the date for SIP submittal be 12 months after publication of the notice of final rulemaking. This date is appropriate in light of the fact that States that are subject to today's rulemaking have already been involved in the OTAG process. In addition, submitting the transport SIP by this time will facilitate area-specific SIP planning required under Subpart 2 of CAA. Nonattainment areas required to develop attainment plans need to know what upwind reductions to expect and when the reductions will occur. The EPA believes that it is appropriate for all areas subject to this rulemaking—attainment as well as nonattainment—to meet the same schedule for making SIP submittals. Upwind attainment area controls are a critical element for reducing elevated levels of ozone and $NO_X$ emissions flowing into the downwind nonattainment areas.

For the 8-hour NAAQS, under section 110(a)(1) of the Act, EPA believes it has the authority to establish different schedules for different parts of the section 110(a)(2) SIP revision. Specifically, EPA proposes to require first the portion of the 110(a)(2) SIP revision that contains the controls required under section 110(a)(2)(D). The EPA proposes to require that the 110(a)(2)(D) portions of the SIPs mandated under the 8-hour ozone NAAQS be submitted within 12 months of the date of final promulgation of this rulemaking. This will assist areas that are ultimately designated nonattainment for the 8-hour standard in their SIP planning under section 172(c) of the CAA and help avoid the kind of delays due to transport that were experienced by nonattainment areas for the 1-hour standard.

Therefore, under section 110(k)(5) for the 1-hour NAAQS and section 110(a)(1) for the 8-hour NAAQS, a demonstration that each State will meet the assigned statewide emission budget (including adopted rules needed to meet the emission budget) must be submitted to EPA as a SIP revision within 12 months of the date of final promulgation of this rulemaking. The EPA solicits comment on the time frames described above and elsewhere in this rulemaking. As discussed in section V.B. of this rulemaking, EPA will evaluate the SIP based on particular control strategies selected and whether the strategies as a whole provide adequate assurance that the budget will be achieved. The SIP revision should include the following general elements related to the regional strategy: (1) baseline 2007 statewide $NO_X$ emission inventory (which includes growth and existing control requirements)— this would generally be the emission inventory that was used to calculate the required statewide budget, (2) a list and description of control measures to meet statewide budget, (3) fully-adopted State rules for the regional transport strategy with compliance dates providing for control between September 2002 and September 2004, depending on the date EPA adopts in its final rulemaking, (4) clearly documented growth factors and control assumptions, and (5) a 2007 projected inventory that demonstrates that the State measures along with national measures will achieve the State budget in 2007. The control measures must meet the requirements for public hearing, be adopted by the appropriate board or authority, and establish by regulation or permit a schedule and date for each affected source or source category to achieve compliance. States should follow existing EPA guidance on emission inventory development and growth projections.

The EPA recognizes that States may need additional detailed guidance on how to develop effective transport-mitigation SIPs. Therefore, the EPA intends to establish a work group with States and affected Federal agencies to determine what types of additional information and guidance will be helpful. As discussed below, this work group will also address what types of tracking and reporting procedures are needed to assure States are making satisfactory progress towards meeting their required $NO_X$ budget once the SIPs have been put in place.

*B. SIP Approval Criteria*

1. Budget Demonstration

In response to the final rulemaking, each State will be required to submit a SIP revision that clearly demonstrates how the State will achieve its statewide $NO_X$ budget by 2007. The $NO_X$ budget demonstration should show how emissions from each sector, or component, of the $NO_X$ emissions inventory will be addressed and that the application of the regional strategy along with existing requirements will allow total $NO_X$ emissions in the State to be at or below the level of the required $NO_X$ budget by 2007.

In section III, Statewide Emissions Budgets, of this rulemaking, EPA described the control strategies that EPA used in the development of the statewide $NO_X$ emissions budgets. The EPA believes these measures provide the most reasonable, cost-effective means for mitigating significant interstate transport. In addition, the control measures are generally consistent with the OTAG control strategy recommendations. However, States have the flexibility to adopt a different set of control strategies so long as they achieve the 2007 budget. There are a variety of different control programs that could provide the necessary $NO_X$ reductions. States may wish to consider the strategies that EPA used for budget development as a starting point in developing their specific statewide $NO_X$ strategy. Where States select different control measures for the various components of their emissions inventory, they should clearly define the particular control measures and document the methods used to estimate emissions reductions from implementation of the measures. For example, if a State elected to adopt more stringent controls for mobile sources than were used in EPA's calculation of the statewide budget and less stringent controls on utilities, the State would identify the additional regulations that would be applied to the mobile sources and the different limits that would be applied to utilities. The State would submit fully adopted rules for those sectors with documentation of the projected emissions reductions the particular control measures would achieve, along with the rules for the other sectors, and a demonstration that the overall control strategy when applied to the baseline 2007 emissions inventory would achieve the statewide 2007 emission budget. The entire $NO_X$ emissions inventory must be accounted for in the demonstration.

As discussed in section III.D, Recalculation of Budgets, if a State has more precise growth estimates and control assumptions that it wishes to use in developing its $NO_X$ budget demonstration, and EPA agrees they are appropriate, EPA will recalculate the statewide budget based on those revised numbers. Because any justifiable lower growth estimates from the State would be used in EPA's budget calculation, lower growth could not be considered as part of a State's $NO_X$ control strategy to attain the budget (unless the change in growth is the result of clearly identified control strategies which can be shown to provide real, permanent, and quantifiable changes in growth).

2. Control Strategies

All the control strategies a State selects to meet its $NO_X$ budget must provide real, permanent, quantifiable, and enforceable reductions. These attributes are consistent with those required of all SIP revisions (40 CFR part 51). Control strategies are generally composed of enforceable limits or measures applied to a source or group of sources (i.e., sector) for the purpose of reducing emissions. Control strategies may be expressed as either a tonnage limit, an emission rate, or a specific technology or measure. Considerations in addition to compliance with its $NO_X$ budget, such as local impacts, may lead to selection of a particular strategy over others. In terms of staying within an emissions budget, the effectiveness of the different strategies vary significantly. A control strategy that employs a fixed tonnage limitation (or cap) for a source or group of sources provides the greatest certainty that a specific level of emissions will be attained and maintained. With respect to transport of pollution, an emissions cap also provides the greatest assurance to downwind States that air emissions from upwind States will be effectively managed over time. Control strategies designed and enforced as an emissions rate limitation can achieve a measurable emissions reduction, but the targeted level of emissions may or may not be reached, depending on the actual activity level of the affected source(s). Finally, control strategies designed as a specific technology or measure have the greatest uncertainty for achieving a targeted emissions level due to uncertainty in both the activity level of the affected source(s) and uncertainty in the effectiveness of the technology or measure.

Based on the desire to establish control strategies with the greatest environmental certainty of providing for achievement and maintenance statewide $NO_X$ emissions budget, EPA would recommend that to the maximum extent practicable, all control strategies be based on a fixed level of emissions for a source or group of sources. However, EPA recognizes that this option may be difficult for some sources because: (1) the available emissions control options may be limited, and (2) the techniques for quantifying mass emissions to ensure compliance with a tonnage budget may not be adequate. Therefore, States may select the most appropriate type of control strategy to achieve and maintain the desired emissions limitation for each source or group of sources regulated in response to this rulemaking. To compensate for the lack of certainty inherent in some types of control strategies (i.e., control strategies that do not set fixed tonnage budgets) and to address rule effectiveness concerns, States may want to consider incorporating a compliance margin in their overall budget calculation. A compliance margin could be used by increasing the level of controls in the overall budget beyond what is required by this rulemaking. Section VII discusses an interstate cap-and-trade program for large combustion sources that EPA intends to develop, in conjunction with interested States. Because this is a proven and cost-effective control strategy that provides maximum flexibility to sources, States may wish to consider this option as part of their regional $NO_X$ strategy.

The EPA is also considering ways to extend the cap-and-trade program to other types of sources. The Agency's interest in developing such approaches is consistent with the goal in the Implementation Plan for the Revised Air Quality Standards of working ''with the States to develop control programs which employ regulatory flexibility to minimize economic impacts on businesses large and small to the greatest possible degree consistent with public health protection.'' The EPA recognizes that there are important advantages of developing a broad-based trading program to provide incentives for the development of innovative, low-cost ways of controlling emissions from these sources. Under market-based approaches like a cap-and-trade program, there will be an incentive for sources to identify and adopt pollution-minimizing fuels, energy efficiency measures, or changes in product mix that offer the lower cost reduction in emissions.

The EPA and OTAG have focused on a cap-and-trade program for large combustion sources because it assures a proven method for achieving and maintaining a fixed level of emissions. The EPA solicits comments on approaches that would allow a broader participation in emissions trading. In addressing expansion of emissions trading beyond large combustion sources, commenters should address what steps can be taken to quantify emissions from each source involved in the program to assure that the emissions cap is met and the costs to Federal, State and local governments of administering such a program.

*a. Enforceable Measures Approach.* Enforceable measures include control strategies expressed as either emission rate limitations or technology requirements. These control strategies do not provide the same environmental certainty that a specific emissions level will be met and maintained as compared to fixed tonnage budgets. However, these control requirements are an appropriate method for achieving emissions reductions for many source sectors that have limited options for controlling and directly measuring emissions.

For control strategies that use emission rate limitations or technology requirements the SIP must include the following elements: (1) the enforceable emission rate, technology requirement, or specific measure for each source that, when applied to year 2007 activity levels and in aggregate with other controls, would meet the statewide emissions budget; (2) the projected activity level for each source or group of sources, as appropriate; (3) other factors necessary to calculate the effect of the control requirements (e.g., speeds and temperature for mobile sources necessary to calculate emissions); (4) emissions rate and activity level measurement and emissions estimation protocols for all sources, or group of sources; (5) reporting protocols for emission rate, activity level, and emissions for all sources, or group of sources (EPA intends to address these requirements in a supplemental EPA rulemaking); (6) enforcement mechanisms, including compliance schedules for installation and operation of all control requirements and institution of all compliance processes by the date between September 2002 and September 2004 that EPA establishes in its final action on this proposal; and (7) requirements for adequate penalties on the sources for exceeding applicable emissions rates or failing to properly install or operate control technologies or carry-out compliance measures.

A State or groups of States may choose to develop, adopt and implement trading programs for sources affected by enforceable measures. Such trading programs should be consistent with EPA guidance on trading, including the Economic Incentive Program rules and guidance as well as guidance provided on Open Market Trading. Such approaches could be adopted by States to help achieve emission reductions cost effectively. The EPA does not anticipate managing the emissions data and market functions of these trading programs that do not incorporate emissions caps.

*b. Fixed Tonnage Budgets.* Under this approach, a group of sources would have their control strategy expressed as a fixed tonnage budget. Because the fixed tonnage budget approach is designed to maintain a specific, fixed level of emissions, this approach does not require an enforceable compliance plan that prescribes exactly how emissions reductions would be achieved. If a State elects to use a fixed tonnage budget as a control strategy, the State would have two options for implementing the program. The State may choose to join the cap-and-trade program that EPA proposes to develop and assist in implementing for sources in cooperation with interested States (this program is discussed in section VII, Model Cap-and-Trade Program, of this rulemaking), or the State may choose to develop a fixed tonnage budget regulation separate from EPA's program. The EPA cap-and-trade program will incorporate all necessary SIP criteria into the program design. If the State elects to develop a fixed tonnage budget program separate from EPA's program, the State program must include the following elements: (1) the total seasonal tonnage emissions limitation for the category of sources which shall be enforceable at the source level by the date between September 2002 and September 2004 that EPA establishes in its final rulemaking through emission tonnage limitations or emission rate limitations that automatically adjust for growth in activity levels over time; (2) requirements to measure and electronically report all emissions from each source; and (3) requirements for adequate penalties for exceeding an emissions limitation or emission rate.

To implement a fixed tonnage budget program, a State or group of States may choose to develop, adopt and implement their own cap-and-trade program. Such trading programs should be consistent with EPA guidance on trading, including the Economic Incentive Program rules and guidance. The EPA does not anticipate managing the emissions data and market functions of these programs.

3. Control Strategy Implementation

As discussed in section I.D.2.e, Control Implementation and Budget Attainment Dates, of this rulemaking, EPA is proposing that States must implement all of their State-adopted $NO_X$ control strategies by a date between 3 to 5 years from the SIP submittal due date. This time frame would result in an implementation deadline within the range from September 2002 and September 2004. The EPA is seeking comment on which date within this range is appropriate, in light of the feasibility of implementing controls and the need to provide air quality benefits as expeditiously as possible. Therefore, for the SIP to be approvable, State $NO_X$ rules must all have compliance dates providing for control by the implementation deadline, which will be specified in the final rulemaking. The EPA believes this is necessary to assist ozone areas in meeting their attainment obligations under the 1-hour standard and to assure timely attainment of the 8-hour standard. The EPA recognizes that the control measures will not be in place in time to assist serious ozone areas in meeting their 1999 attainment date under the 1-hour standard. This is unavoidable because of the time needed to complete this rulemaking and for States to adopt and implement their $NO_X$ measures. The next attainment date under the 1-hour standard is 2005 for severe-15 areas. For the 8-hour standard, the CAA provides for attainment dates of up to 5 or 10 years after designations with 2 potential 1-year extensions. In light of the projected designation date of 2000, the first attainment date under the 8-hour standard could also be 2005. For these areas, it is important that the regional $NO_X$ control measures be in place by no later than September 2004—in time to provide emissions reductions for the 2005 ozone season. Implementing controls earlier than September 2004, or at least phasing in some controls, would improve the chance for minimizing exceedances in the 3-year period up to and including the 2005 attainment year. States required to meet a statewide $NO_X$ budget by 2007 will continue to achieve additional emissions reductions after September 2004 from continued phase in of Federal measures. The EPA will provide guidance to the States on the appropriate amount of emission reduction credit that a State may assume from Federal measures.

4. Growth Estimates

The EPA believes it is important that consistent emissions growth estimates be used for the State's budget demonstration and for EPA's calculation of the required Statewide emissions budget. If a State wishes to substitute its own growth or control information in its budget analyses and can provide adequate justification for its alternative numbers, EPA will evaluate the State's submission and may recalculate the required statewide budget to reflect the State numbers. As mentioned in the previous section, because the revised growth estimates will be included in EPA's budget calculation, lower growth rates could not be considered part of a State's $NO_X$ control strategy to attain that budget unless the change in growth is the result of clearly identified control strategies that can be shown to provide real, permanent, and quantifiable changes in growth. During the comment period for this proposal, States will have an opportunity to comment on EPA's growth assumptions and justifications for emissions rates and control measures. As described in section III.D, Recalculation of Budgets, EPA encourages requests for alterations to the growth estimates or control assumptions be made during the comment period for this proposal so that the budgets given in the final rulemaking will incorporate the changes. Addressing these issues prior to the final rulemaking will allow States to concentrate their efforts on control strategy development and rule adoption procedures during the proposed 12-month time frame for submitting their SIP revisions.

5. Promoting End-Use Energy Efficiency

In order to minimize compliance costs, EPA is interested in allowing States the maximum flexibility practical in meeting their $NO_X$ budgets. The EPA believes that achievement of energy efficiency improvements in homes, buildings, and industry can be one cost-effective component of a comprehensive State strategy. These energy efficiency improvements would substantially reduce control measures required to meet $NO_X$ objectives. To this end, EPA will be investigating, in consultation with the Department of Energy's Office of Energy Efficiency and Renewable Energy, how energy efficiency opportunities can be integrated within SIPs, while maintaining the requisite level of confidence that State budgets will be met. The EPA intends to provide guidance in this area. The EPA is requesting comment on how SIPs and associated processes can allow for the incorporation of cost-effective, end-use energy efficiency.

*C. Review of Compliance*

The EPA believes it is essential that progress in implementing the regional control strategy be periodically assessed after the initial SIP submittal. This will allow early detection of implementation problems, such as overestimates of control measure effectiveness and underestimates of growth. The EPA will be carefully tracking State progress and intends to propose periodic State reporting requirements in its SNPR. Because nonattainment areas will be relying on emissions reductions in other States to assist them in reaching attainment, EPA believes that each State must have an effective program for tracking progress of the regional strategy. The EPA intends to establish a work group of affected States and other impacted Federal Agencies to determine what procedures to put in place to provide adequate assurance that the necessary emissions reductions are being achieved. The EPA believes that tracking efforts should be structured to avoid unnecessary burdens on States. Therefore, EPA intends to integrate activities to track progress on implementing the regional $NO_X$ budget with existing program requirements such as periodic emissions inventories and reporting under title IV for $NO_X$. The EPA is soliciting comment on what types of compliance assurance procedures may be necessary.

The EPA recognizes that success of the program depends, in part, on the availability of reliable, comprehensive inventories of emissions. Currently, EPA is developing a separate rulemaking that would require statewide periodic emissions inventories. This rule would be an extension of the existing periodic emission inventory requirement for nonattainment areas. In regard to the regional transport strategy, EPA intends to use these inventories as a tool to assess progress in implementing the regional strategy, to determine whether the States achieved their required budget by 2007, and for future transport studies.

If tracking and periodic reports indicate that a State is not implementing all of its $NO_X$ control measures or is off-track to meet its budget by 2007, EPA will work with the State to determine the reasons for noncompliance and what course of remedial action is needed. The EPA will expect the State to submit a plan showing what steps it will take to correct the problems. Continued noncompliance with the $NO_X$ transport SIP may lead EPA to make a finding of failure to implement the SIP, and potentially implement sanctions, if the State does not take corrective action within a specified time period. If tracking indicates that, due to actual growth and control effectiveness, the SIP is not adequate to achieve the budget, EPA will issue a SIP call under section 110(k)(5) for States to amend their $NO_X$ control strategy. As discussed above, EPA is proposing that all State-adopted $NO_X$ strategies must be implemented by a date within the range of September 2002 and September 2004. Shortly after the established implementation due date, EPA will begin checking to determine whether States are meeting all of their SIP obligations.

In 2007, EPA will assess how each State's SIP actually performed in meeting the Statewide $NO_X$ emission budget. If 2007 emissions exceed the required budget, the control strategies in the SIP will need to be strengthened. The EPA will evaluate the circumstances for the budget failure and issue a call for States to revise their SIPs, as appropriate.

*D. 2007 Reassessment of Transport*

Today's proposal addresses the emissions reductions necessary to mitigate significant ozone transport based on analyses using the most complete, scientifically-credible tools and data available for the assessment of interstate transport. As the state of ozone science evolves over the next 10 years, EPA expects there will be a number of updates and refinements in air quality methodologies and emissions estimation techniques. Therefore, in 2007, the end year for the current analyses, EPA intends to conduct a new study to reassess ozone transport using the latest emissions and air quality monitoring data and the next generation of air quality modeling tools.

The study will evaluate the effectiveness of the regional $NO_X$ measures States have implemented in response to the final rulemaking action in assisting downwind areas to achieve attainment. Modeling analyses will be used to evaluate whether additional local or regional controls are needed to address residual nonattainment in the post-2007 time frame. The study will examine differences in actual growth versus projected growth in the years up to 2007 as well as expected future growth throughout the entire OTAG region.

The study will also review advances in control technologies to determine what reasonable and cost-effective measures are available for purposes of controlling local and regional ozone problems.

The EPA expects to seek input from a wide range of stakeholders such as State and local governments, industry, environmental groups, and Federal agencies for the study. The OTAG partnership established by the ECOS and EPA resulted in more technical information and more air quality modeling being conducted on regional ozone transport than ever before. Because of the success of the OTAG process, EPA envisions working closely with ECOS for the transport reassessment study.

*E. Sanctions*

1. Failure to Submit

If a State fails to submit the required SIP provisions, the CAA provides for EPA to issue a finding of State failure under section 179(a). (EPA is using the phrase ''failure to submit'' to cover both the situation where a State makes no submission and the situation where the State makes a submission that EPA finds is incomplete in accordance with section 110(k)(1)(B) and 40 CFR part 51, Appendix V.) Such a finding starts an 18-month sanctions clock; if the State fails to make the required submittal which EPA determines is complete within that period, one of two sanctions will apply. If 6 months after the sanction is imposed, the State still has not made a complete submittal, the second sanction will apply. The two sanctions are: withholding of certain Federal highway funds and a requirement that new or modified sources subject to a section 173 new source review program obtain reductions in existing emissions in a 2:1 ratio to offset their new emissions (section 179(b)).

The EPA promulgated regulations to implement section 179 that specify the order in which these sanctions will apply in the case of State noncompliance with requirements under part D of title I of the CAA (40 CFR 52.31). These regulations do not, however, address the imposition of sanctions in the case of State failure to comply with a SIP call under section 110(k)(5) or to make a SIP submission under section 110(a)(1). Since in today's rulemaking EPA is proposing a SIP call and a requirement for a section 110(a)(1) submission, EPA believes it is appropriate to propose the order of sanctions if States fail to comply with these requirements. The EPA believes that the general scheme promulgated for sanctions should also apply here. Under this scheme, EPA will generally apply the 2:1 offset sanction first and the highway funding sanction second. The EPA believes the rationale for this approach provided in the preamble to the sanctions rule applies equally here (59 FR 39832, August 4, 1994).

Section 179 sets certain limits on where mandatory sanctions apply. The highway funding sanction applies in designated nonattainment areas and the 2:1 offset sanction applies in areas with part D NSR programs. However, EPA has additional authority to impose sanctions under section 110(m). The EPA's authority to impose sanctions under section 110(m) is triggered by any finding that a State failed to make a required SIP submission. However, there is no mandatory clock for the imposition of these sanctions. The EPA may determine whether or not to use this authority in response to a SIP failure, and thus they are termed discretionary sanctions. With the discretionary sanctions, use of the 2:1 offset sanction is still limited to areas with part D NSR programs. However, the highway funding sanction can be applied in any area. While sanctions under section 179 apply only to the deficient area, under section 110(m) the highway sanction can be applied statewide, subject to the conditions in EPA's discretionary sanctions rule (40 CFR 52.30). Because the mandatory sanctions would not be applicable in all areas that may fail to respond to requirements proposed in today's rulemaking, EPA is requesting comment on whether the discretionary sanctions should be used in response to a failure of a State to submit the required SIP revision.

In addition to sanctions, a finding that the State failed to submit the required SIP revision triggers the requirement under section 110(c) that EPA promulgate a FIP no later than 2 years from the date of the finding if the deficiency has not been corrected. The FIPs are discussed in the section below.

A State that submits a SIP that is subsequently disapproved, due to failure to meet one or more of the required elements, will be subject to the same sanctions and FIP consequences as a State that fails to make the required submittal.

2. Failure to Implement

If a State fails to implement its SIP, EPA may also make a finding under section 179. The finding triggers the mandatory sanctions as described above. The EPA may also choose to apply discretionary sanctions as a consequence of failure to implement. However, a FIP is not triggered.

*F. Federal Implementation Plans (FIPS)*

1. Legal Framework

The Administrator is required to promulgate a FIP within 2 years of: (1) finding that a State has failed to make a required submittal, or (2) finding that a submittal received does not satisfy the minimum completeness criteria established under section 110(k)(1)(A) (56 FR 42216, August 26, 1991), or (3) disapproving a SIP submittal in whole or in part. Section 110(c)(1) mandates EPA promulgation of a FIP if the Administrator has not yet approved a correction proposed by the State before the time a final FIP is required to be promulgated.

2. Timing of FIP Action

The EPA views seriously its responsibility to address the issue of regional transport of ozone and ozone precursor emissions. Decreases in $NO_X$ emissions are needed in the States named in the rulemaking to enable the downwind States to first develop plans to achieve the clean air goals and then to carry out those plans and actually achieve clean air for their citizens. Thus, although the CAA allows EPA up to 2 years after the finding to promulgate a FIP, EPA intends to expedite the FIP promulgation to help assure that the downwind States realize the air quality benefits of regional $NO_X$ reductions as soon as practicable. This is consistent with Congress's intent that attainment occur in these downwind nonattainment areas ''as expeditiously as practicable'' (sections 181(a), 172(a)). Therefore, EPA intends to propose FIPs at the same time as final action is taken on this proposed Ozone Transport SIP Rulemaking. Furthermore, EPA intends to make a finding and promulgate a FIP immediately after the SIP submittal due date for each upwind State that fails to submit a SIP that meets the terms of the final rulemaking of this proposal.

As described elsewhere in this rulemaking, EPA is proposing to require specific States to decrease their emissions of $NO_X$ in order to reduce the transport of ozone and ozone precursors which affects nonattainment areas over hundreds of miles downwind. This proposal allows States 12 months to develop, adopt and submit revisions to their SIPs in response to the final rulemaking. The EPA intends to expeditiously approve SIP revisions that meet the rulemaking requirements. For States that fail to make the required submittal or fail to submit a complete SIP revision response, EPA would promulgate a FIP as described in the above section. Where the SIP is complete but EPA disapproves it, EPA would also promulgate a FIP. The EPA may choose to propose a FIP at the same time as proposing disapproval of a State's response to the final rulemaking. Thus, EPA intends to move quickly to promulgate a FIP where necessary. The EPA solicits comment on the time frames described above and elsewhere in this rulemaking .

3. Statewide Emissions Budgets

In the FIP proposal, each State would be allocated by EPA the same statewide emissions budget as described elsewhere in this document. That statewide budget is given to States that are found to significantly contribute to nonattainment in downwind States as described in section II. The statewide budget is derived from the set of reasonable, cost-effective measures applied to the various source sectors as discussed in section III.

4. FIP Control Measures

In contrast to the SIP process—where selection and implementation of control measures is the primary responsibility of the State—in the case of a FIP, it is EPA's responsibility to select the control measures for each source sector and assure compliance with those measures. Thus, while the FIP would be designed by EPA to achieve the same total statewide emissions decrease as that described in final action on today's proposal, the specific control measures assigned in the FIP could be different from what a State might choose.

In selecting the specific control measures for a FIP, EPA would take into account the administrative feasibility as well as cost effectiveness of various control options. In developing the budget calculations, EPA generally agreed with the direction of the OTAG recommendations that EPA develop Federal measures for certain sources categories—mobile sources in particular—and that the States develop stationary source measures in response to this rulemaking. It is unlikely that EPA's FIP would focus on mobile source programs such as I/M or transportation control measures because these measures are not as cost effective as others for controlling regional $NO_X$ emissions and because it would be difficult for a limited Federal staff to implement such programs, especially without detailed knowledge of local concerns and circumstances. For stationary sources, the EPA budget calculations include large- and medium-sized stationary sources. As in the case with mobile sources, a program to reduce emissions from stationary sources that is reasonable for States to implement, may be less feasible for EPA to implement due to factors such as a large number of affected sources.

Therefore, for the stationary source sector, EPA's FIP would likely propose to focus controls more on the larger stationary sources. This approach would take account of the potential need for Federal staff to implement the program in more than one State by reducing the number of sources affected so that the program is more manageable. It follows that greater emissions decreases might be needed from the remaining set of stationary sources than is suggested by the EPA's statewide budget calculation (described in section III). That is, to make up the short-fall in the statewide budget from medium-sized stationary sources, additional decreases might be needed from the large stationary sources in a FIP program.

5. FIP Trading Program

In order to minimize the burden on sources, EPA would establish in the FIP an interstate emissions trading program. The FIP trading program would be designed to be compatible with the emissions trading program described elsewhere in this rulemaking. Development of such emissions trading programs would use the process identified in the OTAG July 10, 1997 recommendation on trading—a joint EPA/State effort with appropriate stakeholder input.

6. Section 105 Grants

The EPA provides annual funding to States under section 105 of the CAA to carry out Act-related programs. Where EPA must develop, adopt and implement a FIP, the Agency will consider withholding all or a portion of the grant funds normally appropriated to the State. Those funds would be used by EPA in the FIP work.

*G. Other Consequences*

If a State is implementing all of its control measures but is off course to meet its 2007 budget due to errors in growth estimates or control assumptions, EPA will consider issuing a subsequent SIP call for the State to revise its implementation strategy.

**VI. States Not Covered by This Rulemaking**

Based upon all the available technical information, the EPA is proposing to find that the following 15 States in the OTAG region do not make a significant contribution to downwind nonattainment: Arkansas, Florida, Iowa, Kansas, Louisiana, Maine, Minnesota, Mississippi, North Dakota, Nebraska, New Hampshire, Oklahoma, South Dakota, Texas, Vermont. These 15 States are not required to meet an assigned Statewide $NO_X$ emission budget. Based upon comments received during the comment period, as well as any additional modeling and technical analyses, these States could be found to be significant contributors to nonattainment. If this is the case, EPA will publish a SNPR.

These States may need to cooperate and coordinate SIP development activities with other States. For example, the OTAG recommendation on utility $NO_X$ controls (see Appendix B) recognized that the State of Iowa would work with Wisconsin in developing the Southeast Wisconsin ozone SIP; that the State of Kansas would work with Missouri in the continued progress of the Kansas City ozone SIP; and that Oklahoma, Texas, Arkansas, and Louisiana would share the results of their urban and regional scale modeling with Missouri. The EPA also believes that the 11 States (i.e., Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont) plus the District of Columbia's consolidated metropolitan statistical area (including northern Virginia) that are included in the OTR should continue coordinating their activities through the OTC to provide for attainment of the ozone NAAQS in that region.

States with interstate nonattainment areas for the 1-hour standard and/or the new 8-hour standard are expected to work together to reduce emissions to mitigate local scale interstate transport problems in order to provide for attainment in the nonattainment area as a whole. For example, New Hampshire should work with Massachusetts for the Boston-Lawrence-Worcester nonattainment area. For the 8-hour standard, parts of local scale interstate nonattainment areas may be located in Louisiana and Texas as well as in Arkansas and Tennessee. These States should also coordinate their planning efforts.

In addition, areas in these States may be able to receive the transitional classification as described in section IV, Implementation of Revised Air Quality Standards. The OTAG's modeling (in particular, OTAG strategy Run 5 described in section II.B.2, OTAG Strategy Modeling) shows that a strategy in which a State-adopted $NO_X$ emission decreases similar to those EPA proposes to establish in this rulemaking would achieve attainment in most of these areas that would become nonattainment under the 8-hour standard. If a State wishes to consider this as a viable option for meeting its early SIP requirement and receiving the transitional area classification, EPA will work with the State to achieve this. Section III, Statewide Emission Budgets, describes EPA's process for establishing the statewide $NO_X$ emission budgets. (Note that States not covered by this rulemaking may be eligible for the transitional classification by means other than adopting $NO_X$ emission reductions similar to those in this proposal. In addition to attaining the 1-hour standard, by at least 2000, areas in States not covered by this rulemaking that do not wish to adopt $NO_X$ emission reductions similar to those in this proposal must submit an attainment SIP prior to the designation and classification process in 2000. The SIP must demonstrate attainment of the 8-hour standard and provide for the implementation of the necessary emissions reductions on the same time schedule as the regional transport reductions.)

The EPA strongly suggests that States with new nonattainment counties for the 8-hour standard should consider the option of this strategy since our analysis indicates that nearly all new nonattainment counties are projected to come into attainment as a result of this strategy. States will benefit by early action to aid their cities in these new counties in the attainment of the 8-hour standard and receipt of transitional status which will result in no further controls on local sources. Of the 10 new counties in the 15 States that are not covered by this rulemaking, based on OTAG modeling, all 10 are projected to come into attainment as result of the regional $NO_X$ reductions included in the OTAG Run 5 modeling run.[17] A new county is defined as a county that violates the 8-hour standard but not the 1-hour standard and is not located in an area for the 1-hour standard designated nonattainment as of July 1997. (In the docket to this rulemaking is a table with associated documentation in which EPA lists these 10 new counties in the 15 States with an indication of whether the county is projected to attain the 8-hour ozone standard based on the OTAG Run 5 modeling run.)

This county information should be understood with two caveats. First, this list of counties is based on air quality data from 1993–95. The data from this period will not be the basis for nonattainment area designations for the 8-hour ozone standard. Those designations will be made in the 2000 time frame and will be based on the most recent air quality data available at that time (1997–1999). Therefore, while EPA expects that the vast majority of new counties will attain as a result of the $NO_X$ regional control strategy, the number of new counties may be more or less than the number indicated above. The EPA is also currently updating this list based on more current air quality data which will be included in the docket to the final rule.

Second, the estimate of which counties will attain the 8-hour standard is based on the specific assumptions made by the OTAG in Run 5. Because the proposed budgets are similar but not identical to those contained in Run 5, the estimate may change when this rule is final and implemented. In addition, some of the assumptions used to calculate the proposed budgets may change in response to comments EPA may receive on various portions of this rulemaking. Therefore, the estimate of which areas will attain the standards through the final regional $NO_X$ strategy may be higher or lower than the number indicated above.

In addition, areas in the region not covered by the proposed $NO_X$ reduction strategy in this rulemaking that would exceed the new standard after the voluntary adoption of the regional strategy, including areas that do not meet the current 1-hour standard, would benefit as well because the regional $NO_X$ program would reduce the extent of additional local measures needed to achieve the 8-hour standard. In many cases, these regional reductions may be adequate to meet CAA progress requirements for a number of years, allowing areas to defer additional local controls. In the 15 States, of the 20 counties that violate the 8-hour standard which are located in an area designated nonattainment for the 1-hour standard as of July 1997, 14 are projected to come into attainment of the 8-hour standard as a result of OTAG Run 5 regional $NO_X$ reductions.[18] The caveats noted above for new counties also apply to the information presented here. (In the docket to this rulemaking is a table with associated documentation in which EPA lists these 20 counties in the 15 States, including an indication of whether the area is projected to attain the 8-hour ozone standard as a result of regional

[17] Appendix E contains a description of the controls applied in Run 5.

[18] Appendix E contains a description of the controls applied in Run 5.

$NO_X$ reductions included in the OTAG Run 5 modeling run.)

States that opt in to meet the early SIP requirement this way would not be eligible to participate in the trading program with the States required in this rulemaking to revise their SIPs although they could develop intrastate trading programs. This limitation is needed to avoid the movement of emissions, via trades, from States that do not contribute to nonattainment to States that do contribute to nonattainment.

Section V, SIP Revisions and Approvability Criteria, discusses general SIP requirements for States that EPA has found significantly contribute to downwind nonattainment. The EPA intends to establish a workgroup with the affected States to determine what type of reporting and tracking mechanisms are needed to assure States are making steady progress toward meeting their 2007 budgets. One important element of tracking will be to assess actual growth versus projected growth. While EPA will not be establishing new reporting requirements for States exempted from this rulemaking, EPA intends to periodically review emissions in the exempted States to determine the impacts of any emissions increases on downwind nonattainment areas. In addition, as discussed in section V.F, 2007 Reassessment of Transport, in 2007 EPA will be conducting a reassessment of transport in the full OTAG region to evaluate the effectiveness of the regional $NO_X$ measures and whether additional regional controls are needed.

If States not covered by this rulemaking choose to adopt budgets based on the rationale outlined above, EPA will work with those States to determine what an appropriate statewide budget should be. The EPA would encourage those States to consider statewide budgets based on adoption of $NO_X$ emission decreases similar to those EPA proposes herein to establish for States covered by this rulemaking.

## VII. Model Cap-and-Trade Program

The EPA is planning to develop and administer an interstate cap-and-trade program that could be used to implement a fixed tonnage budget. States electing to reduce emissions from the types of sources covered by this program in order to achieve and maintain the statewide emissions budget could voluntarily participate in this program. Much of the discussion to date on the development of a cap-and-trade program has focussed on establishing a cap-and-trade program for large combustion sources. As noted earlier, EPA is also considering ways to extend the cap-and-trade program to other types of sources.

The EPA is planning to develop a cap-and-trade program for large combustion sources because it provides a proven and cost-effective method for achieving and maintaining a fixed tonnage budget while providing maximum compliance flexibility to affected sources. By capping emissions, the environmental integrity of this market-based approach is assured. For example, as total electricity generation grows, average emissions over the ozone season would not exceed the cap. In addition, the reductions achieved across sectors will be those of lowest cost, since each source will identify and implement the specific control technology, pollution-minimizing fuel, energy efficiency, or production mix that offers the greatest amount of pollution reduction at the least cost. Overall, implementation of a regional cap-and-trade program would likely lower the costs of attaining reductions through more efficient allocation of emission reduction responsibilities, minimize the regulatory burden for pollution sources, and serve to stimulate technology innovation.

A number of regulatory programs are currently in use or under development that use a cap-and-trade program for large combustion sources. These regulatory systems include the EPA's Acid Rain Program for $SO_2$ emissions, the South Coast Air Quality Management District's Regional Clean Air Incentives Market for $SO_2$ and $NO_X$, and the OTC's $NO_X$ Budget Program. Experience with these regulatory programs indicates that establishing a tonnage budget for large combustion sources is currently feasible and cost effective. These approaches exist because there is a range of options available for controlling and measuring emissions from these sources. For measuring emissions, continuous emissions monitors currently installed at most sources participating in these approaches provide accurate and complete emissions measurements which enable the administrators of these approaches to easily and accurately track and enforce emissions on a tonnage basis.

In developing the cap-and-trade program, EPA will build upon the work produced by OTAG's Trading/Incentives Work Group. Based upon OTAG's products and upon experience from other relevant efforts, a model rule will be developed that details the program requirements and provisions of a cap-and-trade program, including: affected sources, monitoring requirements, and market features. In establishing the specific program applicability, EPA expects to propose inclusion of those large combustion sources that are most cost-effective for controlling emissions, while also capturing the majority of $NO_X$ emissions from the stationary source sector. The monitoring requirements are expected to be based largely on existing requirements in 40 CFR Part 75. Market features of the program will address such issues as the basic design of the trading system, the process for setting emission limitations (e.g., allocation of allowances, generation performance standard, etc.), and provisions for emissions trading and banking. The EPA will work to develop a cap-and-trade system with market features that are easily understood to facilitate maximum participation, minimum transaction costs, and maximum cost savings. The EPA will also take comment on ways to include a broader set of industrial and mobile sources within the cap-and-trade system.

The EPA plans to develop the cap-and-trade program, in coordination with States interested in participating in such a system. The EPA will hold two workshops in late 1997 to provide States and stakeholders an opportunity to comment on the trading program framework prior to proposal, as recommended by the OTAG. The product of these workshops would be a model rule that EPA would then publish for comment in the **Federal Register** prior to finalization of this proposal. States electing to participate in this program would either adopt the model rule by reference or State regulations that are consistent with the model rule. The preamble to the model rule would outline EPA and State responsibilities for implementing the program. Generally, EPA expects that it would be responsible for managing the emissions data and market functions of the program and that States would have the primary responsibility for enforcing the requirements of the program.

## VIII. Regulatory Analysis

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether the regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may: (1) have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, it has been determined that this proposal is a ''significant regulatory action'' because it will have an annual effect on the economy of approximately $2 billion. As such, this action was submitted to OMB for review. Any written comments from OMB to EPA and any written EPA response to those comments are included in the docket. The docket is available for public inspection at EPA's Air Docket section, which is listed in the **ADDRESSES** section of this preamble.

Based on the 2 years of analysis conducted by OTAG and other supplemental data, the Agency developed an approach that is presented in this proposal for reducing the transport of ozone emissions over long distances by lowering $NO_X$ emissions from major sources. Currently, the movement of ozone from one region to another makes compliance with the existing NAAQS difficult for certain nonattainment areas. Further, State efforts to reach attainment of the ozone standard through local measures can be very expensive. In essence, this proposal is a regulatory action designed to improve the effectiveness and efficiency of State and EPA efforts to attain and maintain the NAAQS. The OTAG recommended that EPA focus on requiring appropriate States to reduce summer $NO_X$ emissions in three categories: mobile sources, electric power plants, and other stationary sources. The Agency adopted this approach in developing this proposal to establish emissions budgets for 22 States and the District of Columbia. Notably, the Agency is already establishing national requirements for mobile source reductions that OTAG recommended. Therefore, EPA did not estimate their impacts in this regulatory analysis. Agency actions with respect to mobile sources have been and will be addressed in separate rulemaking activities that are described below.

**Mobile Sources**

A number of EPA programs designed to reduce $NO_X$ and other emissions from highway vehicles and nonroad engines have not yet been implemented. Some of these programs have been promulgated but have implementation dates which have not yet arrived. Other programs have been proposed but have not been promulgated, and still other programs are expected to be proposed in the near future. The following table lists some of these mobile source control programs and describes their status as of the date of this rulemaking.

TABLE VIII–1.—ANTICIPATED MOBILE SOURCE CONTROL MEASURES

| Measure | Current status |
|---|---|
| National Low-Emitting Vehicle Standards (NLEV) | Final; not yet implemented. |
| 2004 Heavy-Duty Vehicle Standards | Proposed. |
| FTP Revisions | Final; not yet implemented. |
| Federal Small Engine Standards, Phase II | Proposal in 1997. |
| Federal Marine Engine Standards (for diesels >50 hp) | Proposal in 1997. |
| Federal Locomotive Standards | Proposed. |
| 1997 Proposed Nonroad Diesel Engine Standards | Proposal in 1997. |
| Tier 2 Light-Duty Vehicle Standards | Under study. |

All of the programs listed in the preceding table will be implemented on a nationwide basis (except NLEV which is applicable in 49 States). The EPA continues to evaluate the need for additional Federal controls on mobile source emissions and may propose additional measures as conditions warrant. In addition, EPA continues to encourage States to evaluate as part of their SIPs the appropriateness of mobile source emission control programs that can be implemented on a local or Statewide basis such as I/M programs, RFG, transportation control measures and clean-fuel fleets.

As described in section III, Statewide Emission Budgets, the emission targets for the mobile source sectors (highway vehicle emissions and nonroad emissions) were developed by estimating the emissions expected to result from the projected activity level in 2007. These targets do not assume the implementation of any additional programs beyond those already reflected in SIPs or expected to be implemented at the Federal level, including those listed in Table VIII–1. All of these programs would be implemented even in the absence of today's proposed rule. States and industry will not bear any additional mobile source control costs due to this proposal, unless a State chooses to implement additional mobile source programs under its own authority and to correspondingly limit the scope or reduce the stringency of new controls on stationary sources. The EPA presumes a State would do so only if it found a net savings to its economy in doing so. Furthermore, the cost of such state-operated programs will depend on their specific design, which EPA is unable to predict. The EPA has therefore not included the costs of current or new Federal mobile source controls in its analysis of the costs of this proposal. Information on the costs of the various proposed or promulgated Federal measures can be found in the **Federal Register** notices for the respective measures.

**Electric Power Industry and Other Stationary Sources**

The EPA is proposing to establish a summer season $NO_X$ emissions budget for 22 States and the District of Columbia based on reducing emissions from the electric power industry and other stationary sources.[19] This will lead to the placement of $NO_X$ controls on operating units in these two categories that the Agency has not covered in other specific rulemaking activities. Therefore, EPA has estimated the $NO_X$ emissions reductions and annual incremental costs in the year 2005 resulting from this proposal.

The OTAG recognized the value of market-based approaches to lowering emissions from power plants and large industrial sources. It also encouraged EPA to consider the value of allowing

[19] This category includes industrial, commercial, and institutional boilers, reciprocating engines, gas turbines, process heaters, cement kilns, furnaces at iron, steel, and glass-making operations, and nitric acid, adipic acid and other plants with industrial processes that produce $NO_X$

''banking'' as a program element in any trading program that it would want to run with the States. The Agency agrees that a market-based approach with trading and banking is preferable and wants to work with all States covered by this rulemaking to establish such a program. The EPA currently believes that for such a program to be effective and administratively practicable, the program should have an emissions cap and allow trading between sources in all the States that are covered. The Agency's economic analysis is based on this view.

Analytical limitations kept EPA from estimating the costs of a single cap-and-trade program for the electric power industry and other stationary sources. The Agency can only estimate the impacts of a cap-and-trade program across all States covered in this rulemaking for the electric power industry at the current time.

For its analysis, the Agency assumed that power plants have a trading and banking program that begins in 2005 with a summer $NO_X$ emissions cap of 489 thousand tons. This is the $NO_X$ budget component for the electric power industry that is discussed earlier in the preamble. This type of program represents EPA's current views of how a reasonable trading program would be constructed. The Agency estimates that close to 800 electric power generating sources will come under this program. For other stationary sources, EPA assumed in its economic analysis that there would be a regulatory program that would not allow summer $NO_X$ emissions in 2005 to exceed 466 thousand tons. This is the total $NO_X$ budget component for other stationary sources discussed earlier in the Preamble. In this analysis, EPA set an emissions cap for each State based on its share of the $NO_X$ budget component that EPA has developed and assumes that each State places controls on its sources in a manner that minimizes compliance costs in that State (a ''least-cost'' regulatory approach is used). The EPA estimates that the States would place controls on about 9,000 other stationary sources to comply with EPA's requirements. Given that the Agency could not estimate the costs of a single cap-and-trade program for the electric power industry and other stationary sources, the total cost estimate of this proposal is likely to be overstated to the extent that trading would occur between facilities in both groups.

For the electric power industry, EPA was able to estimate the costs and emissions changes based on two possible baseline scenarios for the future. For an Initial Base Case, EPA considered only the implementation of Phase I (RACT requirements) of the OTC MOU and other existing CAA requirements. For a Final Base Case, EPA considered implementation of Phase II and Phase III of the OTC MOU, which lowered the $NO_X$ emissions levels in the Northeastern United States in the baseline. For the other stationary sources, the Agency was only able to consider the implementation of Phase I of the OTC MOU and estimate the $NO_X$ emission reductions and incremental costs from the Initial Base Case. For the Final Base Case, EPA knows that the emissions reductions and incremental costs are going to be less than would occur in the Initial Base Case.

Table VIII–2 shows the $NO_X$ emissions levels that EPA predicts will occur for each source category in the Initial Base Case and Final Base Case and after States amend their SIPs to meet the $NO_X$ emission budget requirements in this proposal. Notably, some types of control technologies can be used on a seasonal basis and others have to be used year round. Because there are benefits from reducing $NO_X$ throughout the year, the annual and seasonal changes in $NO_X$ emissions are both reported.[20] The EPA's analysis of the use of cap-and-trade program for the electric power industry showed that there would be significant reductions in $NO_X$ emissions occurring from electric generation units throughout the area covered by the proposed rule.

Table VIII–3 shows the annual incremental costs that the Agency estimates the regulated community will incur in 2005, the first full year of implementation of this rule by the States in the two Base Cases. The costs presented here reflect trading across States for electric power generation units and cost minimization within States for other stationary sources. For the Initial Base Case, the total annual incremental costs are estimated to be $2,072 million in 2005. For the Final Base Case, the total annual incremental costs are estimated to be lower than $1,992 million in 2005.

TABLE VIII–2.—$NO_X$ EMISSIONS IN 2005 FOR ALTERNATIVE BASE CASES AND AFTER COMPLIANCE WITH THE OZONE TRANSPORT RULEMAKING

[1,000 $NO_X$ tons]

| Source category | Initial base case (phase I OTC MOU) | | Final base case (phase II/III OTC MOU) | | Under proposed rule implementation | |
|---|---|---|---|---|---|---|
| | Ozone season | Annual | Ozone season | Annual | Ozone season | Annual |
| Electric Power Industry | 1,490 | 3,497 | 1,427 | 3,423 | 489 | 2,278 |
| Other Stationary Sources | 698 | 1,666 | <698 | <1,666 | 466 | 1,227 |
| Total | 2,188 | 5,163 | <2,125 | <5,089 | 955 | 3,505 |

**Note:** EPA was only able to consider partial and full implementation of the Ozone Transport Commission Memorandum of Understanding for the electric power industry. Controls on the electric power industry occur through cap-and-trade. Controls on Other stationary sources occur by States implementing an approach applying least-cost controls.

[20] The ozone season in this analysis covers May 1 through September 30.

TABLE VIII–3.— INCREMENTAL ANNUAL COSTS IN 2005 FOR COMPLIANCE WITH THE OZONE TRANSPORT RULEMAKING UNDER ALTERNATIVE BASE CASES

[Million 1990 dollars]

| Source category | Initial base case (phase I OTC MOU) | Final base case (phase II/III OTC MOU) |
|---|---|---|
| Electric Power Industry | $1,687 | $1,607 |
| Other Stationary Sources | 385 | <385 |
| Total | 2,072 | <1,992 |

**Note:** EPA was only able to consider partial and full implementation of the Ozone Transport Commission Memorandum of Understanding for the electric power industry. Controls on the electric power industry occur through cap-and-trade. States control Other stationary sources by implementing a least-cost approach.

During the OTAG process, there arose concern over whether the States would enter the trading program that EPA offered to form and that they would instead end up employing command-and-control approaches to comply with EPA's proposed rulemaking requirements. There were discussions of the possible application of rate-based controls on electric generation. In keeping with these discussions, EPA has also estimated the costs of this type of control for electric power generation units. The EPA estimates that the electric power industry in the 23 jurisdictions covered by this rulemaking will incur an annual incremental cost under the Final Base Case of $2,108 million, if during the ozone season, these plants are regulated by an emission limitation of .15 pounds of $NO_X$ per million Btus of heat input. Under the Initial Base Case, the costs would be $2,189 million. A comparison of this cost with that in Table VIII–3 reveals that a cap-and-trade program for the electric power industry is much less costly than a traditional rate-based program.

## IX. Air Quality Analyses

As discussed in section III, Statewide Emissions Budgets, EPA has used a comparative cost-effectiveness approach to identify a set of control measures for achieving the emissions budgets for States found to make a significant contribution to downwind nonattainment (see section II, Weight of Evidence Determination of Significant Contribution). These controls are generally consistent with OTAG's recommendations. The OTAG did perform model simulations to assess the air quality benefits of a range of regional strategies. In particular, OTAG strategy Run 5 (see Appendix E) provides large air quality benefits over broad portions of the region. This strategy includes regional $NO_X$ controls similar to what is being proposed in this rulemaking. The EPA intends to estimate the impacts of the proposed statewide emission budgets using air quality modeling for inclusion in the SNPR.

## X. Nonozone Benefits of $NO_X$ Reductions

In addition to contributing to attainment of the ozone NAAQS, decreases of $NO_X$ emissions will also likely help improve the environment in several important ways. On a national scale, decreases in $NO_X$ emissions will also decrease acid deposition, nitrates in drinking water, excessive nitrogen loadings to aquatic and terrestrial ecosystems, and ambient concentrations of nitrogen dioxide, particulate matter and toxics. On a global scale, decreases in $NO_X$ emissions will, to some degree, reduce greenhouse gases and stratospheric ozone depletion. Thus, management of $NO_X$ emissions is important to both air quality and watershed protection on national and global scales. In its July 8, 1997 final recommendations, OTAG stated that it ''recognizes that $NO_X$ controls for ozone reductions purposes have collateral public health and environmental benefits, including reductions in acid deposition, eutrophication, nitrification, fine particle pollution, and regional haze.'' These and other public health and environmental benefits associated with decreases in $NO_X$ emissions are summarized below. (17)

*Acid Deposition:* Sulfur dioxide and $NO_X$ are the two key air pollutants that cause acid deposition (wet and dry particles and gases) and result in the adverse effects on aquatic and terrestrial ecosystems, materials, visibility, and public health. Nitric acid deposition plays a dominant role in the acid pulses associated with the fish kills observed during the springtime melt of the snowpack in sensitive watersheds and recently has also been identified as a major contributor to chronic acidification of certain sensitive surface waters.

*Drinking Water Nitrate:* High levels of nitrate in drinking water is a health hazard, especially for infants. Atmospheric nitrogen deposition in sensitive watersheds can increase stream water nitrate concentrations; the added nitrate can remain in the water and be transported long distances downstream.

*Eutrophication:* $NO_X$ emissions contribute directly to the widespread accelerated eutrophication of United States coastal waters and estuaries. Atmospheric nitrogen deposition onto surface waters and deposition to watershed and subsequent transport into the tidal waters has been documented to contribute from 12 to 44 percent of the total nitrogen loadings to United States coastal water bodies. Nitrogen is the nutrient limiting growth of algae in most coastal waters and estuaries. Thus, addition of nitrogen results in accelerated algae and aquatic plant growth causing adverse ecological effects and economic impacts that range from nuisance algal blooms to oxygen depletion and fish kills.

*Global Warming:* Nitrous oxide ($N_2O$) is a greenhouse gas. Anthropogenic $N_2O$ emissions in the United States contribute about 2 percent of the greenhouse effect, relative to total United States anthropogenic emissions of greenhouse gases. In addition, emissions of $NO_X$ lead to the formation of tropospheric ozone, which is another greenhouse gas.

*Nitrogen Dioxide ($NO_2$):* Exposure to $NO_2$ is associated with a variety of acute and chronic health effects. The health effects of most concern at ambient or near-ambient concentrations of $NO_2$ include mild changes in airway responsiveness and pulmonary function in individuals with pre-existing respiratory illnesses and increases in respiratory illnesses in children. Currently, all areas of the United States monitoring $NO_2$ are below EPA's threshold for health effects.

*Nitrogen Saturation of Terrestrial Ecosystems:* Nitrogen accumulates in watersheds with high atmospheric nitrogen deposition. Because most North American terrestrial ecosystems are nitrogen limited, nitrogen deposition often has a fertilizing effect, accelerating plant growth. Although this effect is often considered beneficial, nitrogen deposition is causing important adverse changes in some terrestrial ecosystems, including shifts in plant species composition and decreases in species diversity or undesirable nitrate leaching to surface and ground water and decreased plant growth.

*Particulate Matter (PM):* $NO_X$ compounds react with other compounds in the atmosphere to form nitrate particles and acid aerosols. Because of their small size nitrate particles have a relatively long atmospheric lifetime; these small particles can also penetrate deeply into the lungs. PM has a wide range of adverse health effects.

*Stratospheric Ozone Depletion:* A layer of ozone located in the upper atmosphere (stratosphere) protects people, plants, and animals on the surface of the earth (troposphere) from excessive ultraviolet radiation. $N_2O$, which is very stable in the troposphere, slowly migrates to the stratosphere. In the stratosphere, solar radiation breaks it into nitric oxide (NO) and nitrogen (N). The NO reacts with ozone to form $NO_2$ and molecular oxygen. Thus, decreasing $N_2O$ emissions would result in some decrease in the depletion of stratospheric ozone.

*Toxic Products:* Airborne particles derived from $NO_X$ emissions react in the atmosphere to form various nitrogen containing compounds, some of which may be mutagenic. Examples of transformation products thought to contribute to increased mutagenicity include the nitrate radical, peroxyacetyl nitrates, nitroarenes, and nitrosamines.

*Visibility and Regional Haze:* $NO_X$ emissions lead to the formation of compounds that can interfere with the transmission of light, limiting visual range and color discrimination. Most visibility and regional haze problems can be traced to airborne particles in the atmosphere that include carbon compounds, nitrate and sulfate aerosols, and soil dust. The major cause of visibility impairment in the eastern United States is sulfates, while in the West the other particle types play a greater role.

## XI. Impact on Small Entities

The Regulatory Flexibility Act, 5 U.S.C. 601(a), provides that whenever an agency is required to publish a general notice of rulemaking, it must prepare and make available a regulatory flexibility analysis (RFA). An RFA is required only for small entities that are directly regulated by the rule. *See Mid-Tex Electric Cooperative, Inc.* v. *FERC,* 773 F.2d 327 (D.C. Cir. 1985) (agency's certification need only consider the rule's impact on regulated entities and not indirect impact on small entities not regulated); *Colorado State Banking Bd.* v. *Resolution Trust Corp.,* 926 F.2d 931 (10th Cir. 1991). This rulemaking simply requires States to develop, adopt, and submit SIP revisions, and does not directly regulate any entities. Accordingly, pursuant to 5 U.S.C. 605(b), the Administrator certifies that this rule will not have a significant economic impact on a substantial number of small entities. Furthermore, because affected States will have discretion to choose which sources to regulate and how much emissions reductions each selected source must achieve, EPA cannot now predict the effect of this rule on small entities. In addition, if States adopt the control measures that form the basis of the proposed State budget, there will be little, if any, effect on small businesses.

## XII. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Pub. L. 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

The EPA has determined that this rule contains a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. Accordingly, EPA has prepared under section 202 of the UMRA a written statement which is summarized below.

The EPA has determined that to meet the requirements of section 110(a)(2)(D) of the Clean Air Act, States must submit SIP provisions that limit $NO_X$ emissions to the specified amounts indicated elsewhere in this rulemaking. The EPA is granting the affected States broad discretion in developing SIP controls to attain these levels. The EPA has examined a variety of possible, regionwide $NO_X$ emissions controls, which could form the basis for (i) State budgets of different levels than proposed, as well as (ii) State packages of control meadeveloping the budget levels. The EPA is soliciting comment on whether the budget levels proposed in today's action are the most cost-effective or least burdensome alternative that achieves the objectives of the rule and on other alternatives (e.g., applying different levels of control in different subregions), if feasible, that EPA should examine in developing final budget levels.

By today's proposal, EPA is not directly establishing any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments. Thus, EPA is not obligated to develop under section 203 of the UMRA a small government agency plan.

Consistent with the intergovernmental consultation provisions of section 204 of the UMRA and Executive Order 12875, ''Enhancing the Intergovernmental Partnership,'' EPA has already initiated consultations with the governmental entities affected by this rule. The EPA already consulted with these governmental entities extensively during the OTAG process. The EPA has received extensive comments from governmental entities through OTAG, including specific recommendations from OTAG, as described above. The EPA has evaluated those comments and recommendations, and has determined to propose statewide budget levels based on a basket of regional $NO_X$ controls that bear some similarity to those OTAG recommendations. The EPA's reasons for doing so are described at length in this rulemaking.

Dated: October 10, 1997.

**Carol M. Browner,**

*Administrator.*

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**Appendix A—References**

1. Ozone Transport Assessment Group (OTAG), Policy Paper approved by the Policy Group on December 4, 1995.

2. National Research Council, Committee on Tropospheric Ozone Formation and Measurement, ''Rethinking the Ozone Problem in Urban and Regional Air Pollution,'' pp. 93–107, National Academy Press, Washington, DC, 1991.

3. Wisconsin Department of Natural Resources, ''An Analysis of Measured and Predicted Concentrations Aloft of Ozone and Total Reactive Oxides of Nitrogen in the Eastern U.S. During July 1995,'' DRAFT, January 25, 1997, Madison, WI.

4. Northeast States for Coordinated Air Use Management, ''The Long-Range Transport of Ozone and Its Precursors in the Eastern United States,'' March 1997, Boston, MA.

5. OTAG, ''Ozone Transport Assessment Group Modeling Protocol,'' Version 3.0, 1996.

6. OTAG, ''Ozone Transport Assessment Group Draft Final Report, Chapter 2 Regional and Urban Scale Modeling,'' 1997.

7. Sonoma Technology, Inc., ''Evaluation of the UAM–V Model Performance in OTAG Simulations, Phase I: Summary of Performance Against Surface Observations,'' January 1997, STI–996120–1605–FR, Santa Rosa, CA.

8. E.H. Pechan & Associates, ''OTAG Emissions Inventory Development Report,'' Volumes I, II, and III: DRAFT Report, June 1997, Durham, NC.

9. OTAG, ''DRAFT Final Report Volume I: Executive Summary, Ozone Transport Assessment Group Air Quality and Analysis Workgroup.'' June, 1997.

10. Chameides, W.L. and E.B. Cowling, ''The State of the Southern Oxidants Study (SOS): Policy-Relevant Findings In Ozone Pollution Research, 1988–1994.'' pg. 37, January 1995.

11. Porter, P.S., S.T. Rao, E. Zalewsky, I Zurbenko, R.F. Henry, and J.Y. Ku, ''Statistical Characteristics of Spectrally-Decomposed Ambient Ozone Time Series Data,'' Report to the Ozone Transport Assessment Group, 1996.

12. Environ, Inc., ''Review of Existing Ozone Measurement and Modeling Studies in the Eastern United States,'' February 21, 1996, Novato, CA.

13. Ozone Transport Commission, ''1994 Fall Meeting Report,'' September 27, 1994, Newport, RI.

14. Morris, R.E., G.M. Wilson, S.B. Shepard, and K. Lee, ''Ozone Source Apportionment Modeling Using the July 1991 OTAG Episode for the Northeast Corridor and Lake Michigan Regions,'' March 1997, Environ, Inc., Novato, CA.

15. McNeill, D., T.W.X. Task, ''Photochemical Modeling Analysis of the Northwest ''Ozone Free'' OTAG States Using the July 1995 OTAG Modeling Episode,'' March 1997, Alpine Geophysics, Golden, CO.

16. EPA, 1995, ''National Air Pollutant Emission Trends, 1990–1994,'' EPA–454/R–95–001, October 1995.

17. U.S. Environmental Protection Agency, ''Nitrogen Oxides: Impacts on Public Health and the Environment,'' EPA–452/R–97–002, August 1997.

**Appendix B—OTAG Recommendations**

July 8, 1997.

Ms. Mary Nichols,

*Assistant Administrator, Air & Radiation Division, U.S. Environmental Protection Agency, 401 M Street, SW., (MC–M6101), Washington, DC 20460*

Dear Ms. Nichols: The Ozone Transport Assessment Group (OTAG) has completed its work in accordance with your memorandum of March 2, 1995. Attached please find the recommendations to the U.S. Environmental Protection Agency approved by OTAG. Also attached are states' and stakeholders' comments on the recommendations and identification of the votes cast on each by each state. The technical support documents resulting from OTAG's work will be forwarded as soon as they are completed.

We appreciate the technical and financial support that EPA has provided OTAG over the past two years. We believe that this unprecedented effort of dynamic interaction among state and federal government, industry and environmental stakeholders has demonstrated that diverse interests can work together constructively on important policy issues. We encourage EPA to consider OTAG's recommendations as it proceeds with implementation of the Clean Air Act.

Sincerely,

Mary A. Gade,
Chair, Policy Group.

Donald R. Schregardus,
Chair, Strategies & Controls Subgroup.

Ned O. Sullivan,
Chair, Outreach & Communications Subgroup.

Robert C. Shinn, Jr.,
Chair, Modeling & Assessment, Subgroup.

Harold Reheis,
Chair, Financial Subgroup.

**Recommendation: Additional Modeling and Air Quality Analysis (Approved by the Policy Group, June 3, 1997)**

Based on the conclusions of OTAG, states must have the opportunity to conduct additional local and subregional modeling and air quality analyses, as well as develop and propose appropriate levels and timing of controls. In taking these actions, priority should be given to the serious and severe nonattainment areas of Atlanta, Lake Michigan, and the Northeast, relative to transport. EPA has announced its intention to propose and take final action on a SIP call. States can work together and with EPA toward completing local SIPs including the evaluation of possible local $NO_X$ disbenefits, and to build on the modeling and air quality analysis work of OTAG to evaluate EPA's proposed statewide tonnage budgets [1] in its proposed SIP calls. The initial statewide tonnage budgets proposed by EPA may be revised or shown to be unnecessary or insufficient through additional subregional modeling or air quality analyses. OTAG recommends EPA evaluate states' timely submittal of comments and subregional modeling regarding the proposed statewide budgets prior to EPA's finalizing the SIP calls within 12 months of their proposal.

The Policy Group recognizes that $NO_X$ controls for ozone reduction purposes have collateral public health and environmental benefits, including reductions in acid deposition, eutrophication, nitrification, fine particle pollution and regional haze.

**Recommendation: Diesel Fuel (Approved by the Policy Group, June 3, 1997)**

OTAG recommends that, by 1999, EPA should evaluate the emission benefits and other effects, such as fuel economy, of cetane adjustments on current technology engines, both on highway and non-road, and, if appropriate, expeditiously adopt and implement standards. OTAG further recommends that the EPA use of existing collaborative process developed as a result of the 1995 statement of principles to identify if new diesel fuel standards are beneficial. If found beneficial and cost-effective, OTAG further recommends that EPA adopt and implement new standards no later than 2004.

**Recommendation: Gasoline (Approved by the Policy Group May 13, 1997)**

The OTAG states recommend the continued use of Federal Reformulated Gasoline (RFG) in the mandated and opt-in areas.

The OTAG states support state flexibility and encourage the opt-in to the Federal RFG program or other fuel strategies consistent with the Clean Air Act, including those attainment areas which contribute to downwind nonattainment situations or which choose to implement strategies to assist in preventing violations of the National Ambient Air Quality Standard (NAAQS) for ozone.

The USEPA should adopt and implement by rule an appropriate sulfur standard to further reduce emissions and assist the vehicle technology/fuel system achieve maximum long term performance.

**Recommendation: Vehicle Emission Inspection and Maintenance Controls (Approved by the Policy Group, June 19, 1997)**

- The OTAG states recommend that, where required by the Clean Air Act, appropriate and effective vehicle emission inspection and maintenance (I/M) programs be implemented. The OTAG states additionally recommend that states consider the adoption of enhanced I/M programs in all urbanized areas in the fine grid [2] with a population greater than 500,000.
- The OTAG states further recommend that EPA recognize and give appropriate

[1] Budget as used in this recommendation does not imply that a cap will be implemented.

[2] As described in the Utility $NO_X$ Controls Recommendation.

credit to the state-by-state emission reduction benefits of vehicle I/M programs and their impact on transport of ozone and its precursors.

• The OTAG states recognize the potential effectiveness of a vehicle on-board diagnostic (OBD) system to alert drivers of emission control system malfunctions and to ensure proper maintenance and operation of the emission control system under real world driving conditions. Therefore, they encourage EPA to support periodic OBD system checks as part of an effective vehicle I/M program and to provide appropriate I/M program credit.

**Recommendation: Major Modeling/Air Quality Conclusions (Approved by the Policy Group, June 3, 1997)**

Based on OTAG modeling, the Regional and Urban Scale Modeling and Air Quality Analysis Workgroups have drawn several conclusions regarding the benefits to be derived from $NO_X$ and VOC controls for all source sectors and regarding ozone transport. Regional $NO_X$ reductions are effective in producing ozone benefits; the more $NO_X$ reduced, the greater the benefit. Ozone benefits are greatest where emission reductions are made and diminish with distance. Elevated and low level $NO_X$ reductions are both effective. VOC controls are effective in reducing ozone locally and are most advantageous to urban nonattainment areas. Air quality data documents the widespread and pervasive nature of ozone and indicates transport of ozone. Air quality analyses also indicate that ozone aloft is carried over and transported from one day to the next. Generally, the range of transport is longer in the North than in the South. Additionally, coarse grid impacts on the fine grid may be minimal. Other relevant documentation of the RUSM and AQA Workgroups' efforts are available on their Web sites.

**Recommendation: National Measures (Approved by the Policy Group May 13, 1997)**

The OTAG states recommend that the USEPA continue to develop and expeditiously adopt, no later than the dates indicated below, and effectively implement stringent control measures on a national basis which meet or exceed the emission reduction levels as contained in the OTAG analysis.

The measures include:

| Measure | Reductions assumed in the modeling | | Adoption date | Start/ implementation date |
|---|---|---|---|---|
| | percent [1] | Tons [2,3] | | |
| Arch & Industrial Maintenance (AIM) Coatings: | | | | |
| —Phase I | 20% VOC | 507 | November 97 | January 98/ |
| —Phase II | 38% VOC | 861 | | 2003. |
| Consumer/Commercial Products: | | | | |
| —Phase I | 20% VOC | 886 | November 97 | March 98/ |
| —Phase II | 30% VOC | 1281 | | 2003. |
| Autobody Refinishing: | | | | |
| —Phase I | 37% VOC | 281 | August 97 | January 98/ |
| —Phase II | 53% VOC | 391 | | 2003. |
| Reformulated Gasoline | 25% VOC [4] | [5] na | | 2000. |
| (RFG) Phase II | 6.8% $NO_X$ | na | | |
| Phase II Small Engine Standards | 43% VOC | 1343 | | 2007. |
| Marine Engine Standards | 23% VOC | 398 | | 1998. |
| Heavy Duty Highway 2g Standard (Equivalent to a 4g standard in 2007) | Varies by Engine Family | [5] na | | 2004. |
| Heavy Duty Nonroad Diesel Standard | 37% $NO_X$ | 1499 | | 2004. |
| Locomotive Standard with Rebuild | 43% $NO_X$ | [6] na | | 1997. |
| | 10% $NO_X$ | 126 | | |

[1] Percent reductions were applied to 1990 emissions projected to 2007.
[2] Tonnage reduction differences are based on 1990 emissions projected to 2007.
[3] Reductions from multi-phase programs are cumulative.
[4] For Phase II RFG, percent reductions are based only on affected emissions.
[5] Tonnage reductions could not be calculated for RFG and the Heavy Duty Highway 2g Standard since the effects of growth and control could not be accounted for separately by the model used.
[6] The 43% reduction includes rebuilt engines; however, rebuilts were not modeled by OTAG. The modeled reduction was only 10%.

• The OTAG states encourage the USEPA to reach closure on the Tier 2 Motor Vehicle Study in recognizing the benefits of volatile organic compound and nitrogen oxide reductions and their implication for ozone production.

**Recommendation: National Low Emission Vehicle (Approved by the Policy Group May 13, 1997)**

The OTAG states acknowledge the ability of states to adopt the California Low Emission Vehicle Program and further acknowledge that the National Low Emission Vehicle Program is a voluntary program. OTAG supports and encourages the implementation of a National Low Emission Vehicle Program.

**Recommendation: Non-Utility Point Source Controls (Approved by the Policy Group, June 19, 1997)**

*Definitions*

For purposes of this recommendation, individual medium non-utility point sources are defined as follows:

A boiler > 100 MMBtu/hr and < 250 MMBtu/hr
A reciprocating i.c. engine > 4000 hp and < 8000 hp
A turbine > 10,000 hp and < 20,000 hp
Any other source > 1 ton/average summer day and < 2 tons/average summer day

For purposes of this recommendation, individual large non-utility point sources are defined as follows:

A boiler ≥ 250 MMBtu/hr
A reciprocating i.c. engine ≥ 8000 hp
A turbine ≥ 20,000 hp
Any other source ≥ 2 tons/average summer day

*Control Levels*

The OTAG Policy Group recommends that the stringency of controls for large non-utility point sources should be established in a manner equitably with utility controls. The OTAG Policy Group recommends that RACT should be considered for individual medium non-utility point sources were appropriate.

If additional modeling and air quality analyses are performed as specified in OTAG's recommendation for ''Additional Modeling and Air Quality Analysis,'' then development of final state non-utility point source strategies should consider said modeling and analyses.

*Control Targets for Budget[3] Calculation Purposes*

The OTAG Policy Group anticipates USEPA will calculate a statewide $NO_x$ tonnage budget for each state. In calculating the statewide $NO_x$ tonnage budgets, the OTAG Policy Group recommends a calculation based on the following non-utility point source control targets:

| Reference utility control level (coal-fired power plants) | Control targets for the large non-utility point source sector (percent) | Control targets for the medium non-utility point source sector |
|---|---|---|
| 55% (0.35 lb/MMBtu). | 55 | Uncontrolled. |
| 65% (0.25 lb/MMBtu). | 60 | Uncontrolled. |
| 75% (0.20 lb/MMBtu). | 65 | RACT. |
| 85% (0.15 lb/MMBtu). | 70 | RACT. |

The control targets, expressed as an emission reduction percentage, should be based on uncontrolled emission rates. The budget component for non-utility point sources is not intended to be an allocation for the non-utility point source sector or for individual units.

*Flexibility and Relationship to Other Requirements*

The OTAG Policy Group acknowledges that states have flexibility in implementing the non-utility point source strategy. These recommendations shall not supersede any other more restrictive state or federal requirement.

**Recommendation: Ozone Action Days (Approved by the Policy Group, June 3, 1997)**

The OTAG states endorse and encourage the development and implementation of ozone action programs to increase public awareness of the public health and welfare issues associated with ozone air pollution. These include but are not limited to daily summertime ozone mapping projects which provide ''real-time'' information to the viewer and other programs and information to encourage participation in programs to reduce the emissions of ozone precursors. These programs may be effective in reducing peak ozone concentrations. They complement traditional control strategies for the reduction of ozone and ozone precursors.

**Recommendation: OTAG's Technical Analysis (Approved by the Policy Group, June 3, 1997)**

OTAG's goal is to ''identify and recommend a strategy to reduce transported ozone and is precursors which, in combination with other measures, will enable attainment and maintenance of the national ambient ozone standard in the OTAG region.'' OTAG has performed the most comprehensive technical analysis of ozone transport ever conducted. In cooperation with the states and stakeholders and by sharing information, OTAG has developed and produced the best and most complete emissions inventory for the OTAG region. OTAG has used UAM–V, a state-of-the-art photochemical model, to analyze the potential impact of various control strategies. OTAG has also developed and applied new techniques to analyze existing air quality data to examine the ozone problem.

**Recommendation: Trading Program Framework (Approved by the Policy Group, June 19, 1997)**

Market-based approaches are generally recognized as having the following benefits in relation to traditional command and control regulations: (1) reduce the cost of compliance; (2) create incentives for early reductions; (3) create incentives for emission reductions beyond those required by regulations; (4) promote innovation; and (5) increase flexibility without resorting to waivers, exemptions and other forms of administrative relief.

OTAG recognizes that states have the option to select market systems that are best suited to their policy purposes and air quality planning and program needs. In anticipation of the state specific decisions, OTAG recognizes that states may choose one of two basic approaches to implement $NO_x$ emissions market systems.

- *Track One*—States that elect to implement equivalent $NO_x$ market systems with emissions caps could be part of a common, interstate emissions market. Designated sources would be authorized to participate in emissions trading. Other stationary sources could opt-in to the market under specific conditions. A central regulatory authority, such as EPA, could administer this multi-state $NO_x$ market system.
- *Track Two*—States that elect to implement $NO_x$ market systems without emissions caps would be part of one or more alternative emissions markets. These alternative markets could have several different forms starting with intra-state emissions trading which could possibly lead to multi-state trading arrangements. Participating sources in each state would be authorized to conduct emissions trading consistent with the scope of the alternative market system. If multiple, equivalent $NO_x$ market systems are generated by states, then some central entity, in consultation with EPA, could administer the multi-state $NO_x$ market system.

While OTAG recognizes that the procedures for a cap and trade program are known and implementable, the OTAG encourages the joint state/EPA workgroup(s) described herein to bring similar certainty to non-cap but SIP approved trading programs.

At some point, states may be interested in cross-track trading. Further development work and more time is necessary to determine whether and how this cross-track trading could be credibly done. Implementation of either track should not be delayed while an approach for cross-track trading is developed. Inter-sector trading might be provided for as well.

EPA review and approval of specific state SIP revisions would be necessary for $NO_x$ market systems from either track that are developed in response to EPA's SIP call. States would be responsible for meeting applicable federal requirements and ensuring that the integrity of the state's emissions budget was maintained, as well as other desirable results from adoption to suitable market systems. EPA is responsible for approving state programs that meet the applicable federal requirements.

OTAG also recommends that a joint state/EPA Workgroup be formed to address, with appropriate stakeholder involvement, the following tasks:

- Appropriate provisions for implementing Tracks One and Two as described above.
- Key design features for $NO_x$ emissions market systems that could be selected by affected states.

A series of seven design proposal papers have been developed by the Trading/Incentives Workgroup which include specific recommendations that are incorporated in the OTAG final report. These papers serve as a sound basis for carrying out the work of this joint workgroup. The following specific issues should also be addressed by the joint workgroup:

1. Subregional modeling and air quality analysis should be carefully evaluated to determine whether distance and direction should affect how trading may take place. Appropriate mechanisms, such as trading ratios or weights, could be developed if significant effects are expected.
2. Market systems should be operated and evaluated, and adjustments made as needed to reflect experience gained with trading dynamics and any attendant air quality impacts.
3. Local control requirements necessary for attainment may still be utilized for specific sources.

**Recommendation: Utility $NO_X$ Controls (Approved by the Policy Group, June 3, 1997)**

The OTAG Policy Group recommends that the range of utility $NO_X$ controls in the fine grid fall between Clean Air Act controls and the less stringent of 85% reduction from the 1990 rate (lb/mmBTU) or 0.15 lb/mmBTU in order to mitigate ozone transport and assist states in complying with the existing 120 ppb ozone standard. OTAG modeling shows that ozone transport is greater in the northern tier than in the southern tier. EPA has indicated that control levels are to be determined and implemented through statewide tonnage budgets. The statewide budget process should be as described OTAG's recommendation ''Additional Modeling and Air Quality Analysis.'' Control measures are to be determined and implemented by the states. The actions set forth in this section must be carried out in accordance with the Clean Air Act. If trading is allowed, public interest stakeholders have recommended that a minimum of 10% of each state's tonnage budget be allocated solely to qualifying, verifiable, and new end-use energy efficiency

[3] Budget as used in this recommendation does not imply that a cap will be implemented.

and renewable projects. The coarse grid states which would be exempt from OTAG-related controls (all of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa,[4] Arkansas, Louisiana, Mississippi, and Florida, as well as the coarse grid portions of Maine, New Hampshire, Vermont, New York, Michigan, Wisconsin, Missouri[5], Alabama, and Georgia) will, in cooperation with EPA, periodically review their emissions, and the impact of increases, on downwind nonattainment areas and, as appropriate, take steps necessary to reduce such impacts including appropriate control measures.

**Appendix C—Tables for Section II**

Weight of Evidence Determination of Significant Contribution

TABLE II–1.—OTAG 2007 STATE TOTAL $NO_X$ Emissions (tons/day)

| State | Total $NO_X$ |
|---|---|
| Texas | 4026 |
| Ohio | 2871 |
| Illinois | 2535 |
| Florida | 2503 |
| Pennsylvania | 2406 |
| Michigan | 2334 |
| Indiana | 2271 |
| Louisiana | 2143 |
| Tennessee | 2090 |
| Georgia | 1711 |
| New York | 1677 |
| Alabama | 1621 |
| Kentucky | 1598 |
| North Carolina | 1506 |
| West Virginia | 1393 |
| Virginia | 1378 |
| New Jersey | 1244 |
| Missouri | 1140 |
| Oklahoma | 1107 |
| South Carolina | 1040 |
| Wisconsin | 1035 |
| Mississippi | 1012 |
| Kansas | 993 |
| Maryland | 940 |
| Minnesota | 917 |
| Iowa | 782 |
| Massachusetts | 701 |
| Arkansas | 643 |
| Nebraska | 411 |
| Connecticut | 362 |
| Maine | 232 |
| New Hampshire | 192 |
| Delaware | 164 |
| South Dakota | 140 |
| Vermont | 78 |
| Rhode Island | 78 |
| North Dakota | 55 |
| District of Columbia | 53 |

[4] It is understood that the State of Iowa will work with the State of Wisconsin in the development of the Southeast Wisconsin ozone SIP.

[5] It is understood that the state of Kansas will work with the state of Missouri in the continued progress of the Kansas City ozone SIP. In addition, the states of Oklahoma, Texas, Arkansas, and Louisiana will share with the state of Missouri the results of their urban and regional scale ozone modeling which includes boundary condition information and emissions in inventory data showing projected impacts of ozone control programs.

TABLE II–2.—OTAG 2007 STATE $NO_x$ Emissions Density (tons/day/1000 sq. mi.)

| State | Emissions density |
|---|---|
| District of Columbia | 771.91 |
| New Jersey | 166.53 |
| Maryland | 95.55 |
| Massachusetts | 89.62 |
| Delaware | 85.09 |
| Connecticut | 74.30 |
| Rhode Island | 73.76 |
| Ohio | 70.03 |
| Indiana | 63.19 |
| West Virginia | 57.73 |
| Pennsylvania | 53.58 |
| Tennessee | 50.79 |
| Louisiana | 48.14 |
| Florida | 46.22 |
| Illinois | 45.56 |
| Michigan | 40.97 |
| Kentucky | 40.27 |
| New York | 35.40 |
| Virginia | 34.71 |
| South Carolina | 34.43 |
| Alabama | 31.92 |
| Texas | 31.42 |
| North Carolina | 30.83 |
| Georgia | 29.48 |
| Mississippi | 21.42 |
| New Hampshire | 21.39 |
| Kansas | 20.85 |
| Oklahoma | 20.68 |
| Wisconsin | 19.02 |
| Minnesota | 18.32 |
| Missouri | 16.54 |
| Iowa | 13.97 |
| Nebraska | 13.43 |
| Arkansas | 12.09 |
| Vermont | 8.42 |
| Maine | 7.49 |
| North Dakota | 7.28 |
| South Dakota | 5.30 |

TABLE II–3.—OTAG 2007 BASELINE CONTROL MEASURES

UTILITY
- Title IV Controls (phase 1 & 2 for all boiler types)
- 250 Ton PSD and NSPS
- RACT & NSR in non-waived nonattainment areas (NAAs)

NON-UTILITY POINT/OTHER AREA
- RACT at major sources in non-waivered NAAs
- 250 Ton PSD and NSPS
- CTG & Non-CTG RACT at major sources in NAAs & in Ozone Transport Region

OTHER AREA
- Two Phases of Consumer & Commercial Products & One Phase of Architectural Coatings
- Stage 1 & 2 Petroleum Distribution Controls in NAAs
- Autobody, Degreasing & Dry Cleaning Controls in NAAs

NONROAD MOBILE
- Federal Phase II Small Engine Standards
- Federal Marine Engine Standards
- Federal HDV (>=50 hp) Standards-Ph.1
- Federal RFG II (statutory and opt-in areas)
- 9.0 RVP maximum elsewhere in OTAG

HIGHWAY MOBILE
- Tier 1 LDV and HDV Standards
- Federal RFG II (statutory and opt-in areas)
- High Enhanced I/M (serious and above areas)
- Low Enhanced I/M for rest of OTR
- Basic I/M (mandated areas)
- Clean Fuel Fleets (mandated areas)
- 9.0 RVP maximum elsewhere in OTAG
- On board vapor recovery

TABLE II–4a.—OTAG STRATEGY CONTROL PACKETS FOR $NO_X$

| $NO_X$ strategy packets | Utility system [Mostly elevated] | Other point/area [Mixed Elevated & Non-elevated] | Nonroad Mobile [Non-elevated] | Highway Mobile [Non-elevated] |
| --- | --- | --- | --- | --- |
| Base 1 (Mandated CAA controls). | *Title IV Controls *[Phase 1 & 2 for all boiler types]*<br>*250 Ton PSD and NSPS<br>*RACT & NSR in non-waived NAAs | *RACT at major sources in non-waivered NAAs<br>*250 Ton PSD and NSPS<br>*NSR in non-waived NAAs | *Fed Phase II Small Eng. Stds<br>*Fed Marine Engine Stds<br>*Fed HDV (>=50 hp) Stds-Phase 1<br>*Fed RFG II [4] | *Tier 1 LDV and HDV Stds<br>*Fed RFG II [4]<br>*Enh I/M [3]<br>*Low Enh I/M for rest of OTR<br>*Basic I/M in mandated areas<br>*Clean Fuel Fleets for mandated areas |
| Level 0 ........................ | Base 1 plus:<br>*OTC NOX MOU (Phase II)<br>* ''9% by 99'' ROP Measures (If substitute for VOC) [3] | Base 1 plus:<br>*''9% by 99'' ROP Measures (If substitute for VOC) [3] | Base 1 plus:<br>*Fed Locomotive Standards (not including rebuilds)<br>*''9% by 99'' ROP Measures (If substitute for VOC) [3] | Base 1 plus:<br>*National LEV<br>*HDV 2 gm std<br>*FTP revisions<br>*''9% by 99'' ROP Measures (If substitute for VOC) [3] |
| Added $NO_X$ Controls—Level 1. | More stringent of Level 0 or:<br>*55% reduction from 1990 rate or<br>*rate-base of 0.35 lb/mmbtu for coal units and 0.20 lb/mmbtu for gas & oil units, whichever is less stringent [7] | Level 0 plus:<br>Controls rated by OTAG as under $1000 per ton | Level 0 plus:<br>*Fed Locomotive Stds (incl rebuild standards) [1] [Replaces Fed Locomotive Stds (not including rebuilds)]<br>*HD engine 4 gm Std | Level 0 plus:<br>*High Enh I/M for LDV (LEV-specific cutpoints) [6] [Replaces Enh I/M [3], Low Enh I/M for rest of OTR, & Basic I/M in mandated areas]<br>*HDV I/M [6] |
| Added $NO_X$ Controls—Level 2. | More stringent of Level 0 or:<br>(a) *65% reduction from 1990 rate or<br>*rate-base of 0.25 lb/mmbtu for coal units and 0.20 lb/mmbtu for gas & oil units, whichever is less stringent [7] | Level 1 plus:<br>Controls rated by OTAG as $1000 to $5000 per ton | Level 1 plus:<br>*Reformed Diesel (50 cetane) [2] | Level 1 plus:<br>*Fed RFG II [2] [5] [Replaces Fed RFG II [4]] or Low Sulfur Fuel (150 ppm) [2,5]<br>*Reformed Diesel (50 cetane) [2]<br>*Max I/M for LDV w/ LEV-specified cutpoints [6] [Replaces High Enh I/M for LDV (LEV-specific cutpoints).[6]] |
| Added $NO_X$ Controls—Level 2. | More stringent of Level 0 or:<br>(b)* 75% reduction from 1990 rate or<br>*rate-base of 0.20 lb/mmbtu for all units, whichever is less stringent [7] | | | |
| Deep $NO_X$ Controls—Level 3. | More stringent of Level 0 or:<br>*85% reduction from 1990 rate or<br>*rate-base of 0.15 lb/mmbtu for all units, whichever is less stringent [7] | Level 2 plus:<br>Controls rated by OTAG as over $5000 per ton | Level 2 plus:<br>*Reformed Diesel (55 cetane) [2] [8] [Replaces Reformed Diesel (50 cetane) [2]] | Level 2 plus:<br>*Cal RFG II [2] [Replaces Fed FG II [2,5]]<br>*Reformed Diesel (55 cetane) [2] [8] [Replaces Reformed Diesel (50 cetane) [2]]. |

[1] National.
[2] OTAG Wide or Specified.
[3] Serious and above areas.
[4] Statutory and opt-in areas.
[5] OTAG-Optimized fuel (e.g., low RVP, low sulfur, low olefins) was evaluated elsewhere during OTAG as an alternative.
[6] For all nonattainment areas & attainment MSAs/CMSAs ≤=100,000.
[7] Qualifications set by OTAG on the use of lb/MMBtu numbers:
(1) These numbers are for initial strategy modeling purposes only. They do not reflect any recommendation form OTAG on the desired level of reduction for these units. (2) OTAG reserves the right to do sensitivity analyses on any source in an effort to achieve a desired ozone impact. Such sources may include those that chose the lb/MMBtu option. The requirement for such analyses may exist in certain areas where the size and location of such a major source is critical to achieving the ozone goals. (3) The alternative lb/MMBtu limits shall not supersede an existing requirement that is more stringent (e.g., OTC MOU or NSPS requirements).
[8] OTAG evaluated California diesel separately.

TABLE II–4b.—OTAG STRATEGY CONTROL PACKETS FOR VOC

| VOC strategy packets | Major point sources | Other point/area | Nonroad mobile | Highway mobile |
|---|---|---|---|---|
| Base 1 (Mandated CAA controls). | *CTG & Non-CTG RACT at major sources in NAAs & in OTC.<br>*New Source LAER & Offsets for NAAs. | *Two Phases of Consumer & Commercial Products & one Phase of Architectural Coatings.<br>*Stage 1 & 2 Petroleum Distribution Controls-NAAs.<br>*Autobody, Degreasing & Dry Cleaning Controls in NAAs. | *Fed Phase II Small Eng. Stds.<br>*Fed Marine Engine Stds ...<br>*Fed HDV (>=50 hp) Stds-Ph. 1.<br>*Fed RFG II4 [4] ...................<br>*9.0 RVP maximum elsewhere in OTAG. | *Tier 1 LDV and HDV Stds.<br>*Fed RFG II [4]<br>*9.0 RVP maximum elsewhere in OTAG.<br>*Enh I/M.[3]<br>*Low Enh I/M for rest of OTR.<br>*Basic I/M in mandated areas.<br>*Clean Fuel Fleets in mandated areas.<br>*On board vapor recovery. |
| Level 0 ........................ | Base 1 plus:<br>*''9% by 99'' ROP Measures ($NO_X$ may be substituted after 1996).[3]. | Base 1 plus:<br>*''9% by 99'' ROP Measures ($NO_X$ may be substituted after 1996).[3]. | Base 1 plus:<br>*Fed Locomotive Standards (not including rebuilds).<br>*''9% by 99'' ROP Measures ($NO_X$ may be substituted after 1996).[3]. | Base 1 plus:<br>*National LEV.<br>*HDV 2 gm std.<br>*FTP revisions.<br>*''9% by 99'' ROP Measures ($NO_X$ may be substituted after 1996).[3] |
| Added VOC Controls-Level 1. | Level 0 plus: (No additional controls). | Level 0 plus: (No additional controls). | Level 0 plus: | Level 0 plus:<br>*High Enh I/M for LDV (LEV-specific cutpoints) [6] [Replaces Enh I/M [3], Low Enh I/M for rest of OTR, & Basic I/M in mandated areas].<br>*HDV I/M.[6]<br>*Low RVP (6.7 psi) in non-RFG areas [2] [Replaces 9.0 RVP maximum elsewhere in OTAG]. |
| Added VOC Controls-Level 2. | Level 1 plus:<br>(a) * Apply NAA Base 1 default control assumptions across AA down to 100 TPY sources. | Level 1 plus:<br>(a) * Apply NAA Base 1 default control assumptions across AA down to 100 TPY sources—Bulk Terminals. | Level 1 plus:<br>*Fed RFG II [2 5] [Replaces Fed RFG II [4]]. | Level 1 plus:<br>*Maximum I/M (LEV-specific cutpoints) for LDV [6] [Replaces High Enh I/M (LEV-specific cutpoints) [3]].<br>*Fed RFG II [2 5] [Replaces Fed RFG II [4]]. |
| | Level 2a plus:<br>(b) *10% reduction in VOC emissions beyond level 2a from major point sources in major metropolitan NAAs. | Level 2a plus:<br>(b) *Increased C/C Products limits.<br>*Increased AIM limits ..........<br>*Increased Autobody Refinishing limits. | ............................................ | |
| Deep VOC Controls-Level 3. | Level 2 plus: (Same as 2b) | Level 2 plus: (Same as 2b) | Level 2 plus:<br>*Cal RFG II [2] [Replaces Fed RFG II [2 5]].<br>*Cal Tier II small engine std | Level 2 plus:<br>*Cal RFG II [2] [Replaces Fed RFG II [2 5]]. |

[1] National.
[2] OTAG Wide or Specified.
[3] Serious and above areas.
[4] Statutory and opt-in areas.
[5] OTAG-Optimized fuel (e.g., low RVP, low sulfur, low olefins) was evaluated elsewhere during OTAG as an alternative.
[6] For all nonattainment areas & attainment MSAs/CMSAs >=100,000.

TABLE II–5a.—ROUND 1 AND 2 CONTROL LEVELS BY EMISSIONS SECTOR

| Run | OTAG round 1 & round 2 control levels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Point | | | Nonroad | | Other area | | Motor vehicle[1] | |
| | Utility $NO_X$ | Nonutility | | | | | | | |
| | | $NO_X$ | VOC | $NO_X$ | VOC | $NO_X$ | VOC | $NO_X$ | VOC |
| Round 1: | | | | | | | | | |
| 1 ..................................... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 ..................................... | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3 ..................................... | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4b ................................... | 0 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 3 |

TABLE II–5a.—ROUND 1 AND 2 CONTROL LEVELS BY EMISSIONS SECTOR—Continued

OTAG round 1 & round 2 control levels

| Run | Point | | | Nonroad | | Other area | | Motor vehicle[1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Utility $NO_X$ | Nonutility | | | | | | | |
| | | $NO_X$ | VOC | $NO_X$ | VOC | $NO_X$ | VOC | $NO_X$ | VOC |
| Round 2: | | | | | | | | | |
| 5 | 3 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| 6 | 2b | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| 7 | 2a | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| 8 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| 9 | 3 | 2 | 0 | 2 | 2 | 2 | 2 | 1.5 | 1.5 |
| 10 | 2b | 2 | 0 | 2 | 2 | 2 | 2 | 1.5 | 1.5 |
| 11 | 2a | 2 | 0 | 2 | 2 | 2 | 2 | 1.5 | 1.5 |
| 12 | 1 | 2 | 0 | 2 | 2 | 2 | 2 | 1.5 | 1.5 |

[1] Motor vehicle emissions level 1.5 includes enhanced I/M in all 1-hr nonattainment areas and in all attainment Metropolitan Statistical Areas and Consolidated Metropolitan Statistical Areas with population >=500,000.

TABLE II–5b.—DOMAINWIDE ROUND 1 AND 2 EMISSION TOTALS BY SECTOR

Emissions totals (tons/day)

| Run | Point | | | Nonroad | | Other Area | | Motor vehicle | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Utility $NO_X$ | Nonutility | | | | | | | | | |
| | | $NO_X$ | VOC | $NO_X$ | VOC | $NO_X$ | VOC | $NO_X$ | VOC | $NO_X$ | VOC |
| Round 1: | | | | | | | | | | | |
| 1990 | 20144 | 8600 | 8340 | 7390 | 6500 | 3500 | 18300 | 16619 | 15731 | 56253 | 48871 |
| Base1b | 14500 | 10330 | 5557 | 7427 | 6027 | 4460 | 17692 | 14000 | 9400 | 50717 | 38676 |
| 1 | 13970 | 10215 | 5557 | 7315 | 6027 | 4460 | 17637 | 12400 | 8700 | 48360 | 37921 |
| 2 | 5203 | 4969 | 4217 | 5725 | 5854 | 4460 | 16912 | 9200 | 4500 | 29557 | 31483 |
| 3 | 5203 | 9626 | 5557 | 7315 | 6027 | 4460 | 17637 | 12400 | 8700 | 39004 | 37921 |
| 4b | 13946 | 5562 | 5557 | 5725 | 5854 | 4460 | 16912 | 9200 | 4500 | 38893 | 32823 |
| Round 2: | | | | | | | | | | | |
| 1990 | 21019 | 7709 | 8304 | 7567 | 6541 | 3238 | 17806 | 16619 | 15731 | 56152 | 48382 |
| Base1c | 15441 | 8459 | 5719 | 7506 | 6039 | 4202 | 17076 | 14000 | 9400 | 49608 | 38234 |
| 5 | 5348 | 6828 | 5712 | 6453 | 6039 | 4202 | 17076 | 12400 | 8700 | 35231 | 37527 |
| 6 | 7383 | 6828 | 5712 | 6453 | 6039 | 4202 | 17076 | 12400 | 8700 | 37266 | 37527 |
| 7 | 9249 | 6828 | 5712 | 6453 | 6039 | 4202 | 17076 | 12400 | 8700 | 39132 | 37527 |
| 8 | 11425 | 6828 | 5712 | 6453 | 6039 | 4202 | 17076 | 12400 | 8700 | 41308 | 37527 |
| 9 | 5348 | 5247 | 5712 | 6381 | 5989 | 4202 | 15757 | 10650 | 5500 | 31828 | 32958 |
| 10 | 7383 | 5247 | 5712 | 6381 | 5989 | 4202 | 15757 | 10650 | 5500 | 33863 | 32958 |
| 11 | 9249 | 5247 | 5712 | 6381 | 5989 | 4202 | 15757 | 10650 | 5500 | 35729 | 32958 |
| 12 | 11425 | 5247 | 5712 | 6381 | 5989 | 4202 | 15757 | 10650 | 5500 | 37905 | 32958 |

TABLE II–6.—RESULTS OF ROUND 1 AND ROUND 2 STRATEGY MODELING

Round-1 Results:

*Run 1 (Level 0)*

—Little additional benefit on regional scale

—Benefits occur mostly in Northeast

*Run 2 (Level 3)*

—Large areas of lower ozone; decreases of 10–40 ppb

—Level 3 control will not provide for attainment throughout the eastern U.S.

*Run 3 (Level 3 Elevated $NO_X$)* and Run 4b (Level 3 Low-Level $NO_X$)

—Both elevated and low-level control effective in lowering ozone on regional scale

—Relative effectiveness varies by region and episode (e.g., elevated [utility] $NO_X$ more effective in Midwest, low-level $NO_X$ more effective in Northeast and Southeast)

*All Strategies*

—For all strategies, there are ozone increases in some areas on some days

—For all strategies, the 8-hour concentration changes are directionally consistent with the 1-hour concentration changes

Round-2 Results:

The Round-2 strategy emission/ozone reductions are all within the range of Run 1 (Round-1) and Run 2 (Round-1)

—More emissions reductions, more ozone reductions

—Run 9 (maximum Round-2 emissions reduction) provides a little less ozone benefit than Run 2

—Run 9 will not be sufficient to provide for attainment of the current 1-hour ozone NAAQS throughout the Eastern U.S.

—Elevated and low-level $NO_X$ reductions are both effective in lowering ozone (relative effectiveness varies by episode)

—Elevated and low-level $NO_X$ reductions are cumulative, but may not be synergistic (i.e., appear to act independently)

—Run 8 (minimum Round-2 emissions reduction) show ozone increases in some areas on some days; note, increases do not seem to get any worse by Run 9 (maximum Round-2 emissions reduction)

—All Round-2 strategies show ozone decrease in areas and on days with high ozone, and ozone increases in areas and on days with low ozone

—Magnitude and spatial extent of 8-hour concentration differences are similar to 1-hour concentration differences

TABLE II–7.—ROUND 3 CONTROL LEVELS BY GEOGRAPHIC ZONE [1]

| Source category | Control level |
|---|---|
| Nonroad/Area Sources | Level 2. |
| Point Source VOC | Level 0. |
| Highway Vehicles | Level 1.3 (same as Level 2, except high enhanced I/M is applied to all nonattainment areas and attainment Metropolitan Statistical Areas/Consolidated Metropolitan Statistical Areas with population >= 500,000 in the ‘‘Fine Grid’’ portion of the OTAG region only) |

| Non-utility point source $NO_X$ | Linked to the level of utility controls | |
|---|---|---|
| | Utility | Non-Utility |
| | Level 0 or | Level 1 for sources >250 MMBtu/hr. |
| | Level 1 | Level 0 for sources <250 MMBtu/hr. |
| | Level 2a | Level 1. |
| | Level 2b or | Level 2 for sources >250 MMBtu/hr. |
| | Level 3 | Level 1 for sources <250 MMBtu/hr. |

[1] The control levels for nonroad sources, area sources, point source VOC, and highway vehicles were applied throughout the OTAG region in all of the Round 3 runs. Utility and non-utility NOx control levels varied geographically.

TABLE II–7.—(CONTINUED)

| Round 3 utility control levels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Run # | Chicago/Atlanta/Northeast NAAs | Zone III Northeast | Zone I Midwest | Zone V N. Georgia | Zone II Ohio Valley | Zone IV Southeast | Coarse grid | Utility $NO_X$ emissions |
| A | 2b | 1 | 1 | 1 | 1 | 1 | 0 | 1,822,915 |
| B | 2a | 2a | 2a | 2a | 1 | 1 | 0 | 1,767,341 |
| C | 2b | 2b | 2b | 2b | 1 | 1 | 0 | 1,678,866 |
| D | 2b | 2b | 2b | 2b | 2a | 1 | 0 | 1,581,554 |
| E | 2b | 2b | 2b | 2b | 2a | 2a | 0 | 1,528,004 |
| F | 2a/2b | 2b | 2a | 2a | 2a | 2a | 0 | 1,595,237 |
| G | 2b | 2b | 2b | 2b | 2b | 2a | 0 | 1,433,002 |
| H | 2b | 2b | 2b | 2b | 2b | 2b | 0 | 1,392,877 |
| I1 | 3 | 3 | 3 | 3 | 3 | 2b | 0 | 1,199,268 |
| I | 3 | 3 | 3 | 3 | 3 | 2b | 1 | 1,019,578 |

Level 0—OTC MOU Phase II/Acid Rain.
Level 1—0.35 lb/MMBtu or 55% rate reduction from 1990.
Level 2a—0.25 lb/MMBtu or 65% rate reduction from 1990.
Level 2b—0.20 lb/MMBtu or 75% rate reduction from 1990.
Level 3—0.15 lb/MMBtu or 85% rate reduction from 1990.

TABLE II–8a.—COUNTIES VIOLATING THE 1-HR OZONE NAAQS BASED ON 1993–1995 AMBIENT AIR QUALITY MONITORING DATA

| State | County |
|---|---|
| Alabama | Jefferson. |
| Alabama | Shelby. |
| Connecticut | Hartford. |
| Connecticut | New Haven. |
| Connecticut | Middlesex. |
| Connecticut | Litchfield. |
| Connecticut | New London. |
| Connecticut | Fairfield. |
| Connecticut | Tolland. |
| Delaware | New Castle. |
| Delaware | Kent. |
| District of Columbia | Washington. |
| Georgia | Rockdale. |
| Georgia | Douglas. |
| Georgia | De Kalb. |
| Georgia | Fulton. |
| Illinois | Cook. |
| Illinois | Madison. |
| Indiana | La Porte. |
| Indiana | Warrick. |
| Indiana | Clark. |
| Louisiana | Lafourche. |
| Louisiana | Ascension. |
| Louisiana | Iberville. |
| Louisiana | East Baton Rouge. |
| Maine | York. |
| Maine | Sagadahoc. |
| Maryland | Prince Georges. |
| Maryland | Anne Arundel. |
| Maryland | Harford. |
| Maryland | Cecil. |
| Maryland | Baltimore City. |
| Maryland | Baltimore. |
| Massachusetts | Worcester. |
| Massachusetts | Middlesex. |
| Massachusetts | Hampden. |
| Massachusetts | Hampshire. |
| Michigan | Allegan. |
| Michigan | Macomb. |
| Michigan | St Clair. |
| Michigan | Mason. |
| Michigan | Muskegon. |
| Missouri | St Louis. |
| Missouri | Clay. |
| Missouri | St Charles. |
| Missouri | Jefferson. |
| New Hampshire | Rockingham. |
| New Jersey | Camden. |
| New Jersey | Monmouth. |
| New Jersey | Middlesex. |
| New Jersey | Ocean. |
| New Jersey | Mercer. |
| New Jersey | Hudson. |
| New Jersey | Gloucester. |
| New York | Westchester. |
| New York | Putnam. |
| New York | Suffolk. |
| New York | Queens. |
| New York | Kings. |
| New York | Richmond. |
| Ohio | Warren. |
| Pennsylvania | Philadelphia. |
| Pennsylvania | Montgomery. |
| Pennsylvania | Bucks. |
| Pennsylvania | Delaware. |
| Pennsylvania | Allegheny. |
| Rhode Island | Kent. |
| Rhode Island | Providence. |
| Tennessee | Shelby. |
| Texas | Jefferson. |
| Texas | Harris. |
| Texas | Gregg. |
| Texas | Dallas. |
| Texas | Galveston. |
| Texas | Brazoria. |
| Texas | Tarrant. |
| Texas | Collin. |
| Texas | Denton. |
| Virginia | Arlington. |
| Virginia | Fairfax. |
| Wisconsin | Manitowoc. |
| Wisconsin | Ozaukee. |
| Wisconsin | Milwaukee. |
| Wisconsin | Kenosha. |

TABLE II–8b.—COUNTIES VIOLATING THE 8-HR OZONE NAAQS BASED ON 1993–1995 AMBIENT AIR QUALITY MONITORING DATA

| | |
|---|---|
| Alabama | Clay. |
| Alabama | Shelby. |
| Alabama | Madison. |
| Alabama | Jefferson. |
| Arkansas | Crittenden. |
| Connecticut | New London. |
| Connecticut | Tolland. |
| Connecticut | New Haven. |
| Connecticut | Hartford. |
| Connecticut | Middlesex. |
| Connecticut | Litchfield. |
| Connecticut | Fairfield. |
| Delaware | New Castle. |
| Delaware | Kent. |
| Delaware | Sussex. |
| District of Columbia | Washington. |
| Florida | Escambia. |
| Georgia | Rockdale. |
| Georgia | Fulton. |
| Georgia | Gwinnett. |
| Georgia | De Kalb. |
| Georgia | Douglas. |
| Georgia | Richmond. |
| Illinois | Madison. |
| Illinois | Cook. |
| Illinois | Kane. |
| Illinois | Lake. |
| Indiana | Porter. |
| Indiana | Hancock. |
| Indiana | Marion. |
| Indiana | La Porte. |
| Indiana | Vanderburgh. |
| Indiana | Floyd. |
| Indiana | Lake. |
| Indiana | Hamilton. |
| Indiana | Allen. |
| Indiana | Warrick. |
| Indiana | Tippecanoe. |
| Indiana | Clark. |
| Indiana | Madison. |
| Indiana | Kosciusko. |
| Indiana | St Joseph. |
| Kentucky | Fayette. |
| Kentucky | Greenup. |
| Kentucky | Hancock. |
| Kentucky | Livingston. |
| Kentucky | Campbell. |
| Kentucky | Christian. |
| Kentucky | Lawrence. |
| Kentucky | Scott. |
| Kentucky | Oldham. |
| Kentucky | Boyd. |
| Kentucky | Henderson. |
| Kentucky | Jefferson. |
| Kentucky | Kenton. |
| Kentucky | Bullitt. |
| Kentucky | Daviess. |
| Kentucky | McLean. |
| Kentucky | Hardin. |
| Louisiana | Calcasieu. |
| Louisiana | Livingston. |
| Louisiana | Ascension. |
| Louisiana | Iberville. |
| Louisiana | Lafayette. |
| Louisiana | East Baton Rouge. |
| Louisiana | Lafourche. |
| Maine | Knox. |
| Maine | Sagadahoc. |
| Maine | York. |
| Maine | Cumberland. |
| Maryland | Kent. |
| Maryland | Baltimore City. |
| Maryland | Charles. |
| Maryland | Prince Georges. |
| Maryland | Anne Arundel. |
| Maryland | Montgomery. |
| Maryland | Baltimore. |
| Maryland | Cecil. |
| Maryland | Harford. |
| Maryland | Carroll. |
| Massachusetts | Middlesex. |
| Massachusetts | Barnstable. |
| Massachusetts | Hampden. |
| Massachusetts | Hampshire. |
| Massachusetts | Essex. |
| Massachusetts | Bristol. |
| Massachusetts | Worcester. |
| Michigan | Benzie. |
| Michigan | Berrien. |
| Michigan | Kent. |
| Michigan | Macomb. |
| Michigan | Cass. |
| Michigan | Muskegon. |
| Michigan | Wayne. |
| Michigan | Mason. |
| Michigan | Lenawee. |
| Michigan | Allegan. |
| Michigan | St Clair. |
| Mississippi | Hancock. |
| Missouri | St Charles. |
| Missouri | St Louis. |
| Missouri | Clay. |
| Missouri | Jefferson. |
| New Hampshire | Rockingham. |
| New Hampshire | Hillsborough. |
| New Jersey | Camden. |
| New Jersey | Mercer. |
| New Jersey | Gloucester. |
| New Jersey | Hudson. |
| New Jersey | Ocean. |
| New Jersey | Atlantic. |

TABLE II–8b.—COUNTIES VIOLATING THE 8-HR OZONE NAAQS BASED ON 1993–1995 AMBIENT AIR QUALITY MONITORING DATA—Continued

| | |
|---|---|
| New Jersey | Morris. |
| New Jersey | Middlesex. |
| New Jersey | Bergen. |
| New Jersey | Hunterdon. |
| New Jersey | Monmouth. |
| New Jersey | Union. |
| New Jersey | Cumberland. |
| New Jersey | Essex. |
| New York | Dutchess. |
| New York | Essex. |
| New York | Richmond. |
| New York | Orange. |
| New York | Queens. |
| New York | Putnam. |
| New York | Niagara. |
| New York | Kings. |
| New York | Suffolk. |
| New York | Jefferson. |
| New York | Westchester. |
| New York | Bronx. |
| New York | Wayne. |
| North Carolina | Wake. |
| North Carolina | Northampton. |
| North Carolina | Lincoln. |
| North Carolina | Haywood. |
| North Carolina | Granville. |
| North Carolina | Guilford. |
| North Carolina | Yancey. |
| North Carolina | Forsyth. |
| North Carolina | Caswell. |
| North Carolina | Franklin. |
| North Carolina | Chatham. |
| North Carolina | Cumberland. |
| North Carolina | Durham. |
| North Carolina | Rowan. |
| North Carolina | Mecklenburg. |
| North Carolina | Johnston. |
| Ohio | Lawrence. |
| Ohio | Franklin. |
| Ohio | Logan. |
| Ohio | Hamilton. |
| Ohio | Jefferson. |
| Ohio | Medina. |
| Ohio | Portage. |
| Ohio | Summit. |
| Ohio | Mahoning. |
| Ohio | Clermont. |
| Ohio | Cuyahoga. |
| Ohio | Trumbull. |
| Ohio | Ashtabula. |
| Ohio | Knox. |
| Ohio | Madison. |
| Ohio | Lake. |
| Ohio | Allen. |
| Ohio | Washington. |
| Ohio | Clinton. |
| Ohio | Licking. |
| Ohio | Stark. |
| Ohio | Lucas. |
| Ohio | Clark. |
| Ohio | Butler. |
| Ohio | Montgomery. |
| Ohio | Warren. |
| Oklahoma | Tulsa. |
| Pennsylvania | Washington. |
| Pennsylvania | Erie. |
| Pennsylvania | Philadelphia. |
| Pennsylvania | Bucks. |
| Pennsylvania | Northampton. |
| Pennsylvania | Lehigh. |
| Pennsylvania | York. |
| Pennsylvania | Beaver. |
| Pennsylvania | Allegheny. |
| Pennsylvania | Blair. |
| Pennsylvania | Lancaster. |
| Pennsylvania | Cambria. |
| Pennsylvania | Delaware. |
| Pennsylvania | Luzerne. |
| Pennsylvania | Berks. |
| Pennsylvania | Perry. |
| Pennsylvania | Mercer. |
| Pennsylvania | Lackawanna. |
| Pennsylvania | Westmoreland. |
| Pennsylvania | Dauphin. |
| Pennsylvania | Montgomery. |
| Rhode Island | Kent. |
| Rhode Island | Providence |
| South Carolina | Richland. |
| South Carolina | Anderson. |
| South Carolina | Chester. |
| South Carolina | York. |
| Tennessee | Blount. |
| Tennessee | Hamilton. |
| Tennessee | Sullivan. |
| Tennessee | Dickson. |
| Tennessee | Sevier. |
| Tennessee | Sumner. |
| Tennessee | Knox. |
| Tennessee | Shelby. |
| Tennessee | Williamson. |
| Tennessee | Madison. |
| Tennessee | Anderson. |
| Tennessee | Jefferson. |
| Texas | Harris. |
| Texas | Smith. |
| Texas | Jefferson. |
| Texas | Brazoria. |
| Texas | Orange. |
| Texas | Tarrant. |
| Texas | Dallas. |
| Texas | Galveston. |
| Texas | Denton. |
| Texas | Gregg. |
| Texas | Collin. |
| Virginia | Caroline. |
| Virginia | Hanover. |
| Virginia | Fairfax. |
| Virginia | Chesterfield. |
| Virginia | Prince William. |
| Virginia | Alexandria City. |
| Virginia | Arlington. |
| Virginia | Hampton City. |
| Virginia | Henrico. |
| Virginia | Charles City. |
| Virginia | Suffolk City. |
| Virginia | Stafford. |
| West Virginia | Cabell. |
| West Virginia | Wood. |
| Wisconsin | Racine. |
| Wisconsin | Outagamie. |
| Wisconsin | Ozaukee. |
| Wisconsin | Sheboygan. |
| Wisconsin | Milwaukee. |
| Wisconsin | Kewaunee. |
| Wisconsin | Kenosha. |
| Wisconsin | Door. |
| Wisconsin | Manitowoc. |

TABLE II–9a.—SUMMARY OF AIR QUALITY CONTRIBUTIONS TO DOWNWIND NONATTAINMENT, FOR SUBREGIONS 1–6.

| | Approach 1 | | Approach 2 | | Approach 3 | | Approach 4 | |
|---|---|---|---|---|---|---|---|---|
| | 1 hr-violating co. | | 1 Hr-all grid cells | | 8 hr-violating co. | | 8 Hr-all grid cells | |
| | No. impacts | No. States | No. impacts | No. States | No. impacts | No. States | No. impacts | No. States |
| SubRegion 1: | | | | | | | | |
| 2–5 ppb | 70 | 4 | 102 | 7 | 80 | 8 | 180 | 10 |
| 5–10 ppb | 0 | 0 | 14 | 2 | 21 | 2 | 29 | 3 |
| 10–15 ppb | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 1 |
| 15–20 ppb | 0 | 0 | 0 | 0 | 6 | 1 | 11 | 1 |
| 20–25 ppb | 0 | 0 | 0 | 0 | 5 | 1 | 10 | 1 |
| >25 ppb | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| SubRegion 2: | | | | | | | | |
| 2–5 ppb | 193 | 8 | 362 | 14 | 239 | 16 | 432 | 16 |
| 5–10 ppb | 38 | 5 | 93 | 9 | 37 | 5 | 101 | 6 |
| 10–15 ppb | 0 | 0 | 23 | 6 | 10 | 2 | 15 | 2 |
| 15–20 ppb | 0 | 0 | 6 | 2 | 2 | 1 | 6 | 2 |

TABLE II–9a.—SUMMARY OF AIR QUALITY CONTRIBUTIONS TO DOWNWIND NONATTAINMENT, FOR SUBREGIONS 1–6.—Continued

| | Approach 1 | | Approach 2 | | Approach 3 | | Approach 4 | |
|---|---|---|---|---|---|---|---|---|
| | 1 hr-violating co. | | 1 Hr-all grid cells | | 8 hr-violating co. | | 8 Hr-all grid cells | |
| | No. impacts | No. States | No. impacts | No. States | No. impacts | No. States | No. impacts | No. States |
| 20–25 ppb | 0 | 0 | 1 | 1 | 5 | 1 | 6 | 2 |
| >25 ppb | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| SubRegion 3: | | | | | | | | |
| 2–5 ppb | 176 | 9 | 484 | 10 | 206 | 9 | 527 | 10 |
| 5–10 ppb | 187 | 7 | 376 | 10 | 146 | 9 | 236 | 11 |
| 10–15 ppb | 67 | 4 | 180 | 7 | 45 | 3 | 69 | 5 |
| 15–20 ppb | 27 | 3 | 42 | 4 | 11 | 1 | 14 | 3 |
| 20–25 ppb | 5 | 1 | 9 | 3 | 0 | 0 | 0 | 0 |
| >25 ppb | 3 | 1 | 21 | 3 | 0 | 0 | 0 | 0 |
| SubRegion 4: | | | | | | | | |
| 2–5 ppb | 10 | 3 | 41 | 5 | 2 | 1 | 3 | 1 |
| 5–10 ppb | 12 | 3 | 32 | 3 | 37 | 3 | 84 | 3 |
| 10–15 ppb | 30 | 3 | 82 | 3 | 28 | 3 | 91 | 3 |
| 15–20 ppb | 7 | 2 | 51 | 3 | 22 | 3 | 46 | 4 |
| 20–25 ppb | 4 | 2 | 11 | 2 | 11 | 2 | 19 | 2 |
| >25 ppb | 37 | 3 | 121 | 3 | 25 | 2 | 29 | 2 |
| SubRegion 5: | | | | | | | | |
| 2–5 ppb | 51 | 7 | 131 | 10 | 181 | 13 | 493 | 14 |
| 5–10 ppb | 6 | 2 | 42 | 4 | 150 | 6 | 283 | 8 |
| 10–15 ppb | 8 | 3 | 16 | 3 | 12 | 2 | 23 | 2 |
| 15–20 ppb | 3 | 2 | 5 | 2 | 0 | 0 | 0 | 0 |
| 20–25 ppb | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 |
| >25 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SubRegion 6: | | | | | | | | |
| 2–5 ppb | 85 | 6 | 236 | 13 | 343 | 13 | 523 | 13 |
| 5–10 ppb | 122 | 8 | 215 | 10 | 161 | 10 | 281 | 10 |
| 10–15 ppb | 25 | 4 | 63 | 6 | 46 | 3 | 120 | 5 |
| 15–20 ppb | 2 | 1 | 11 | 3 | 10 | 1 | 29 | 2 |
| 20–25 ppb | 0 | 0 | 2 | 2 | 8 | 2 | 14 | 2 |
| >25 ppb | 4 | 1 | 17 | 3 | 1 | 1 | 2 | 2 |

TABLE II–9b. SUMMARY OF AIR QUALITY CONTRIBUTIONS TO DOWNWIND NONATTAINMENT, FOR SUBREGIONS 7–12

| | Approach 1 | | Approach 2 | | Approach 3 | | Approach 4 | |
|---|---|---|---|---|---|---|---|---|
| | 1 Hr-violating co. | | 1 Hr-all grid cells | | 8 Hr-violating co. | | 8 Hr-all grid cells | |
| | Number impacts | Number States | Number impacts | Number States | Number impacts | Number States | Number impacts | Number States |
| SubRegion 7: | | | | | | | | |
| 2–5 ppb | 114 | 6 | 249 | 12 | 178 | 9 | 315 | 10 |
| 5–10 ppb | 113 | 4 | 211 | 8 | 154 | 7 | 233 | 7 |
| 10–15 ppb | 50 | 4 | 90 | 6 | 52 | 4 | 87 | 4 |
| 15–20 ppb | 21 | 4 | 47 | 4 | 15 | 2 | 35 | 2 |
| 20–25 ppb | 8 | 2 | 20 | 2 | 8 | 1 | 12 | 1 |
| > 25 ppb | 19 | 2 | 65 | 2 | 8 | 1 | 35 | 1 |
| SubRegion 8: | | | | | | | | |
| 2–5 ppb | 28 | 5 | 135 | 12 | 89 | 10 | 265 | 12 |
| 5–10 ppb | 0 | 0 | 56 | 7 | 19 | 3 | 133 | 4 |
| 10–15 ppb | 0 | 0 | 75 | 5 | 8 | 3 | 41 | 3 |
| 15–20 ppb | 1 | 1 | 60 | 4 | 1 | 1 | 21 | 1 |
| 20–25 ppb | 0 | 0 | 9 | 2 | 0 | 0 | 6 | 1 |
| > 25 ppb | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| SubRegion 9: | | | | | | | | |
| 2–5 ppb | 11 | 2 | 140 | 9 | 161 | 10 | 340 | 12 |
| 5–10 ppb | 4 | 3 | 68 | 7 | 69 | 6 | 197 | 6 |
| 10–15 ppb | 4 | 1 | 11 | 2 | 27 | 2 | 67 | 3 |
| 15–20 ppb | 0 | 0 | 6 | 1 | 2 | 1 | 8 | 1 |
| 20–25 ppb | 0 | 0 | 4 | 1 | 0 | 0 | 2 | 1 |
| > 25 ppb | 0 | 0 | 20 | 2 | 0 | 0 | 2 | 1 |
| SubRegion 10: | | | | | | | | |
| 2–5 ppb | 0 | 0 | 1 | 1 | 13 | 2 | 24 | 3 |
| 5–10 ppb | 0 | 0 | 0 | 0 | 4 | 1 | 4 | 1 |
| 10–15 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–9b. SUMMARY OF AIR QUALITY CONTRIBUTIONS TO DOWNWIND NONATTAINMENT, FOR SUBREGIONS 7–12—Continued

| | Approach 1 | | Approach 2 | | Approach 3 | | Approach 4 | |
|---|---|---|---|---|---|---|---|---|
| | 1 Hr-violating co. | | 1 Hr-all grid cells | | 8 Hr-violating co. | | 8 Hr-all grid cells | |
| | Number impacts | Number States | Number impacts | Number States | Number impacts | Number States | Number impacts | Number States |
| 20–25 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SubRegion 11: | | | | | | | | |
| 2–5 ppb | 11 | 2 | 19 | 3 | 21 | 6 | 37 | 7 |
| 5–10 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| 10–15 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SubRegion 12: | | | | | | | | |
| 2–5 ppb | 13 | 2 | 28 | 3 | 73 | 3 | 105 | 5 |
| 5–10 ppb | 11 | 1 | 19 | 1 | 0 | 0 | 0 | 0 |
| 10–15 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 ppb | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–10.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 1: 1-HR "VIOLATING COUNTIES"

**Number of Impacts from SubRegion 1**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 5–10 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 22 | 0 | 0 | 7 | 20 | 21 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 2**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

TABLE II–10.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 1: 1-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 23 | 0 | 1 | 36 | 47 | 65 | 3 | 13 | 0 | 0 | 0 |
| 5–10 | 23 | 0 | 0 | 4 | 6 | 3 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 3**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 43 | N.A. | N.A. | 8 | N.A. | 74 | 3 | 17 | 0 | 4 | 7 |
| 5–10 | 47 | N.A. | N.A. | 33 | N.A. | 78 | 3 | 6 | 0 | 0 | 0 |
| 10–15 | 19 | N.A. | N.A. | 34 | N.A. | 13 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 4 | N.A. | N.A. | 21 | N.A. | 2 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | N.A. | N.A. | 5 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | N.A. | N.A. | 3 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 4**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

TABLE II–10.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 1: 1-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 1 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 1 | 0 | 8 | 0 |
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 9 | 0 | 1 | 2 |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 4 | 0 | 11 | 15 |
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 4 | 0 | 3 | 0 |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 3 | 0 | 1 | 0 |
| >25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 6 | 30 | 0 | 1 | 0 |
| **Number of Impacts from SubRegion 5** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | N.A. | 0 | N.A. | N.A. | 11 | 0 | N.A. | 0 | | |
| 5–10 | 0 | N.A. | 0 | N.A. | N.A. | 4 | 0 | N.A. | 0 | | |
| 10–15 | 0 | N.A. | 0 | N.A. | N.A. | 3 | 0 | N.A. | 0 | | |
| 15–20 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 | | |
| 20–25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 | | |
| >25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | N.A. | 0 | 4 | 10 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | N.A. | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 8 | 0 | 2 | 10 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 6** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |

TABLE II–10.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 1: 1-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20—25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| 5–10 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| >25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 | | |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 1 | | |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 | | |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 | | |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 | | |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 6 | 4 | 4 | 26 | 41 | 4 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 52 | 6 | 4 | 32 | 16 | 9 | 2 | 0 | 0 | 0 | 0 |
| 10–15 | 17 | 0 | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 7**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | N.A. | N.A. | 3 | 17 | 30 | 50 | 2 | 12 | 0 | 0 | 0 |
| 5–10 | N.A. | N.A. | 2 | 28 | 52 | 31 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | N.A. | 13 | 14 | 15 | 8 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | N.A. | 11 | 4 | 4 | 2 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | N.A. | N.A. | 7 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–10.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 1: 1-HR "VIOLATING COUNTIES"—Continued

**Number of Impacts from SubRegion 8**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 3 | 0 | 17 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 15–20 | 0 | 0 | 1 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| >25 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |

| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 9**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 5–10 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 10–15 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 15–20 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 20–25 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| >25 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |

| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–10.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 1: 1-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 10** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| >25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 11** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–10.—NUMBER OF IMPACTS IN EACH ''DOWNWIND'' STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 1: 1-HR ''VIOLATING COUNTIES''—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 12** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | oi0MN | | |
| 2–5 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 5–10 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 10–15 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 15–20 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 20–25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| >25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | N.A. | N.A. | N.A. | 5 | 0 | 8 | 0 | 0 | 0 | | |
| 5–10 | N.A. | N.A. | N.A. | 0 | 0 | 11 | 0 | 0 | 0 | | |
| 10–15 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[1] N.A. (Not Applicable) indicates that all or major portions of these States are part of the subregion and thus, are not considered as being ''downwind''.

TABLE II–11.—NUMBER OF IMPACTS IN EACH ''DOWNWIND'' STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR ''ALL GRID CELLS''

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Number of Impacts from SubRegion 1** | | | | | | | | | |
| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 4 | 2 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | N.A. | 0 | N.A. | N.A. | N.A. | 1 | 2 | 0 | 1 |
| 5–10 | N.A. | 0 | N.A. | N.A. | N.A. | 6 | 8 | 0 | 0 |
| 10–15 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| >25 | N.A. | 0 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 24 | 0 | 0 | 16 | 35 | 23 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 4 | 2 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 2** | | | | | | | | | |
| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 3 | 13 |
| 5–10 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 14 |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 4 | 15 |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 1 | 5 |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 11 | 0 |
| 5–10 | 9 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 |
| 10–15 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 49 | 0 | 5 | 73 | 69 | 68 | 13 | 41 | 0 |
| 5–10 | 34 | 0 | 5 | 12 | 10 | 3 | 0 | 0 | 0 |
| 10–15 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 5 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 3** | | | | | | | | | |
| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 144 | 1 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 1 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 72 | N.A. | N.A. | 28 | N.A. | 77 | 16 | 103 | 0 |
| 5–10 | 82 | N.A. | N.A. | 70 | N.A. | 84 | 19 | 47 | 0 |
| 10–15 | 37 | N.A. | N.A. | 115 | N.A. | 14 | 1 | 4 | 0 |
| 15–20 | 4 | N.A. | N.A. | 30 | N.A. | 3 | 0 | 0 | 0 |
| 20–25 | 2 | N.A. | N.A. | 6 | N.A. | 0 | 0 | 0 | 0 |
| >25 | 7 | N.A. | N.A. | 3 | N.A. | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 12 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5–10 | 7 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **Number of Impacts from SubRegion 4** | | | | | | | | | |
| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 2 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 14 | 0 |
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 24 | 0 |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 33 | 0 |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 32 | 0 |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 10 | 0 |
| >25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 38 | 82 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 10 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 19 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 9 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 5** | | | | | | | | | |
| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | N.A. | 0 | N.A. | N.A. | 18 | 3 | N.A. | 5 |
| 5–10 | 0 | N.A. | 0 | N.A. | N.A. | 16 | 5 | N.A. | 0 |
| 10–15 | 0 | N.A. | 0 | N.A. | N.A. | 6 | 0 | N.A. | 0 |
| 15–20 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 |
| 20–25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 |
| > 25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | N.A. | 0 | 12 | 19 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | N.A. | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 16 | 0 | 2 | 45 | 9 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 70 | 0 | 0 | 7 | 4 | 1 |
| 5–10 | 0 | 0 | ............... | 151 | 0 | 0 | 16 | 2 | 1 |
| 10–15 | 0 | 0 | ............... | 60 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 6** | | | | | | | | | |
| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | N.A. | 1 | N.A. | N.A. | N.A. |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5–10 | 0 | 0 | 0 | 0 | N.A. | 1 | N.A. | N.A. | N.A. |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | 6 | N.A. | N.A. | N.A. |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | 1 | N.A. | N.A. | N.A. |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. |
| > 25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | N.A. | 0 | 1 | 1 | 0 | 1 | 1 | N.A. | 0 |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 0 | 1 | N.A. | 1 |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 3 | N.A. | 0 |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 1 | N.A. | 0 |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 |
| > 25 | N.A. | 0 | 0 | 0 | 0 | 0 | 7 | N.A. | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 9 | 4 | 15 | 85 | 76 | 4 | 14 | 24 | 0 |
| 5–10 | 93 | 9 | 13 | 61 | 21 | 12 | 3 | 0 | 0 |
| 10–15 | 37 | 0 | 10 | 3 | 4 | 0 | 0 | 0 | 0 |
| 15–20 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 1 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 0 | 0 | 0 | 23 | 2 | 13 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 2 | 0 |
| 10–15 | 0 | 0 | ............... | 6 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 7**

| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 3 | N.A. |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 5 | 0 | 0 | 0 | 0 | 04 | N.A. | N.A. | N.A. |
| 5–10 | 1 | 0 | 0 | 0 | 0 | 01 | N.A. | N.A. | N.A. |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | N.A. | N.A. | 16 | 39 | 77 | 54 | 8 | 32 | 0 |
| 5–10 | N.A. | N.A. | 27 | 56 | 75 | 34 | 4 | 13 | 0 |
| 10–15 | N.A. | N.A. | 20 | 32 | 19 | 9 | 5 | 5 | 0 |
| 15–20 | N.A. | N.A. | 17 | 18 | 10 | 2 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | 6 | 14 | 0 | 0 | 0 | 0 | 0 |
| > 25 | N.A. | N.A. | 13 | 52 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

**Number of Impacts from SubRegion 8**

| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 2 | 0 | 3 | 4 | 0 | 3 | 19 | 5 |
| 5–10 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 28 | 0 | 40 | N.A. | 0 | N.A. | N.A. | 13 | 0 |
| 5–10 | 6 | 0 | 23 | N.A. | 0 | N.A. | N.A. | 18 | 0 |
| 10–15 | 1 | 0 | 5 | N.A. | 0 | N.A. | N.A. | 45 | 0 |
| 15–20 | 1 | 0 | 8 | N.A. | 0 | N.A. | N.A. | 47 | 0 |
| 20–25 | 0 | 0 | 2 | N.A. | 0 | N.A. | N.A. | 7 | 0 |
| > 25 | 0 | 0 | 3 | N.A. | 0 | N.A. | N.A. | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 3 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 9**

| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | N.A. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 2 | 5 | 0 | 5 | 22 | 5 |
| 5–10 | 0 | 2 | 0 | 2 | 4 | 1 | 3 | 24 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 6 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 44 | 0 |
| 5–10 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 32 | 0 |
| 10–15 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 |
| 15–20 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 |
| 20–25 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 |
| > 25 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 28 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 5 | 0 | 0 | 12 | 2 | 1 |
| 5–10 | 0 | 0 | ............... | 17 | 0 | 0 | 11 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 2 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 10**

| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | N.A. | N.A. | N.A. | N.A. | 1 | 0 | 0 | 0 |
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| > 25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

**Number of Impacts from SubRegion 11**

| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 5–10 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| > 25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |

| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 1 | 0 | 11 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | ............... | 38 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 12**

| Impact (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 5–10 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 10–15 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 15–20 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 20–25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| > 25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |

| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | N.A. | N.A. | 8 | 2 | 18 | 0 | 0 | 0 |
| 5–10 | N.A. | N.A. | N.A. | 0 | 0 | 19 | 0 | 0 | 0 |
| 10–15 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |

| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–11.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1 2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 2: 1-HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 207 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | ............... | 56 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | |

1. N.A. (Not Applicable) indicates that all or major portions of these States are part of the subregion and thus, are not considered as being "downwind".
2. Codes for the Great Lakes are: LM-Lake Michigan; LS-Lake Superior; LH-Lake Huron; LE-Lake Erie; LC-Lake St. Clair; LO-Lake Ontario.

TABLE II–12.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 3: 8-HR "VIOLATING COUNTIES"

| Number of Impacts from SubRegion 1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | N.A. | 0 | N.A. | N.A. | N.A. | 9 | 25 | 3 | 5 | | |
| 5–10 | N.A. | 0 | N.A. | N.A. | N.A. | 16 | 5 | 0 | 0 | | |
| 10–15 | N.A. | 0 | N.A. | N.A. | N.A. | 1 | 0 | 0 | 0 | | |
| 15–20 | N.A. | 0 | N.A. | N.A. | N.A. | 6 | 0 | 0 | 0 | | |
| 20–25 | N.A. | 0 | N.A. | N.A. | N.A. | 5 | 0 | 0 | 0 | | |
| >25 | N.A. | 0 | N.A. | N.A. | N.A. | 1 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 1 | 0 | 14 | 1 | 22 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 2** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

TABLE II–12.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 3: 8-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 13 | 7 | | |
| 5–10 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 2 | 3 | | |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 1 | 0 | 0 | 0 | 0 | 0 | 10 | 9 | 1 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 36 | 9 | 42 | 45 | 25 | 19 | 1 | 5 | 0 | 8 | 8 |
| 5–10 | 2 | 0 | 26 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 6 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 3** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 00 | 26 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 28 | N.A. | N.A. | 22 | N.A. | 31 | 8 | 44 | 0 | 12 | 28 |
| 5–10 | 32 | N.A. | N.A. | 35 | N.A. | 38 | 1 | 25 | 0 | 1 | 0 |
| 10–15 | 7 | N.A. | N.A. | 35 | N.A. | 3 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | N.A. | N.A. | 11 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | N.A. | N.A. | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | N.A. | N.A. | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 4** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

TABLE II–12.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 3: 8-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 2 | 0 |
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 11 | 0 | 6 | 20 |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 16 | 0 | 6 | 6 |
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 1 | 17 | 0 | 0 | 4 |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 11 | 0 | 0 | 0 |
| >25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 8 | 17 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 5** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | N.A. | 0 | N.A. | N.A. | 21 | 57 | N.A. | 9 | | |
| 5–10 | 0 | N.A. | 0 | N.A. | N.A. | 64 | 68 | N.A. | 3 | | |
| 10–15 | 0 | N.A. | 0 | N.A. | N.A. | 2 | 10 | N.A. | 0 | | |
| 15–20 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 | | |
| 20–25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 | | |
| >25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | N.A. | 0 | 2 | 3 | 0 | 0 | 1 | 6 | 0 | | |
| 5–10 | N.A. | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 2 | 2 | 71 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 6** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

TABLE II–12.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 3: 8-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 7 | N.A. | 23 | N.A. | N.A. | N.A. | | |
| 5–10 | 0 | 0 | 0 | 4 | N.A. | 20 | N.A. | N.A. | N.A. | | |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| >25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | N.A. | 0 | 0 | 1 | 0 | 9 | 44 | N.A. | 0 | | |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 4 | 29 | N.A. | 0 | | |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 4 | N.A. | 0 | | |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 | | |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 1 | N.A. | 0 | | |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 1 | N.A. | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 42 | 19 | 72 | 44 | 15 | 44 | 1 | 22 | 0 | 0 | 0 |
| 5–10 | 14 | 14 | 53 | 18 | 3 | 2 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 2 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 7** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | N.A. | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | N.A. | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 1 | N.A. | N.A. | N.A. | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | N.A. | N.A. | 57 | 14 | 39 | 36 | 4 | 18 | 0 | 0 | 3 |
| 5–10 | N.A. | N.A. | 66 | 45 | 16 | 16 | 3 | 7 | 0 | 0 | 0 |
| 10–15 | N.A. | N.A. | 30 | 17 | 4 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | N.A. | 4 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | N.A. | N.A. | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–12.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 3: 8-HR "VIOLATING COUNTIES"—Continued

**Number of Impacts from SubRegion 8**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 10 | 0 | 1 | 7 | 1 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 28 | 0 | 12 | N.A. | 0 | N.A. | N.A. | 10 | 0 | | |
| 5–10 | 1 | 0 | 6 | N.A. | 0 | N.A. | N.A. | 12 | 0 | | |
| 10–15 | 1 | 0 | 1 | N.A. | 0 | N.A. | N.A. | 6 | 0 | | |
| 15–20 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 1 | 0 | | |
| 20–25 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| >25 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 13 | 6 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 9**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | 2 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 10 | 18 | 52 | 31 | 23 | 5 | | |
| 5–10 | 0 | 2 | 0 | 9 | 11 | 0 | 2 | 40 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 24 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 14 | 0 | | |
| 5–10 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 5 | 0 | | |
| 10–15 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 15–20 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| 20–25 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| >25 | N.A. | N.A. | N.A. | N.A. | 0 | N.A. | N.A. | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–12.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 3: 8-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 10** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | N.A. | 14 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | N.A. | 4 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | N.A. | N.A. | N.A. | N.A. | 1 | 0 | 0 | 0 | | |
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| >25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 11** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | 0 | 1 | 0 | 9 | 2 | 2 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–12.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE,[1] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 3: 8-HR "VIOLATING COUNTIES"—Continued

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 12** | | | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN | | |
| 2–5 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 5–10 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 10–15 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 15–20 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| 20–25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| >25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | | |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV | | |
| 2–5 | N.A. | N.A. | N.A. | 14 | 7 | 52 | 0 | 0 | 0 | | |
| 5–10 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC | | |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT | NH | ME |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[1] N.A. (Not Applicable) indicates that all or major portions of these States are part of the subregion and thus, are not considered as being "downwind".

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"

| **Number of Impacts from SubRegion 1** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | N.A. | 0 | N.A. | N.A. | N.A. | 10 | 64 | 5 | 39 |
| 5–10 | N.A. | 0 | N.A. | N.A. | N.A. | 20 | 8 | 0 | 0 |
| 10–15 | N.A. | 0 | N.A. | N.A. | N.A. | 5 | 0 | 0 | 0 |
| 15–20 | N.A. | 0 | N.A. | N.A. | N.A. | 11 | 0 | 0 | 0 |
| 20–25 | N.A. | 0 | N.A. | N.A. | N.A. | 10 | 0 | 0 | 0 |
| >25 | N.A. | 0 | N.A. | N.A. | N.A. | 1 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 1 | 0 | 20 | 3 | 36 | 0 | 1 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 01 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 0 | 0 | 24 | 65 | 0 | 64 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 13 | 25 | 3 | 4 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 1 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 2**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 18 | 69 |
| 5–10 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 2 | 39 |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 2 | 0 | 0 | 0 | 0 | 0 | 11 | 20 | 1 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 56 | 11 | 89 | 70 | 34 | 20 | 1 | 9 | 0 |
| 5–10 | 2 | 0 | 46 | 2 | 10 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 7 | 0 | 8 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 9 | 12 | ............... | 1 | 0 | 0 | 0 | 0 | 20 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 32 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 1 | 0 | 17 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 10 | 0 | 1 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 13 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 3**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 25 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 19 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 1 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 82 | N.A. | N.A. | 83 | N.A. | 34 | 16 | 96 | 0 |
| 5–10 | 44 | N.A. | N.A. | 51 | N.A. | 40 | 1 | 30 | 0 |
| 10–15 | 13 | N.A. | N.A. | 41 | N.A. | 4 | 0 | 0 | 0 |
| 15–20 | 1 | N.A. | N.A. | 12 | N.A. | 0 | 0 | 0 | 0 |
| 20–25 | 0 | N.A. | N.A. | 0 | N.A. | 0 | 0 | 0 | 0 |
| >25 | 0 | N.A. | N.A. | 0 | N.A. | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 21 | 84 | ............... | 0 | 0 | 0 | 0 | 0 | 4 |
| 5–10 | 4 | 8 | ............... | 0 | 0 | 0 | 0 | 0 | 6 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 15 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 35 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 8 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 4** | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 42 | 0 |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 38 | 0 |
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 1 | 22 | 0 |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 4 | 15 | 0 |
| >25 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | 12 | 17 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 3 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 10 | 32 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 11 | 42 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 2 | 21 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 5** | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | N.A. | 0 | N.A. | N.A. | 26 | 122 | N.A. | 101 |
| 5–10 | 0 | N.A. | 0 | N.A. | N.A. | 89 | 132 | N.A. | 22 |
| 10–15 | 0 | N.A. | 0 | N.A. | N.A. | 7 | 16 | N.A. | 0 |
| 15–20 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 |
| 20–25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 |
| >25 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 | N.A. | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | N.A. | 1 | 8 | 9 | 0 | 0 | 2 | 19 | 0 |
| 5–10 | N.A. | 0 | 8 | 2 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 20 | 3 | 163 | 4 | 12 | 0 | 0 | 0 | 0 |
| 5–10 | 5 | 0 | 24 | 0 | 1 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 75 | 0 | 32 | 63 | 0 | 54 |
| 5–10 | 0 | 0 | ............... | 86 | 0 | 9 | 31 | 3 | 0 |
| 10–15 | 0 | 0 | ............... | 17 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 6** | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE[1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 7 | N.A. | 31 | N.A. | N.A. | N.A. |
| 5–10 | 0 | 0 | 0 | 4 | N.A. | 31 | N.A. | N.A. | N.A. |
| 10–15 | 0 | 0 | 0 | 0 | N.A. | 1 | N.A. | N.A. | N.A. |
| 15–20 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. |
| 20–25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. |
| >25 | 0 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | N.A. |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | N.A. | 0 | 0 | 1 | 0 | 20 | 70 | N.A. | 0 |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 9 | 47 | N.A. | 0 |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 8 | N.A. | 0 |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | 0 |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 1 | N.A. | 0 |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 1 | N.A. | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 95 | 39 | 92 | 77 | 21 | 47 | 1 | 22 | 0 |
| 5–10 | 46 | 15 | 104 | 20 | 3 | 2 | 0 | 0 | 0 |
| 10–15 | 15 | 2 | 94 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 6 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 52 | 0 | 27 | 51 | 0 | 40 |
| 5–10 | 0 | 0 | ............... | 84 | 0 | 12 | 12 | 0 | 1 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 7**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | N.A. |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | N.A. |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 2 | N.A. | N.A. | N.A. |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | N.A. | N.A. | N.A. |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | N.A. | N.A. | 117 | 18 | 44 | 37 | 7 | 39 | 0 |
| 5–10 | N.A. | N.A. | 120 | 59 | 20 | 17 | 4 | 12 | 0 |
| 10–15 | N.A. | N.A. | 35 | 32 | 18 | 2 | 0 | 0 | 0 |
| 15–20 | N.A. | N.A. | 4 | 31 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | 0 | 12 | 0 | 0 | 0 | 0 | 0 |
| >25 | N.A. | N.A. | 0 | 35 | 0 | 0 | 0 | 0 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 5 | 37 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 8**

| Impacts (ppb) | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 15 | 0 | 1 | 24 | 1 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 53 | 0 | 46 | N.A. | 0 | N.A. | N.A. | 27 | 0 |
| 5–10 | 9 | 0 | 27 | N.A. | 0 | N.A. | N.A. | 79 | 0 |
| 10–15 | 1 | 0 | 2 | N.A. | 0 | N.A. | N.A. | 38 | 0 |
| 15–20 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 21 | 0 |
| 20–25 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 6 | 0 |
| >25 | 0 | 0 | 0 | N.A. | 0 | N.A. | N.A. | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 31 | 8 | 32 | 26 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 9**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | N.A. | 0 | 3 | 5 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 10 | 22 | 70 | 67 | 73 | 26 |
| 5–10 | 0 | 2 | 0 | 21 | 38 | 0 | 2 | 116 | 0 |
| 10–15 | 0 | 0 | 0 | 1 | 9 | 0 | 0 | 57 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 47 | 0 |
| 5–10 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 18 | 0 |
| 10–15 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 0 |
| 15–20 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 0 |
| 20–25 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 0 |
| >25 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 6 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | 0 | 59 | 0 | 0 | 6 | 3 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Number of Impacts from SubRegion 10**

| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
|---|---|---|---|---|---|---|---|---|---|
| 2–5 | 0 | N.A. | 3 | 14 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | N.A. | 14 | 4 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | N.A. | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | N.A. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 4 | N.A. | N.A. | N.A. | N.A. | 6 | 0 | 0 | 0 |
| 5–10 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 10–15 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 15–20 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| 20–25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| >25 | 0 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 11** | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 5–10 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| >25 | N.A. | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | 0 | 1 | 0 | 15 | 2 | 2 | 0 | 6 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 6 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ≤ 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Impacts from SubRegion 12** | | | | | | | | | |
| Impacts (ppb): | AR | LA | TX | OK | KS | NE | SD | ND | MN |
| 2–5 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 5–10 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 10–15 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 15–20 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| 20–25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| >25 | 0 | 0 | 0 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| | IA | MO | WI | IL | IN | MI | OH | KY | WV |
| 2–5 | N.A. | N.A. | N.A. | 17 | 7 | 74 | 0 | 6 | 0 |
| 5–10 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | N.A. | N.A. | N.A. | 0 | 0 | 0 | 0 | 0 | 0 |
| | TN | MS | AL | GA | FL | SC | NC | VA | DC |
| 2–5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE II–13.—NUMBER OF IMPACTS IN EACH "DOWNWIND" STATE [1,2] BY IMPACT CONCENTRATION RANGE FOR EACH SUBREGION—APPROACH 4: 8–HR "ALL GRID CELLS"—Continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MD | DE | PA | NJ | NY | CT | RI | MA | VT |
| 2–5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NH | ME | blank | LM | LS | LH | LE | LC | LO |
| 2–5 | 0 | 0 | ............... | 125 | 0 | 0 | 6 | 0 | 0 |
| 5–10 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–15 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–20 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| 20–25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |
| >25 | 0 | 0 | ............... | 0 | 0 | 0 | 0 | 0 | 0 |

[1] N.A. (Not Applicable) indicates that all or major portions of these States are part of the subregion and thus, are not considered as being "downwind".

[2] Codes for the Great Lakes are: LM—Lake Michigan; LS—Lake Superior; LH—Lake Huron; LE—Lake Erie; LC—Lake St Clair; LO—Lake Ontario.

TABLE II–14a.—PERCENT OF 2007 STATE TOTAL $NO_X$ EMISSIONS BY SUBREGION

| | Percent of State Emissions in Each Subregion | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SUBR–1 | SUBR–2 | SUBR–3 | SUBR–4 | SUBR–5 | SUBR–6 | SUBR–7 | SUBR–8 | SUBR–9 | SUBR–10 | SUBR–11 | SUBR–12 | OTHER |
| TX | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 | .......... | .......... |
| OH | .......... | 33.30 | .......... | .......... | .......... | 66.70 | .......... | .......... | .......... | .......... | .......... | .......... | .......... |
| PA | .......... | 0.30 | 79.05 | 20.61 | .......... | 0.04 | .......... | .......... | .......... | .......... | .......... | .......... | .......... |
| IL | 49.45 | .......... | .......... | .......... | 50.53 | .......... | .......... | .......... | .......... | .......... | .......... | 0.02 | .......... |
| FL | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 | .......... | .......... | .......... |
| LA | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 40.99 | 59.01 | .......... | .......... |
| MI | 8.68 | 83.32 | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 8.00 |
| IN | 28.70 | 7.03 | .......... | .......... | 41.68 | 22.59 | .......... | .......... | .......... | .......... | .......... | .......... | .......... |
| TN | .......... | .......... | .......... | .......... | 16.71 | 10.09 | .......... | 0.63 | 72.58 | .......... | .......... | .......... | .......... |
| GA | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 6.47 | 74.19 | 19.34 | .......... | .......... | .......... |
| NY | .......... | .......... | 31.09 | 49.56 | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 19.35 |
| KY | .......... | .......... | .......... | .......... | 39.00 | 61.00 | .......... | .......... | .......... | .......... | .......... | .......... | .......... |
| AL | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 73.40 | 26.60 | .......... | .......... | .......... |
| NC | .......... | .......... | .......... | .......... | .......... | 0.74 | 13.14 | 78.04 | 8.08 | .......... | .......... | .......... | .......... |
| VA | .......... | .......... | .......... | .......... | .......... | 7.72 | 92.20 | .......... | .......... | .......... | .......... | .......... | 0.08 |
| WV | .......... | .......... | 3.70 | .......... | .......... | 74.64 | 21.66 | .......... | .......... | .......... | .......... | .......... | .......... |
| NJ | .......... | .......... | 0.81 | 98.98 | .......... | .......... | 0.21 | .......... | .......... | .......... | .......... | .......... | .......... |
| MO | .......... | .......... | .......... | .......... | 43.60 | .......... | .......... | .......... | 0.61 | .......... | .......... | 55.78 | .......... |
| OK | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 86.99 | 13.01 | .......... |
| KS | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 | .......... |
| SC | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 93.12 | 6.44 | 0.43 | .......... | .......... | .......... |
| MS | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 49.69 | 45.56 | 4.75 | .......... | .......... |
| WI | 87.53 | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 6.02 | 6.45 |
| MD | .......... | .......... | 3.11 | 0.48 | .......... | .......... | 96.12 | .......... | .......... | .......... | .......... | .......... | 0.29 |
| MN | 0.30 | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 99.70 | .......... |
| IA | 22.97 | .......... | .......... | .......... | 2.73 | .......... | .......... | .......... | .......... | .......... | .......... | 74.30 | .......... |
| MA | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 |
| AR | .......... | .......... | .......... | .......... | 0.40 | .......... | .......... | .......... | 10.54 | .......... | 85.36 | 3.71 | .......... |
| NE | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 | .......... |
| CT | .......... | .......... | .......... | 96.60 | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 3.40 |
| ME | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 |
| NH | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 |
| DE | .......... | .......... | 33.57 | 23.69 | .......... | .......... | 42.74 | .......... | .......... | .......... | .......... | .......... | .......... |
| SD | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 | .......... |
| RI | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 |
| VT | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 |
| ND | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 | .......... |
| DC | .......... | .......... | .......... | .......... | .......... | .......... | 100.00 | .......... | .......... | .......... | .......... | .......... | .......... |

TABLE II–14b.—PERCENT 2007 BASELINE $NO_X$ Emissions by Subregion, by State

| Subregion/State | Percent of subregion total $NO_X$ |
|---|---|
| 1: | |
| Illinois | 39.50 |
| Indiana | 19.49 |
| Iowa | 5.63 |
| Michigan | 6.39 |
| Minnesota | 0.07 |
| Wisconsin | 28.90 |
| Percent of Domain Total | 6.21 |
| 2: | |
| Indiana | 4.69 |
| Michigan | 60.19 |
| Ohio | 27.60 |
| Pennsylvania | 0.23 |
| Canada | 7.29 |
| Percent of Domain Total | 6.34 |
| 3: | |
| Delaware | 2.27 |
| Maryland | 0.92 |
| New Jersey | 0.34 |
| New York | 18.62 |
| Pennsylvania | 66.51 |
| West Virginia | 1.69 |
| Canada | 9.63 |
| Percent of Domain Total | 5.91 |
| 4: | |
| Connecticut | 12.15 |
| Delaware | 1.55 |
| Maryland | 0.14 |
| New Jersey | 40.56 |
| New York | 28.79 |
| Pennsylvania | 16.81 |
| Percent of Domain Total | 6.09 |
| 5: | |
| Arkansas | 0.08 |
| Illinois | 34.35 |
| Indiana | 24.09 |
| Iowa | 0.57 |
| Kentucky | 17.42 |
| Missouri | 14.04 |
| Tennessee | 9.45 |
| Percent of Domain Total | 7.30 |
| 6: | |
| Illinois | 0.00 |
| Indiana | 10.45 |
| Kentucky | 21.80 |
| North Carolina | 0.25 |
| Ohio | 38.39 |
| Pennsylvania | 0.02 |
| Tennessee | 4.57 |
| Virginia | 2.39 |
| West Virginia | 22.12 |
| Percent of Domain Total | 9.12 |
| 7: | |
| Delaware | 3.06 |
| District of Col | 2.01 |
| Maryland | 30.20 |
| New Jersey | 0.09 |
| North Carolina | 7.34 |
| Pennsylvania | 0.00 |
| Virginia | 46.78 |
| West Virginia | 10.50 |
| Percent of Domain Total | 5.57 |
| 8: | |
| Georgia | 5.05 |
| North Carolina | 51.88 |
| Pennsylvania | 0.00 |
| South Carolina | 42.52 |
| Tennessee | 0.55 |
| Percent of Domain Total | 4.69 |
| 9: | |
| Alabama | 24.11 |
| Arkansas | 1.55 |
| Georgia | 28.23 |
| Louisiana | 0.00 |
| Mississippi | 10.71 |
| Missouri | 0.15 |
| North Carolina | 2.62 |
| South Carolina | 1.44 |
| Tennessee | 31.20 |
| Percent of Domain Total | 9.61 |
| 10: | |
| Alabama | 8.90 |
| Florida | 50.02 |
| Georgia | 7.50 |
| Louisiana | 19.91 |
| Mississippi | 10.00 |
| South Carolina | 0.10 |
| Off Shore | 3.57 |
| Percent of Domain Total | 9.43 |
| 11: | |
| Arkansas | 7.96 |
| Louisiana | 17.88 |
| Mississippi | 0.65 |
| Oklahoma | 13.09 |
| Texas | 57.47 |
| Off Shore | 2.95 |
| Percent of Domain Total | 15.11 |
| 12: | |
| Arkansas | 0.67 |
| Illinois | 0.02 |
| Iowa | 14.52 |
| Kansas | 27.99 |
| Minnesota | 19.95 |
| Missouri | 16.82 |
| Nebraska | 9.96 |
| North Dakota | 1.47 |
| Oklahoma | 3.79 |
| South Dakota | 3.22 |
| Wisconsin | 1.58 |
| Percent of Domain Total | 17.80 |

**Table II–15.—Estimate of Local Control Cost Avoided by OTAG Strategy [1, 2]**

23–Jurisdictions VOC Emission Reductions Avoided: 513,000 (tpy)

Low-end Local VOC Removal Cost per ton: $2,400 (Average cost of local VOC measures selected in RIA)

High-end Local VOC Removal Cost per ton: $10,000 (Integrated Implementation Plan limit)

23–Jurisdictions $NO_X$ Emission Reductions Avoided: 767,000 (tpy)

Low-end Local $NO_X$ Removal Cost per ton: $2,200 (Average cost of local VOC measures selected in RIA)

High-end Local $NO_X$ Removal Cost per ton: $10,000 (Integrated Implementation Plan limit)

23—Jurisdiction Local VOC Removal Cost Avoided (million 1990$): Low-end $1,231; High-end $5,131

23—Jurisdiction Local $NO_X$ Removal Cost Avoided (million 1990$): Low-end $1,687; High-end $7,671

23—Jurisdiction Total Removal Cost Avoided (million 1990$): Low-end $2,918; High-end $12,802

**BILLING CODE 6560–50–M**

[1] The emission reductions avoided are assessed assuming a slightly different regional $NO_X$ strategy than the strategy analyzed in this notice. However, the results here are nonetheless illustrative of the potential savings associated with a similar regional $NO_X$ strategy.

[2] To inflate cost estimates, use CPI inflator: 1990 to 1995=1.17; 1990 to 1996=1.20

**Appendix D—Figures for Section II.**

**Weight of Evidence Determination of Significant Contribution**

*Figure II–1. OTAG Modeling Domain.*

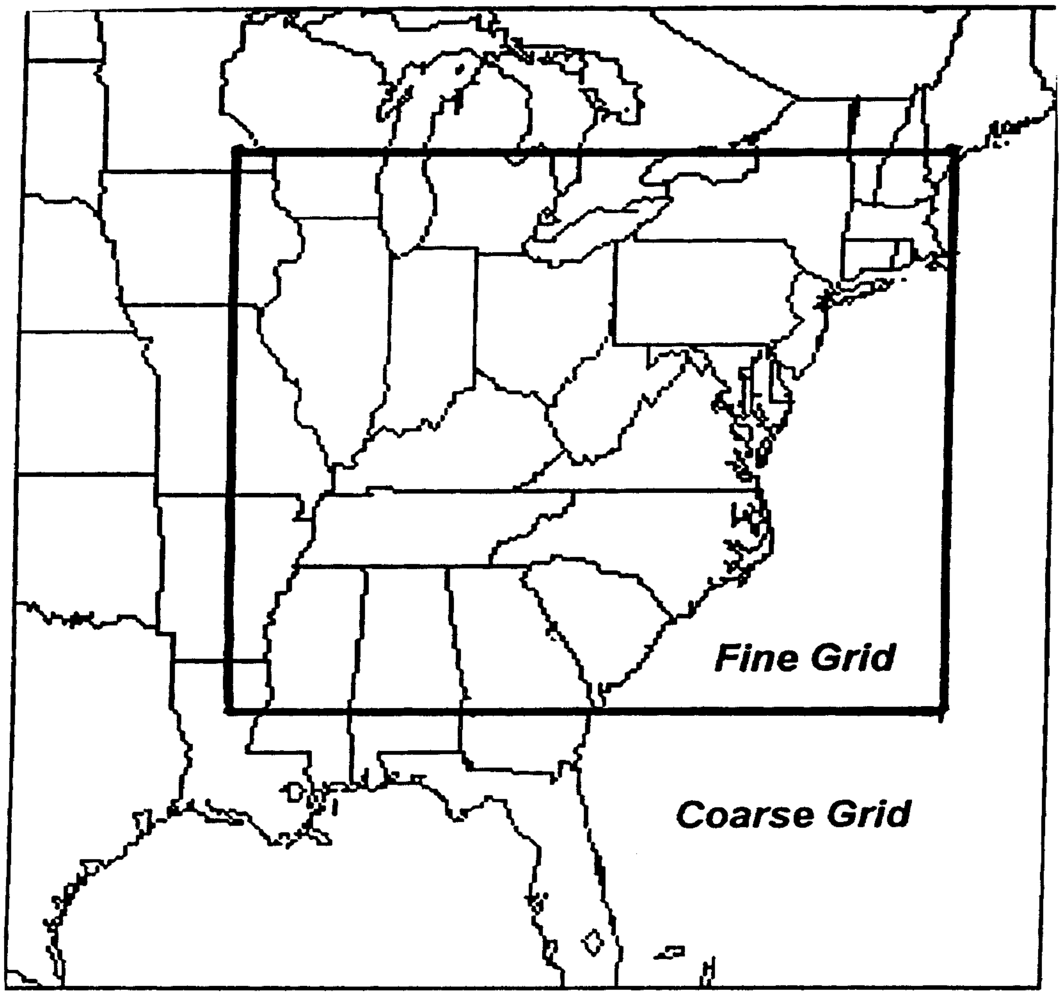


*Figure II–2.—Location of Subregions.*

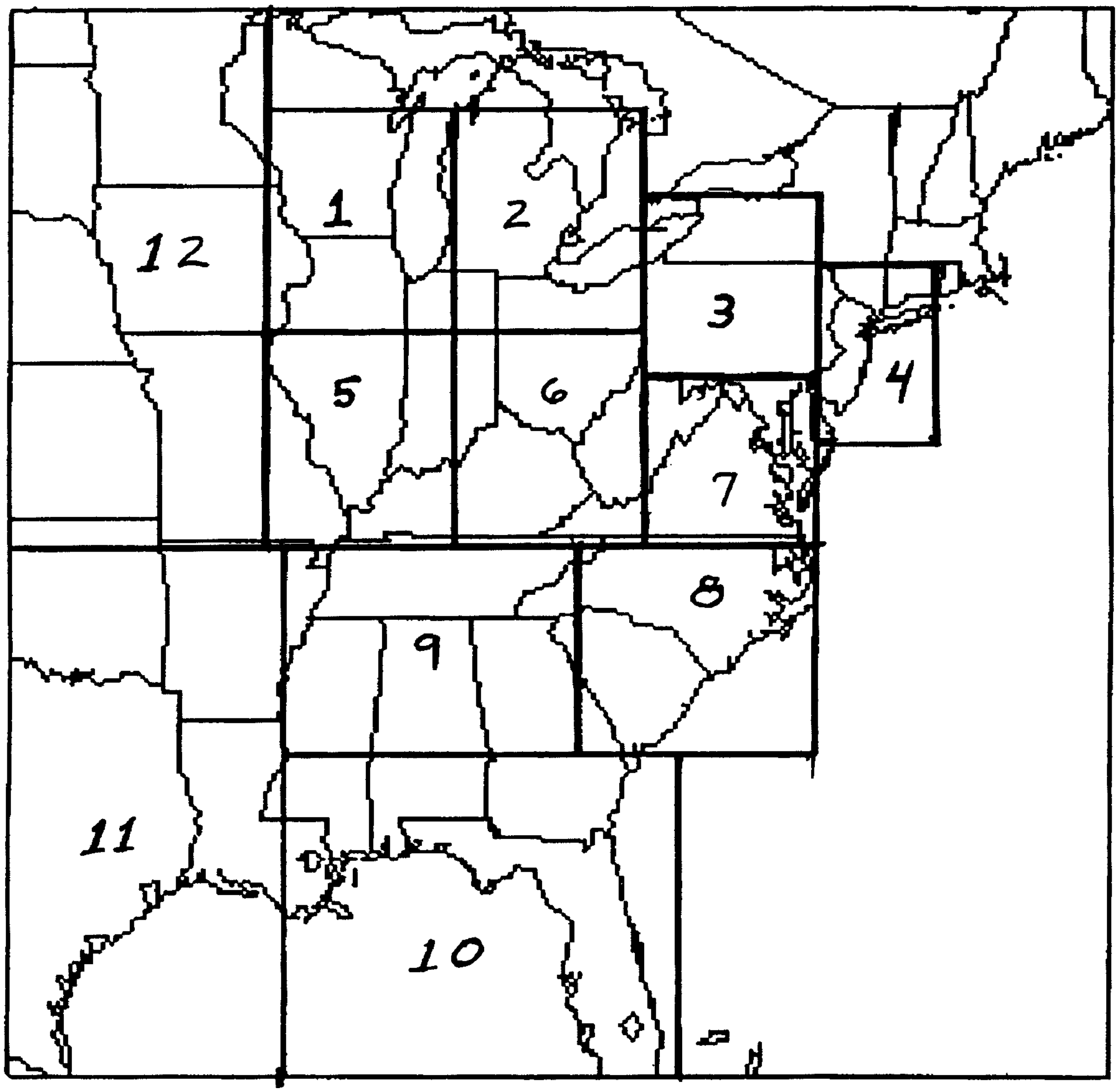


*Figure II–3.—OTAG Round 3 Geographic Zones (shaded areas are 3 ''major'' nonattainment areas).*

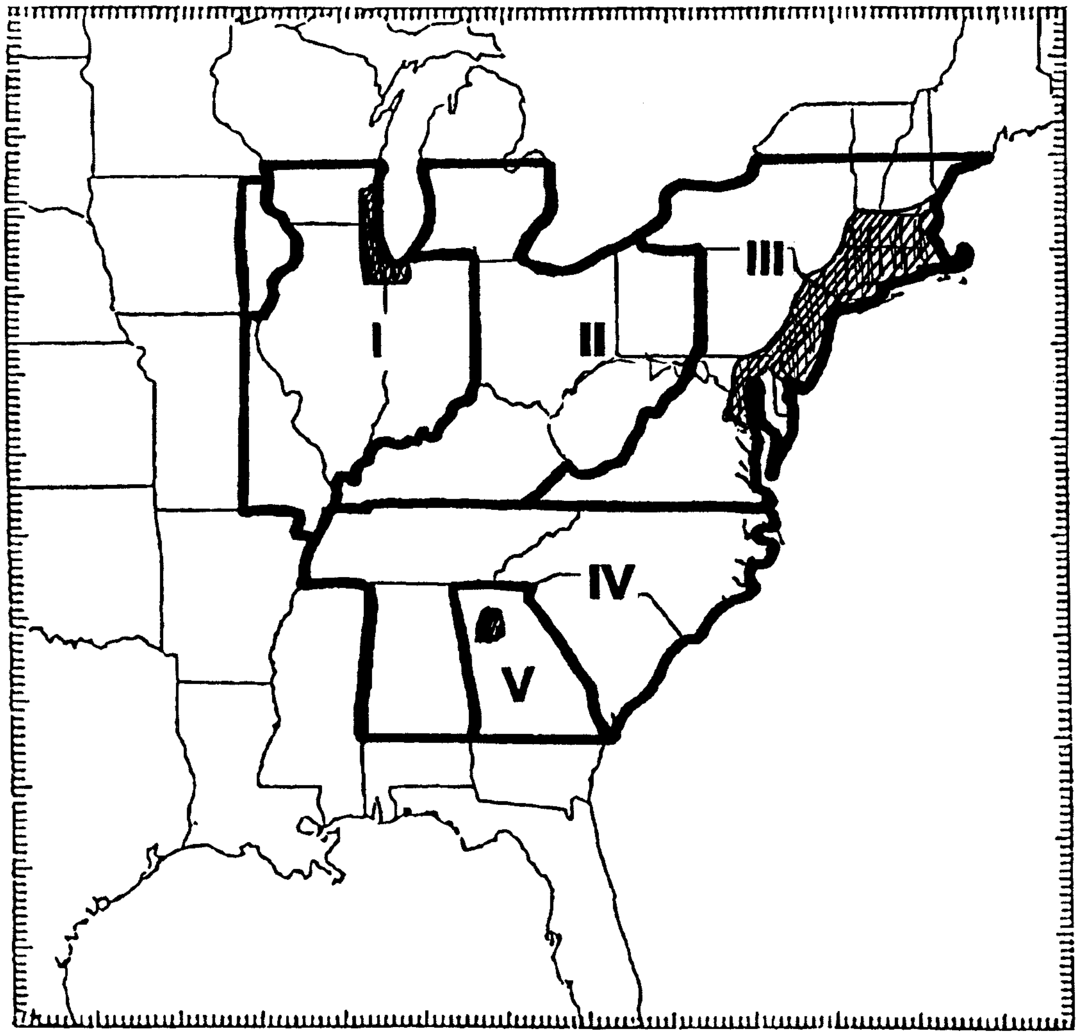
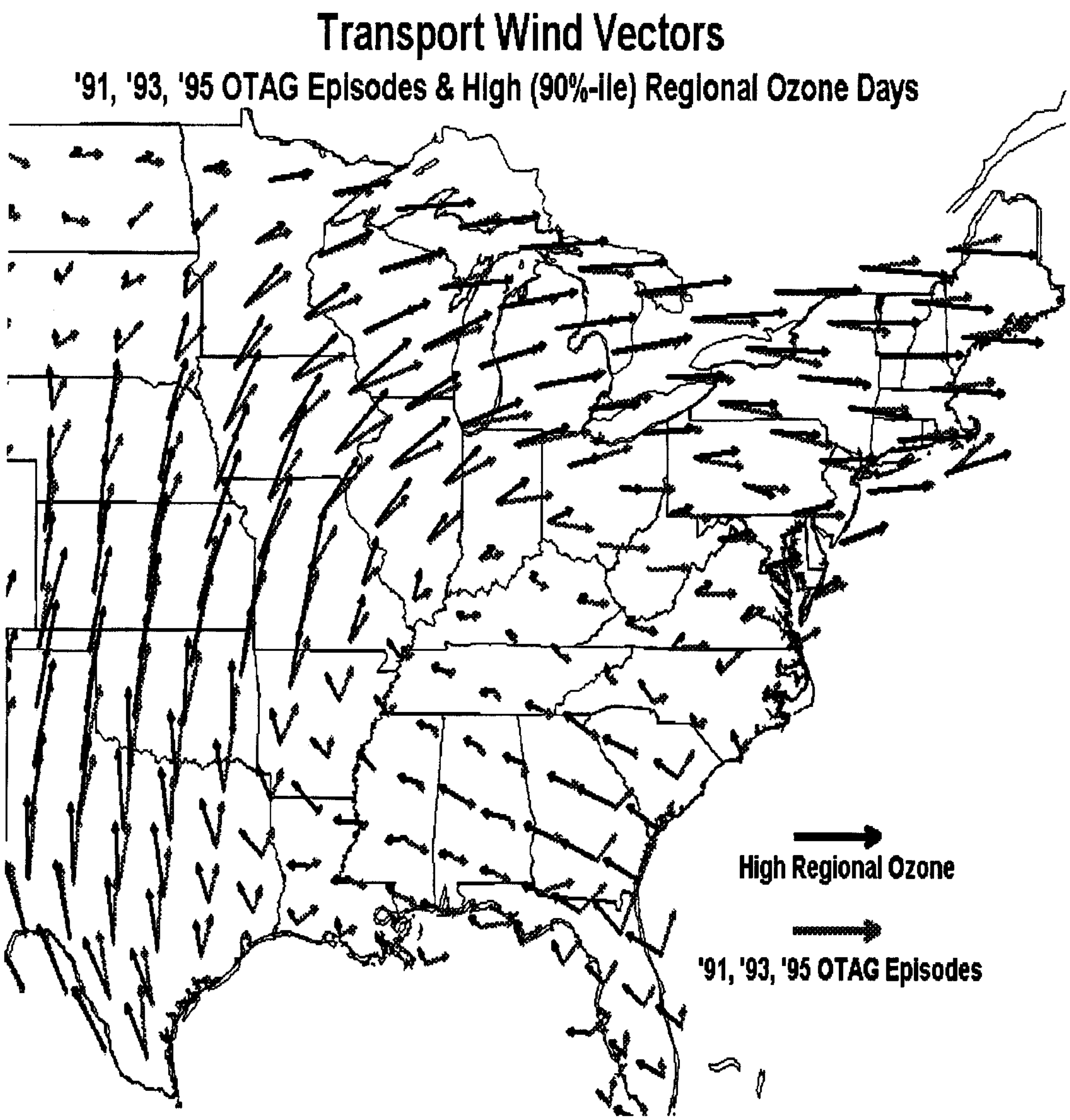


*Figure II–4.—Transport Wind Vectors During Regionally High Ozone Days.*

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**Appendix E—Control Strategies Contained in Model Run 5 of the Ozone Transport Assessment Group**

*Utility*

Mandated CAA controls

- Acid Rain Controls (Phase 1 & 2 for all boiler types)
- RACT & NSR in nonattainment areas (NAAs) without waivers

Additional controls

- OTC $NO_X$ MOU (Phase II)
- 85 percent reduction from 1990 rate or rate-base of 0.15 lb/mmbtu for all units, whichever is less stringent

*Non-Utility Point Sources*

Mandated CAA controls

- RACT at major sources in NAAs without waivers
- 250 Ton PSD and NSPS (not modeled)
- NSR in NAAs without waivers (not modeled)
- CTG & Non-CTG RACT at major sources in NAAs & throughout OTC
- New Source LAER & Offsets for NAAs (not modeled)
- ''9 percent by 99'' ROP Measures (VOC or $NO_X$) for serious and above areas

Additional controls

- $NO_X$ Controls based on cost per ton of reduction (< $1,000 per ton)—primarily LNB technology

*Nonroad Mobile*

Mandated CAA controls

- Federal Phase II Small Engine Standards
- Federal Marine Engine Standards
- Federal HDV (>=50 hp) Standards—Phase 1
- Federal RFG II (statutory and opt-in areas)
- 9.0 RVP maximum elsewhere in OTAG
- ''9 percent by 99'' ROP Measures(VOC or $NO_X$) for serious and above areas

Additional controls

- Federal Locomotive Standards (including rebuilds)
- HD Engine 4gm Standard

*Highway Mobile*

Mandated CAA controls

- Tier 1 light-duty and heavy-duty Standards
- Federal reformulated gas (RFG II) (statutory and opt-in areas)
- High Enhanced I/M (serious and above areas)
- Low Enhanced I/M for rest of OTR
- Basic I/M (mandated areas)
- Clean Fuel Fleets (mandated areas)
- 9.0 RVP maximum elsewhere in OTAG
- On board vapor recovery

Additional controls

- National LEV
- Heavy Duty Vehicle 2 gm Standard
- Federal Test Procedure (FTP) revisions
- ''9 percent by 99'' ROP Measures (if substitute for VOC) in serious and above areas

*Other Area Source Controls*

Mandated CAA controls

- Two Phases of Consumer & Commercial Products & One Phase of Architectural Coatings
- Stage 1 & 2 Petroleum Distribution Controls—NAAs
- Autobody, Degreasing & Dry Cleaning Controls in NAAs
- ''9 percent by 99'' ROP Measures (VOC or $NO_X$) (serious and above areas)

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